

2014 ASCFG CUT F

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This year's Trials could be summarized by the phrase "back to basics", since all the cultivars tested were typical specialty cut flowers: aster, celosia, delphinium, ornamental cabbage, marigold, snapdragon, sunflowers, and zinnias.

A classic garden plant and cut flower, marigolds are native to the Americas and have a long, rich history. Marigolds were used by the Aztec people, who also began breeding and selecting types for larger flowers. After Spanish explorers brought marigolds back to Europe, they became established there. Two main categories exist: "French", for the dwarf, "crested" types, and "African" for the tall, large-flowered types. The popularity of marigolds spread to Asian countries, where they became important in religious ceremonies and weddings. Back in Mexico and Latin America, marigolds became popular in All Saints Day and All Souls Day celebrations, October 31 to November 2.

Why has the marigold become so popular around the world? It has large, bright yellow to orange flowers, is easy to grow, and produces a ton of flowers—the same characteristics that make it a great cut flower. Of course, every cut flower has a drawback and for the marigold, it is the fragrance, or smell, as some members of our research group describe it. Some people love it and some hate. The scent/odor is most obvious during cutting when harvesters are enveloped in it. However, the fragrance is much milder and enjoyed by some when marigold flowers are used in arrangements and mixed into bouquets.

Of the five marigold cultivars in the trials, all from AmeriSeed, the highest ranked cultivar was

'Jedi Deep Gold' for its yellow-orange color, large flowers, and productivity—an average of 14 stems per plant with trialers reporting anywhere from 6 to 22 stems harvested per plant. Trialers also reported an excellent vase life of 11 days, and stem length averaged 18 inches, with a range of 12 to 36 inches. The other four cultivars, 'Babuda Gold', 'Babuda Yellow', 'Jedi Gold', and 'Optiva Orange', were also very productive and produced similar stem lengths. 'Jedi Gold' had strong stems at our trials, but the color was only a shade lighter than "Jedi Deep Gold". One trialer called both Jedi cultivars a "workhorse flower in bouquets".

One of the mainstays of cut flower production, the zinnia's broad range of colors has made it a versatile and popular cut. We have trialed many new zinnia cultivars over the years and this year we had one of the most distinctive series seen in the trials. The elongated disk florets characteristic of the Cupcake series (Gro N' Sell/Floragran) create a very different look. Vase life was good and plants were productive. Unfortunately, the "cupcaking" trait showed up in only a small percentage of the flowers. The majority of the blooms were attractive, but unexceptional, single flowers. The other potential problem is that the flowers were small, smaller even than the Oklahoma series. This flower type is available under other names in the trade at other companies. So, is it a good cut flower? Let's say it is a great start. If the cupcaking trait could be made more prevalent and/or the flower size increased, it would be a blockbuster. At this point it is a lovely curiosity that will work for some growers.

LOWER SEED TRIALS

All three celosias in the trial were uniform and very productive, producing an average of 10 or more stems that were 18 inches or longer. ‘Sunday Yellow’ (Kieft Pro-Seed) was the top scoring cultivar with a plume color variously described as shimmery yellow or light orange. While some growers wished the stems were longer, another grower wrote that his problem with it was that he “didn’t have enough”. The companion cultivar ‘Sunday Orange’ was awarded the ASCFG Fresh Cut Flower of the Year last year. ‘Celway Red’ and ‘Celway White’ (Kieft Pro-Seeds) had smaller plumes that were closer in style to wheat celosia. ‘Celway Red’ was a knockout with its rich rosy-red color and burgundy foliage. The “neutral” color of ‘Celway White’ was a positive for many trialers, less so for others that noted the heads turned brown too quickly.

Would it be an ASCFG National Cut Flower Trials without sunflowers? Well, we won’t have to answer that question for at least one more year. There were two classically colored sunflower cultivars in the trials this year: ‘Jua Maya’ and ‘Jua Inca’ (PanAmerican Seed). ‘Jua Maya’ had dark brown centers with golden yellow petals, and ‘Jua Inca’ was a golden/rusty bicolor with brown centers. Both were uniform, consistent, fast to flower, and not sensitive to short days, according to Chris Wien, Cornell University, who performs the sunflower photoperiod testing. Flower heads were small to medium size on short stems—short for a sunflower anyway. Trialers recorded stems lengths of 24 to 63 inches, with an average of 30 to 34 inches. In the olden days, we would have

heralded two cultivars that were so good, but these days with many excellent cultivars available, it is harder to get noticed.

We had only one snapdragon cultivar in the trials this year—‘Calima Deep Pink’ from Sakata. The cultivar was a “beautiful bubblegum pink color” according to one trialer, and it had strong stems, averaging 18 inches, with some trialers getting up to 32-inch long stems. Many growers grew them as single stems, and others pinched to get up to 14 stems per plant.

Asters are a difficult field crop for many growers due to their sensitivity to aster yellows disease, which is mainly a problem in the center of the United States, and exacting photoperiod requirements—long days followed by short days. So it was nice to see an aster, ‘Bonita Light Blue’ (Sakata), score so well in the trials. One trialer stated that it was the “best plant in the trial”. Trialers reported an average of 7 stems per plant, but the number includes some who harvested the whole plant as one stem, and others who got up to 16 stems per plant. A couple of trialers also commented that they not only cut multiple stems per plant, but all at the same time. Stem length ranged from 10 to 36 inches, with an average of about 20 inches, very nice for a field aster. To prevent aster yellows, one trialer reported excellent results by covering the plants with row cover to prevent leafhoppers, which transmit the disease, and then taking off the cover just as the plants started to flower.

In summary, we had 21 cultivars from five companies. Based on trial results, the top five commercially available performers are automatically nominated for the ASCFG Cut Flower of the Year. The rankings are based on the combined ratings score: market appreciation + repeat again + ease of cultivation. Thus, from the 2014 trials, aster ‘Bonita Light Blue’, celosia ‘Celway Red’ and ‘Sunday Yellow’, marigold ‘Jedi Deep Gold’, and zinnia ‘Queen Lime’ are nominated for the Cut Flowers of the Year and will join other nominations from ASCFG members.

Interpreting the trial results: The numbers reported are averages of all the respondents. Many factors will affect the success of any plant species. Our participants are growing and harvesting the trial plants in a wide variety of ways. After looking at the average, check the range of responses listed below each number to see how the cultivar performed at its best and its worst. If the range of responses in the ratings is narrow and high, i.e., 3-5 or 4-5, the plant was a winner for most of the respondents and is likely to do well for you. The ‘Repeat Again Rating’ is particularly important because it indicates if the trialer would take the time, money, and space to actually grow the cultivar again. Review the trial results carefully. If a cultivar sounds interesting but did not appear to do well, try it anyway. The cultivar may work well for you.

Acknowledgments: A hearty thank you to all of the 18 evaluators who returned their trial reports, and to the seed companies for providing such great cultivars. Congratulations to Nanette Dietmeyer for being the first trialer to return the evaluations. We would also like to thank Kendyl Finley, Logan Haislip, and Christiane Martins for assisting with the NCSU trials. In preparing the report we did a bit of editing of the comments for space and clarity; apologies if we’ve altered the tone or content of anyone’s comments.

PARTICIPATING SEED COMPANIES

AMERISEED
Lompoc, California
www.ameriseed.com

GRO ‘N SELL FLORAGRAN
Chalfont, Pennsylvania
www.gro-n-sell.com

KIEFT-PRO-SEEDS
Venhuizen, Netherlands
www.kieft-pro-seeds.com

PANAMERICAN SEED
West Chicago, Illinois
www.panamseed.com

SAKATA SEED
Morgan Hill, California
www.sakata.com

PARTICIPATING GROWERS

CYNTHIA ALEXANDER
Quarry Flower Farm
Celina, Texas

LEON CARRIER
PlantMasters
Laytonsville, Maryland

TANIS CLIFTON
Happy Trails Flower Farm
Dennis, Mississippi

CONNIE DAM-BYL
William Dam Seeds
Dundas, Ontario

NANETTE DIETMEYER
Fox Ridge Flowers
Buckner, Kentucky

DAVE DELBO
Dave’s Flowers
Elysburg, Pennsylvania

MICHELLE ELSTON
Roots
Carlisle, Pennsylvania

PEGGY HUFF
Johnny’s Selected Seeds
Winslow, Maine

BARB JEWELL
Island Meadow Farms
York, Prince Edward Island

INGRAM MCCALL
JOHN DOLE
North Carolina
State University
Raleigh, North Carolina

CARRIE MCCANN
Fernrock Farm
Hillsborough, North
Carolina

JOHN MILLIGAN
Prickly Pair Farm
Round Rock, Texas

LYNN RAPP
Cultivating Joy
Oreland, Pennsylvania

CAROLYN SNELL
Carolyn Snell Designs
Bar Mills, Maine

RODGER TSCHANZ
University of Guelph
Trial Garden
Guelph, Ontario

CHERYL WAGNER
Wagner’s
Homestead Farm
Belleville, Michigan

CHRIS WIEN
Cornell University
Ithaca, New York

SUSAN WRIGHT
Shady Grove Gardens
Vilas, North Carolina

SUMMARY OF COMMENTS

The number in a parenthesis refers to the number of respondents who made the comment. If no number is present, only one person made the comment. Comments by each individual are separated with a semicolon (;). Note: many respondents did not make specific comments on each cultivar and in some cases, comments have been shortened because of limited space.

ASTER

Aster 'Bonita Light Blue' (Sakata)

Good Qualities: Good color (5), different than other darker blues; Long, strong stems (3); Uniform flowering bloom time, spray habit; Good double flowers, even colour; Healthy plants, only one wilted, can cut the entire plant, used a lot in bouquet work and arrangements, liked the shape, size, and colour of this aster, plan to grow in 2015, really like this series from Sakata; Taller than Matsumoto, can harvest whole plant as one branchy spray; Gave a "pop" to mixed bouquets.

Problems: Aster yellows (2); Most plants died in the field, it's too hot here; Bug and disease problems, must be grown covered here; I did not have a good germination rate with this plant, I did not get any seedlings that lasted long enough to plant; Aster rust. **Similar Cultivars:** 'Matsumoto Light Blue' (4); Other Bonita colors.

Postharvest Recommendations: Clean water, fresh cut (2); Flower preservative and cold water.

Comments: Best plant in the trial (2), florists loved them, cut whole plant at one time, already had seed ordered to grow this variety, I will definitely grow again; Covered the asters with row cover to prevent disease spread by leafhopper, I took the cover off just as they started to bloom and had excellent cut flowers; 6 x 6 inch spacing; We cut the whole plant, so that is why we only listed one stem, the colour seems deep for a light blue, but we were cutting it as the days got cooler, which might affect the shade, sadly, the deer also enjoyed this variety; Would make several sowings to extend the bloom period; Nice aster!; Nice

addition to bouquets, like the branching of the plant, full branches fill up a bouquet quickly; Never grew to fruition, succumbed to aster yellows; I did not use any different techniques with these seeds so I'm not sure if I had bad seeds or what.

CABBAGE

Cabbage 'White and Pink Center' (Sakata)

Good Qualities: Strong stems (3); Good germination rate (3); Color (3); Very useable size (3), other flowering cabbage I have grown have been too large to use in arrangements; Vigour, liked the interesting markings and the different, oblong-shaped central leaves, definitely a change from the usual Crane varieties, not as much insect damage with this variety compared to 'Lucir', the latter must be "very tasty"! significant insect damage on it, but it has some lovely traits; Late season, long vase life, ease of growing; Sort of a tie-dyed look, great for fall bouquets, arrangements, centerpieces; Sturdy growth.

Problems: Cabbage worms (4); Other cut flower kale varieties we have in trial are nicely flowered, but this variety has mostly cabbage-like heads; This cabbage is taking WAY longer to color up (over a month longer) than the Crane series and 'Lucir White', to date (11/4) we still have no pink color despite many nights at 38-40 degrees in the high tunnel, all other cabbages have had good color for over 3 weeks; Would have liked longer stems, have had the same problem when I've grown other cabbage cut flower types, the heads are large and I find it difficult to use too many in a mixed bouquet; Not really a problem but I did find this variety grew a lot larger than the other varieties I typically grow, they seemed to be extra large, which is fine if that's what you are needing, they were planted the same close spacing as the others, and they still grew bigger than I would feel comfortable putting into a bouquet, both the top bloom and the stem diameter, therefore I would recommend it for larger arrangements, will probably grow again as I enjoyed the change in foliage; Direct sown late in the season, never showed



Aster 'Bonita Light Blue'
photo by *Christiane Martins*

pink, just white centers, even with very cold weather, needs two levels of support, planted one per six-inch square caused large flower heads, plant 2 or 3 per square; Eaten by animals; Ours were a bit short, but we planted them in our later planting of kales, and they still got nice sized (medium) heads on them; We planted them at 6 x 6 inch spacing, but still had 43% forming heads, color development was late or not at all, those that showed a little white had no pink color developing, other varieties like 'Lucir White' and 'Lucir Red' had no problem forming good color in the same trial.

Similar Cultivars: Crane Bicolor. **Postharvest Recommendations:** Chrysal OVB; Flower preservative and cold water; Plain water; Clean cut, fresh water, remove outer leaves if beginning to yellow; Chlorine pill to minimize odor. **Comments:** I accidentally planted the seedlings in the hoophouse, they grew very well but since I don't use any pesticides, the bugs demolished them, and I wasn't able to use any of them; Grew in high tunnel with all other cabbages on 6-inch spacing; Started seed 7/15, bumped to 72 tray on 7/22, transplanted to hoophouse with shade cover in August to prevent cabbage worm problems, they did not put on

much growth even when days became short, maybe a soil problem, fertility, not sure, no harvest; Nice addition to bouquets, color was nice; Will grow again, but will watch spacing very closely to avoid large bloom and keep fertilizer at a minimum; As of October 12, no pink center, leaves turned more of a light yellow instead of white, still nice coloring; Great plant except for lack of pink center coloration; Transplanted 9/9/14 at 6 x 6 in. but no useable stems; Would like to give this another try and see what it looks like; Nice kale!

CELOSIA

Celosia 'Celway Red' (Kieft-Pro-Seed)

Good Qualities: Great colour, deep pinky-red (8); Good branching structure (3); Strong stems (3); Productive (2); Good filler flower (2); Generous stem length and abundance of blooms, found 'Celway Red' very useful, a consistent go-to in bouquet making, lasting well



Celosia 'Celway Red'

both in the field and bouquet; Great foliage color; Very uniform maturity, fast from transplant to harvest (plant in field 6/23, harvest 8/18); Modest size for smaller bouquets if pinched; Dark red stems and leaves; Mid height plants; Stem length, great for drying and mixed bouquets; Long vase life, interesting "spiky" texture, florists like unique texture and color.

Problems: Didn't seem to last as long as my other celosia in the field; Over very fast - all ready at same time so needs to be used within one week, lower part turns brown if not harvested at optimum time, side shoots are too short for our use, pinching may produce more uniform, usable stems; Poor germination, fungal disease; Nice color, but burgundy, not red; Not a clear red, more of a dark red; The relatively thin plume-type flower is not impressive, stem length could be longer; Very short.

Similar Cultivars: Other Celway cultivars
Postharvest Recommendations: Remove leaves (2); I do not put my celosia in the cooler, find it does not appreciate 38 degrees, I leave at room temp, cut only as required, using #2 holding solution; We cut all celosias into Chrysal OVB; Chrysal Pro2; I use a flower preservative and cold water; Floral preservative.

Comments: Next year I would cut out the central stem to encourage nice sides, found the central bloom will turn brown, due to age, perhaps if this was removed earlier, it would be prevented and encourage more consistent sides; I liked this celosia, the color was different than the other red celosia, it seemed to have a shorter life span preharvest than the other celosia though so I didn't get to use a whole lot of it; Successions would be very important since it's ready so uniformly; Only had a few seedlings survive, those died in the field; 6 x 6 in. spacing; Direct seeded in field, shorter "feathers" than the 'Celway White'; The Celway series is an easy source for abundant filler material for our bouquets; Very short, however, I believe that was my problems not necessarily the seeds -



Celosia 'Celway White'

first, seeded 4/28 and did not transplant until 7/1 so it was root bound, second, I transplanted into a bed that we had just established in the winter after clearing a pine forest, the soil was heavy clay, nonamended and most likely heavily acid, the blooms went to seed before I could harvest.

Celosia 'Celway White' (Kieft-Pro-Seed)

Good Qualities: Good neutral green-gray color (7), the neutral colour highlights the focal flowers in bouquets; Amazing number of stems (4); Long stems (4); Great textural element for bouquets (3); Strong stems (2); This plant is "whiter" than the palest celosia I've used in the past, it's not really white though; Uniform bloom time; Great germination, Long-lasting filler; Bees liked it; Staying quality in the field; Nice filler material; Easy to grow, dries nicely.

Problems: Flowers were off-white and turned brown very quickly (8); I found the color to be unimpressive - it faded into oblivion in my floral arrangements; it is good as a filler, but I don't think that's what you want from celosia, I probably

wouldn't grow it again; Longer spindly 'feathers' than the red; Flower is an aggregate of short, plump plumes that are light green, not white, stem length could be longer; Later to flower than 'Celway Red' by 5 days; Short side shoots.

Similar Cultivars: Other Celway cultivars, 'Sunday Yellow'.

Postharvest Recommendations: Strip as many leaves as possible; Chrysal Pro2; Floralife; I use a flower preservative and cold water; Floral preservative or just water. See also postharvest article in this issue for more information.

Comments: Suggest pinching or cutting out central stem to allow for even sides, also the center will brown up if left too long, I will definitely be growing again, I had it on my own seed order for 2014, so we had a nice amount, and it did not disappoint; It's a different colored celosia but I found it hard to fit in my colorful arrangements, since it's not really white it didn't fit in well with my white arrangements either; We prefer stronger, more saturated colors, this is way too pale, yet not white; 6 x 6 in. spacing 7/7 transplant date; Least favorite variety in the seed trials; This has a tighter flower habit and a lot more foliage than 'Celway Red'. The Celway series is an easy source for abundant filler material for our bouquets.

Celosia 'Sunday Yellow' (Kieft-Pro-Seed)

Good Qualities: Nice shimmery yellow (9); Productive variety (2); Great stem length (2); Very uniform plants in habit and bloom time; Good head size, beautiful feather shape like 'Forest Fire' and other Sunday series, reblooming late (10/10) with shorter stems, good for vasework; Full stems; Excellent filler, plants were vigorous and healthy; Broad, showy plume, well extended above the foliage; This one sold on its own as a bunch; Strong stems, great for drying and mixed bouquets; Easy to grow, great plume flower.

Problems: Looked "dirty" quickly as it aged (3); Plants are not strong enough to

hold up the stems, the plants have fallen over, larger center flower, pre-harvest life seemed to be shorter than other celosia; Not quite as full and large of a head as 'Sunday Orange', since head is not quite as dense, we prefer a bit taller stems, some selection could possibly yield this, direct seeding may yield taller blooms; Foliar disease; Plants should be taller, Didn't have enough.

Similar Cultivars: Other Sunday cultivars.

Postharvest Recommendation: We harvest all celosias into Chrysal OVB; Strip as many leaves as possible, cooler for storage; I use a flower preservative and cold water; Floralife; Floral preservative. See postharvest article in this issue for more information

Comments: We'll try pinching next year, center bloom was not as nice as side shoots, plus side shoots will hopefully be longer (2); I did not find the color or plant much different from what is currently available; We've been selecting our own celosias for several years now, I think some selecting for longer stem length would be helpful, we'll definitely be saving seeds of this one!; Great color; We found this colour to be more golden than yellow; As with all my flowers, we do not irrigate, once they are planted in the field, through black biodegradable plastic, they are netted and basically on their own, they survived a dry July and made up for it in the wetter than usual August, for this reason, I will plant them again, they seemed to be forgiving of harder conditions, also the only pests they seemed to attract were some late season aphids - we are surrounded by potato and grain fields, when these are harvested, they tend to come looking for my suns, snaps, celosia and peppers, we did spray occasionally with Bravo fungicide and Desis or Admire for the aphids; They reminded me of little paint brushes!; The large size heads were a nice filler in bouquets and the color was very nice.

DELPHINIUM

Delphinium 'Blue' (Sakata)

Good Qualities: Nice bright shade of blue (6), a bit lighter and brighter than belladonna; Airy plants; Awesome for mini bouquets; Good germination rate; Stem length, strong stems; Prolific bloomer, easy to grow, great for farmers' market sales.

Problems: Very short (6); No valuable stem production, in southern Pennsylvania, delphiniums do much better if fall planted, our summers get too hot too quickly for field-grown delphinium to perform well; Does not compete well with weeds, short harvest window; No useable stems, maybe planted out too late; Planted prior to hot dry spell most died upon transplant in spite of watering, these are better sown in summer for fall and spring bloom.

Similar Cultivars: 'Belladonna', see above; Short version of 'Butterfly' delphinium or 'Energy Blue'; 'Morpho Grand Blue'.

Postharvest Recommendations: I use a flower preservative and cold water; For longest vase life, harvest when top flower has opened and all other flowers are still in bud, all other flowers will color and open in postharvest.

Comments: I would definitely try this one again as a fall planted crop—color and form were nice; We had poor germination, but this might have been our problem, not a reflection on the variety; Nice to have a few in the mix, but will not be replacing 'Belladonna' any time soon; 9 x 9 inch spacing, good germination and strong seedlings; I had terrible germination with these seeds even with cold stratification, the few seedlings that I did get did not produce much, I am hoping they will come back next spring; This is too short for cut flowers, compact plants are best suited for landscape or container production; Didn't start them in time so seeded a month ago for the hoop house; 1/16 seeded and cooled for 2 weeks, 2/6 placed on germination heat mat, transplanted to 72 tray on 2/20, transplanted plugs to hoop house, however, they were very frail plugs, they did not make it....total fail!

Delphinium 'Light Pink' (Sakata)

Good Qualities: Nice blush color (3); Good germination rate; Stem length, strong stems; Blooms over a long period of time.

Similar Cultivars: 'Morpho Happy Pink'.

Problems: Very short (5), most were not long enough to cut; Very pale, washed out pink color (2); Here in Pennsylvania, field delphiniums do much better if fall planted, our summers get too hot too quickly for them to perform well; Poor germination; Does not compete with weeds; Planted prior to hot dry spell, most died upon transplant in spite of watering, these are better sown in summer for fall and spring bloom; Okay for farmers' market.

Postharvest Recommendations:

I use a flower preservative and cold water; Longest vase life if harvested when top flower is showing color but all other flowers are still in bud, buds will color and open in postharvest.

Comments: A good color if you need more blush flowers for boutonniere work or floral gowns or very short bouquets, otherwise, I'd skip this one; 9 x 9 inch spacing, slightly weaker than 'Blue'; Didn't start them in time so seeded a month ago for the hoop house; 1/16 seeded and cooled for 2 weeks, 2/6 placed on germination heat mat, transplanted to 72 tray on 2/20, transplanted plugs to hoop house, however, they were very frail plugs, they did not make it...total fail!; Easy to grow, continued to bloom up to a hard frost; This is too short for cut flowers, compact plants that are best suited for landscape or container production, spur less; I had terrible germination with these seeds even with cold stratification, the few seedlings that I did get did not produce much, I am hoping they will come back next spring.

MARIGOLD

Marigold 'Babuda Gold' (AmeriSeed)

Good Qualities: Nice golden yellow color (5); Very productive (3); Large blooms (2); Excellent vase life (2); Easy to grow (2); Good stem length (2); Fragrance, good branching; Has round fully double flowers; Good germination rate; Good in bouquets; Nice useable marigold; Strong stems.

Problems: Fragrance (3), overpowering when processing; Short branchy stems, very few long enough to cut; Japanese beetles liked it; Shorter than Jedi series, stems



Marigold 'Babuda Yellow'

slightly weaker than Jedi, did get leaf spot a bit earlier than Jedi late in the season (late September); None; Stems were very short even after pinching, we started harvesting in August and then the rains came, all cultivars got botrytis after first harvest, stem neck too thin for size of flower head, heads often caused stem to bend and break.

Similar Cultivars: 'Jedi Gold'; 'Babuda Yellow'.

Postharvest Recommendations: Clean water (2), fresh cut; Strip leaves; I use a flower preservative and cold water; Floralife; Cut into Chrysal OVB, transfer into Chrysal holding; Chrysal Pro2. See also postharvest article in this issue for more information.

Comments: Marigolds are a tough sale for me, I did cut some of this variety Started 4/22, transplanted 5/7 spaced at 18 x 18 in.; For all the marigold varieties trialed, our customers were not eager for straight bunches, these were fine as part of mixed

bouquets; If only 'Babuda' existed, it's a perfectly good marigold, 'Jedi' just seemed taller & stronger with same good gold color and abundant blooms, we grew all marigolds on landscape fabric and netted with a double layer of Hortonova, they held up beautifully; This variety was not different than what is currently available, stem length and color were good; Workhorse flower in bouquets; Nice addition to bouquets, color was nice, large flowers.

Marigold 'Babuda Yellow' (AmeriSeed)

Good Qualities: Beautiful sunny yellow (7); Big producer (2); Very uniform and compact plants; Fragrance; Perfect for mixing in bouquets, great round, double flower shape; Easy to grow; Great for mid-season work when you don't want orange/gold of other varieties, good repeat blooms; Lights up our bouquets; Strong stems.

Problems: Fragrance(3), overpowering fragrance when processing; Stems weaker than other cultivars (2)

('Jedi Deep Gold', 'Jedi Gold', 'Babuda Gold'); Short branchy stems, very few long enough to cut; Majority of plants have short stems with flowers beneath the foliage, the shortest of the marigold trials; Japanese beetle magnet; Got leaf spot the earliest of all marigolds, more stems seemed to flop compared to other varieties; Yellow doesn't seem to get as tall or produce as well as the orange or gold

colors, it also seemed to start browning up earlier in the fall than the orange and gold colors; None.

Similar Cultivars: ‘Babuda Gold’.

Postharvest Recommendations: Clean water, fresh cut; Strip leaves; I use a flower preservative and cold water.

Comments: ‘Babuda Gold’ and ‘Yellow’ have very similar colors, marigolds are a tough sale for me; Started 4/22, transplanted 5/7, spaced at 18 x 18 in., All of our African type marigolds are loved by Japanese beetles; Our customers were not receptive to straight marigold bunches, these were fine in mixed bouquets; We like this one for early to mid-season, it definitely minded the cold nights more than the orange and gold ones and declined most quickly; This variety was very similar to what I already grow, good color and stem length; Workhorse flower in bouquets; Nice addition to bouquets, color was nice, large flowers, I have noticed that the gold color is especially attractive to customers; overall the plant grows better for me than the yellows I have grown in the past.

workhorse of our September supermarket bouquets, nice branching, taller than Babuda series, our favorite of the gold marigolds, just slightly more orange than ‘Jedi Gold’, which was nice in fall bouquets, strongest of marigold varieties, last to get leaf spot in late fall; Good producer.

Problems: Fragrance (3), overpowering when processing; After days of mid-August rains, plants succumbed to botrytis, head too heavy for stem neck; None; Slower to flower than ‘Jedi Gold’ by 7 days; Japanese beetle magnet; Need to harvest when tight, or else necks will break, didn’t seem to have quite as much rebloom as ‘Jedi Gold’ (but maybe just because we cut it the hardest since we liked it the most).

Similar Cultivars: ‘Jedi Gold’; As tall as ‘Optiva Orange’.

Postharvest Recommendations: Chrysal Pro2; Clean water, fresh cut; Cut into



Marigold ‘Jedi Deep Gold’
photo by Christiane Martins

this variety again; Marigolds do not sell well for me, probably should have pinched; Started 4/22, transplanted 5/7, spaced at 18 x 18 in.; This colour was slightly darker than ‘Jedi Gold’, not a huge difference; Our customers were not receptive to straight bunches, these were fine in mixed bouquets; Nice plants, great for landscape plantings and a good cut, yellow marigolds are sometimes a hard sell; Our favorite of the golds!; This was a great color and a joy to harvest!; Color was nice, large flowers, gold color is especially liked by customers, easily blends with many colors for bouquets, I think the Jedi series bloomed late into the season and didn’t brown as quickly as the Babuda series did this year with all our rain.

Marigold ‘Jedi Gold’ (AmeriSeed)

Good Qualities: Nice yellow color (3); Strong stems (3); Very tall (3), taller than Babuda series; Large-headed flower; Fragrance; Big flower; Great vase life, has long strong stems; Easy to grow; Nice; strong performer, good second and third cuts from plants we transplanted into the field 7/1 and they

“I have noticed that the gold color of ‘Babuda Yellow’ is especially attractive to customers; overall the plant grows better for me than the yellows I have grown in the past.”

Marigold ‘Jedi Deep Gold’ (AmeriSeed)

Good Qualities: Strong stems (4); Great color (3); Stem length was good also: Stems are longer than ‘Jedi Gold’; Fragrance; Nice large flower head; Excellent vase life; Easy to grow; Tallest, sturdiest and best yellow of the trial; Very tall, strong performer, good second and third cuts from plants we transplanted into the field 7/1 and they were the

Chrysal OVB, transferred to Chrysal holding solution; Floralife; I use a flower preserver and cold water. See also postharvest article in this issue for more information.

Comments: Harvested a full week after all other cultivars trialed (74 days after transplant); I found myself cutting more of this marigold than the other colors, it is different and it looks good in arrangements, I will definitely grow



Marigold 'Optiva Orange'

were the workhorse of our September supermarket bouquets, nice branching, good; Good producer.

Problems: Fragrance (3), overpowering when processing; Head too large for small stem neck; None; Plants fell over creating crooked stems; Late and low production, poorer heads, top heavy, shows age easily; Lots of beetles; Little color difference from 'Jedi Deep Gold', but slightly more yellow (especially as nights got colder), needed to be harvested somewhat tight to prevent neck from breaking.

Similar Cultivars: 'Jedi Deep Gold'; Similar height and vigor to 'Optiva Orange'.

Postharvest Recommendations: Chrysal Pro2; Clean water, fresh cut; Cut into Chrysal OVB, transferred to Chrysal holding solution; I use a flower preserver and cold water.

Comments: Rains caused botrytis to set in, only got about one harvest, all subsequent blooms browned and were small; I did not find this variety to be any different from what is on the market now, it had nice big flowers and stems that were long enough to use in arrangements, seemed to have a short blooming cycle meaning that this variety died back rather quickly; Only marigold in the trials to fall over; Started 4/22, transplanted 5/7; Colour is not much different than 'Jedi Deep Gold'; Good production, sales just okay; We love the Jedi series! excellent yellow/gold marigold; This comment goes for all 6 marigolds in the trial I think marigolds are enjoying a comeback of sorts, they are trendy, bold, herbal, and they last, we also dried the bunches that didn't sell and they are a welcome color after frosts, my wife commented the other day that they were selling better than the fresh ones!; Color was nice, large flowers, gold color is especially liked by customers, easily blends with many colors for bouquets, I think the Jedi series bloomed late into the season and didn't brown as quickly as the Babuda series did this year with all our rain.

Marigold 'Optiva Orange' (AmeriSeed)

Good Qualities: Excellent bright orange color (7); Stems were long enough to use in arrangements; The tallest marigold in the trials, good branching, fragrance, large blooms; Very productive; Double flower; Easy to grow; Good stem length, larger ruffled heads than 'Jedi Orange'; Tall and vigorous plants, good repeat bloom, and branching perfect for fall bouquet work—this is our favorite marigold!

Problems: Fragrance (2); Japanese beetles love this (2), but are easily controlled; None; Late producer, didn't bloom before end of season, heavy plant falls over if not netted, heads sometimes pulled off if not careful when harvesting; Sometimes center shoot is weak (like all marigolds) and benefits from being cut out; First cut was nice and large, next blooms were much smaller, this was the shortest overall plant and also stem length.

Similar Cultivars: 'Babuda Orange'; 'Jedi Orange' is taller with smaller blooms, but straighter thinner stems.

Postharvest Recommendations: Clean water, re-cut stems; Cut a bit tighter to avoid stem breakage, we cut all marigolds into Chrysal OVB, then into Chrysal holding solution; Floralife; Chrysal Pro2. See also postharvest article in this issue for more information.

Comments: I did not see much difference in this variety and what is currently available; Marigolds are a tough sale for me, I did cut and sell a few of this variety; Started 4/22, transplanted 5/7; All of our African type marigolds were loved by Japanese beetles; All varieties tested were easy to grow, all had problems with beetles, will grow marigolds again and use varieties tested, will reduce number of plants grown since not highly marketable as bunches; Great for mixed bouquets, bulk buckets, and wedding garlands; Will grow again for Indian-themed events for orange pompom garlands; This is our favorite marigold! very slightly weaker stemmed than Jedi, but you can't beat the bright orange color; This comment goes for all 6 marigolds in the trial, I think marigolds are enjoying a comeback of sorts, they are trendy, bold, herbal, and they last, we also dried the bunches that didn't sell and they are a welcome color after frosts, my wife commented the other day that they were selling better than the fresh ones!; Lost this variety early in the season due to a late frost, I thought I could get some plants out early and lost them; Pinched ALL five marigold cultivars, botrytis in all 5 varieties, only harvested for approximately 3 weeks before they succumbed to the disease.

SNAPDRAGON

Snapdragon 'Calima Deep Pink' (Sakata)

Good Qualities: Beautiful vibrant colour (12); Strong stems (3); Stem length (2); Prolific, easy to germinate and grow; Florets are spaced closely on the stem; I always sow snaps at least 3-4 plantings per growing season, we had a very dry July

here (no irrigation), followed by a warm, wet August, my best snaps were mid July (typical for us) and again mid to late September, still harvesting 'Calima Deep Pink' on Oct 25, used several blooms in bridal bouquets, like the fact that it was tolerant of wet cold weather, had at least 6-8 stems per plant, and came back with more blooms suitable for bouquets; Color held well in heat, plant survived in field through summer, then rebloomed in early fall, however, pink was not as useful a color in fall as it was in late spring; Tall, upright stems, tight flower; Great form; Nice sturdy stems, good timing of bloom; Uniform growth, maturity, color, etc. fast bloom time - plant in field 5/6, begin harvest 6/10, excellent second flush of blooms 7/29 - we did have a cooler than normal summer for Pennsylvania, over 70% of second flush were marketable stems, this is unusual for field-grown snaps.

Problems: Germination; Medium pink with yellow throat—expected a darker deep pink, stem sturdy, but still needed

netting; Variable heights and flowers seem to pass quickly; Seedlings slightly weaker than other snaps, used 9 x 9-inch spacing; Aphids; Not a popular color for me this year, requires netting for straight stems; None!; Needs to be staked otherwise they fall over and bend.

Similar Cultivars: A lot of the snaps have similar traits; 'Potomac Pink'; Similar color to 'Opus Pink', but faster time to bloom and more uniform.

Postharvest Recommendations: Floralife; I always treat snaps with Chrystal AVB, then put in #2 holding solution until sold, find snaps have better postharvest life in July and September, find August the stems are softer, and don't hold up as well; Careful to stand upright so stems don't bend; I use a flower preservative and cold water; Chrysal Pro2; Clean cut, fresh water; We harvest all snaps into Chrysal OVB. See also postharvest article in this issue for more information.

Comments: Will grow again, had 'Calima Ivory' and 'Deep Rose' as well, all consistent in bloom time, 'Calima Deep Pink' very similar to deep rose, a shade or two lighter, so close I would not grow both colors, either deep rose or deep pink but not both; Nice addition to bouquets, color was great and customers liked it a lot, large heads; 140 out of 200 germinated, unpinched stems harvested one week earlier than pinched, unpinched were large while pinched were smaller, but more stems per plant, harvested multiple times until plants succumbed to aphids, treated with organic "Worry Free" insecticide, but it was not enough; We loved this snapdragon and will definitely be trying more Calima colors, its uniformity and vigor were better than snaps we traditionally field grow (Opus, Rocket, Chantilly, Maryland); These were large, full-blooming snaps that I grew

in the hoop house, they also are reblooming in September, I loved the shade of pink, would definitely grow again and stake so that they grow straighter.

SUNFLOWER

Sunflower 'Jua Inca'

(PanAmerican Seed)

Good Qualities: Color (3), consistent bicolor with rusty corona around black disk; Early blooming sunflower (4); Very vigorous germination, all healthy, no deformed seedlings, excellent germination, all sowed into 200 cell Speedling trays, first sowing May 20, bloomed July 22-25, very uniform; Stem length, strong stems, and mixed bouquets; Small flower heads; Sturdy; Good height-over 5 feet, but I didn't measure, just cut the stem length I needed for mixed bouquets; Upward facing, some even faced up toward the sky, shorter than most other one cuts I've grown; Bicolor with broad darker petal bases, petals relatively short and broad, standard maturity and conventional height, insensitive to daylength in our seedling screen test; Neck does not bend, strong stem, no petal drop, best bicolor we've ever grown, direct seeded 6/17 and harvested 8/6 - strong uniform flowering and bloom time, excellent germination, nice head size—5-6 inches; Good sized sunflower heads that were useable in arrangements; Love the bronze striping in the center, short crop time—59 days from May 14 seeding.

Problems: None (3); Varying shades of color, some are red/gold bicolor, solid yellow or yellow petals with varying shades of red streaks; Shorter and thinner stems than other cultivars at a similar spacing; Critters love to eat these; Center black disk oozed droplets of sap occasionally; Flower size is a little small, did not respond to short days, seeded second crop on 9/18 and transplanted in hoop house on 10/5, as of 11/22 transplants are very small and just starting to form a bud on very short stems.

Similar Cultivars: 'ProCut Bicolor'



Snapdragon 'Calima Deep Pink'
photo by Tanis Clifton

Postharvest Recommendations: I use a flower preservative and cold water; Remove all leaves except small collar leaves; Cut into Chrysal OVB then into Floralife; Used Chrysal Pro2.

Comments: The 'Jau' varieties are very consistent suns, certainly would recommend them for that, the colour is quite autumnal and I found I was hesitant to reach for it in summer bouquets, again, it would need to be harvested quickly, if left a day too long, in hot weather, you would be too late, recommend it for fall harvests due to the colour, I probably won't grow it again, not because of any growing issues, just personally do not like the color and the bloom set, prefer 'Vincent', 'Sunbright' and 'Sunrich' varieties, the later fall planting was not as tall, closer to 36 inches, rather than 48 inches earlier in season; A few days earlier to bloom than 'Jua Maya'; 6 x 6 inch spacing, 6/5 through 8/25 transplanted; My problem: grew in spring, next year better for autumn, will add this sunflower to my list; Sow 7/20 or later for fall bloom, too dark for summer use; I did not find anything special about this sunflower variety, it is a nice looking sunflower and the customers bought them quickly, but they were not unusual or eye catching to me, they had strong stems and a good germination rate; Transplanted on a 9 x 12 inch spacing.

Sunflower 'Jua Maya' (PanAmerican Seed)

Good Qualities: Great color, very bold and vibrant yellow (4); Good looking, strong stemmed sunflower; Early to flower, nice flower size; Traditional looking sunflower, sold well to florists; Medium flower size is easy to bunch and use in mixed bouquets; Sturdy; Good height, over 5 feet, but I didn't measure, cut stems for use in mixed bouquets; Traditional sunflower; Useful medium size, nice upright posture on the stem,



Sunflower 'Jua Inca'
photo by Tanis Clifton

stem size not too thick (florists prefer slender stems); Quick crop, wide golden yellow ray petals around large black disk; Standard orange flower with dark disk, petals relatively broad and short, insensitive to daylength in seedling screen test, main season maturity and height; Good if looking for a smallish sunflower, short crop time of 57 days when seeded 5/14; Stem length, strong stems, and mixed bouquets; Very even bloom period, all consistent, no off types, free of disease; Nice shape flower, uniform maturity and size.

Problems: None (3); Shorter and thinner stems than other cultivars at a similar spacing; Critters love to eat these; Lowish petal count; Sticky disk when allowed to partially open requiring debris removal, late-season pest problems with smut and beetles; Flower petals unfurled unevenly; A bit erratic with germination compared to 'Inca'; We prefer gold or orange petals over yellow, but this is just a personal preference.

Similar Cultivars: Similar color to 'Sunrich Lemon', but this is 14 days

earlier to flower; 'Sunbright' and 'Sunrich'; 'Sunrich Summer Orange', 'Sunrich Lemon' - similar days to bloom, size head, shape head.

Postharvest Recommendations: Chrysal Pro2; I use a flower preservative and cold water; Floralife; Chrysal OVB then Floralife, 2 of 3 stems collapsed after 8 days - water change may be important. See also postharvest article in this issue for more information.

Comments: I did not find anything special about this sunflower variety, it is a nice looking sunflower and the customers bought them quickly, but they were not unusual or eye catching to me, they had strong stems and a good germination rate, I would grow them again because they were easy to sell; A few days later to bloom than 'Jua Inca', 6 x 6 in. spacing,

7; Not as good in my opinion as 'Procut Orange' or 'Sunbright'; One of only a few standard orange varieties that is not sensitive to daylength, so could be grown under short day conditions; This is a nice smallish 3½ -4 inch sunflower with a dark center, does not respond to short days, grew very short and field transplanted on 10/21 and got a killing frost prior to harvest, they did great under row cover; I liked both sunflowers for their color and stem strength, nice size of flowers and long lasting qualities; This is a good sun, I grew it last year for the first time after a recommendation from our Ball Seed rep, I found it very uniform and very short bloom window, need to keep a very close eye as it will blow open quickly in the field, not really keen on the colour, I find most people like the typical orange colour, however, if I was wanting that particular colour of yellow, it would be a top choice, also for bouquet making a top/upward facing bloom is more desirable for my own use, best feature very uniform harvest window, harvest 80% the first cutting day.

ZINNIA

**Zinnia 'Queen Lime'
(Gro 'n Sell/Floragran)**

Good Qualities: Great lime green color (2); Nice medium sized head.

Problems: Shorter vase life than other zinnias (Benary) about 50% of flowers were single type, not doubles, these tend to show brown at the center more than the doubles, not as tall as Benary's, this could be due to transplanting vs. direct seed (see below); Over time, flowers get smaller and lankier, leaf spot near end of season.

Similar Cultivars: 'Benary's Lime', but 'Queen Lime' is more productive than 'Benary's Lime'.

Postharvest Recommendations: We cut all zinnias into Chrysal chlorine tablets; Floralife; Chrysal Pro2. See also postharvest article in this issue for more information.

Comments: We received the zinnias late in the season, they were planted in the field almost 2 months after we normally plant zinnias, so our yield was way down compared to zinnias we have had in the past; We tend to have stronger, taller plants from direct seeding zinnias vs. transplanting, we would try direct seeding next season, customers loved the lime color, but did comment that they were not holding up as long Benary's cut and sold same day (we sell all zinnias by the stem and mixed trial ones with our standard Benary's).

**Zinnia 'Queen Lime-Red'
(Gro 'n Sell/Floragran)**

Good Qualities: Beautiful vintage pink, some center portions of flower had great green and deep pink contrast; Really fun antique pink color, customers appreciated the antique look and new color; nice medium size head.

Problems: Flowers varied in form. Some were multi petaled, some were single petaled; color was not consistent, all colors were beautiful, just inconsistent from each other; We tend to have stronger, taller plants from direct seeding zinnias vs. transplanting (Note – this cultivar was sent as a plug); we would try direct seeding next season, they seemed to

“ 'Queen Lime Red' zinnia has a really fun antique pink color, customers appreciated the antique look and new color.”

get powdery mildew earlier than our Benary's, short vase life, customers did complain about this, but liked the color, hard to use with bright colored bouquets.

Similar Cultivars: None listed.

Postharvest Recommendations: Chrysal Pro2; Floralife; We cut all zinnias into Chrysal chlorine tablets. See also postharvest article in this issue for more information.

Comments: We received the zinnias late in the season, they were planted in the field almost 2 months after we normally plant zinnias, so our yield was way down compared to zinnias we have had in the past; At first we hated this flower! As we figured out how to use it with greens, purples and lavenders, it definitely grew on us, it is not a traditional bright colored zinnia, but does have interest for an antique look, we will definitely grow again.

Zinnia Cupcake 'Deep Orange', 'Red', 'Yellow' (Gro 'n Sell/Floragran)

Good Qualities: Makes great bouquet filler in short bouquets; 'Red' had the best percentage of doubles of three cupcake varieties (75-80%), and was the nicest color of three varieties, was more of an orange than red; 'Deep Orange' had about 50% singles.

Problems: The majority of the flowers were singles, stems very thin; Leaf spot, inconsistent flower form, size, shape; We did not care for the form at all, small flower heads, tedious to harvest short plants, we do not have a use for such small flowers in general unless it's a time of year when there's scarcity of blooms, customers also did not care for this form, bordering on ugly, to be fair, we grow only Benary's, because we do not care for small zinnias in general.

Similar Cultivars: Similar to some 'Lilliput' zinnias.

Postharvest Recommendations: Chrysal

Pro2; Floralife. See also postharvest article in this issue for more information.

Comments: Our 'Cupcake Deep Orange' and 'Cupcake Red' looked a lot alike; So disappointed that only about 30% were the actual cupcake form, transplanted plugs the day received, yet most budded at 4-inches tall, had to disbud/pinch all; We received the zinnias late in the season, they were planted in the field almost 2 months after we normally plant zinnias, so our yield was way down compared to zinnias we have had in the past.



Zinnia 'Queen Lime'



Zinnia 'Queen Lime-Red'



Zinnia Cupcake 'Red'

2014 ASCFG Seed Trial Results. The first row of data for each cultivar is the average and the second row is the range of responses. Note when only one response is listed, either only one person responded for that category or several responded and all gave the same rating. The single highest score and the single lowest score in each category for each cultivar have been dropped.

Species Cultivar Company	Yield (stems/plant)	Stem length (inches)	Market appreciation rating ¹	Repeat again rating ¹	Ease of cultivation rating ¹	Average postharvest life (days)
Aster 'Bonita Light Blue' Sakata	6.6 1-16	19.5 10-36	4.2 3-5	4.4 2-5	3.9 1-5	8.3 6-12
Cabbage 'White and Pink Center' Sakata	1.0 1-4	21.5 8-36	3.3 2-5	3.0 1-4	3.8 2-5	12.1 7-21
Celosia 'Celway Red' Genesis Seed	11.6 4-25	17.7 10-38	3.6 1-5	4.1 1-5	4.4 2-5	8.2 7-12
Celosia 'Celway White' Kieft-Pro-Seed	10.9 2-31	20.0 12-36	2.9 1-5	2.8 1-5	4.5 4-5	9.3 7-19
Celosia 'Sunday Yellow' Kieft-Pro-Seed	11.1 4-25	20.3 9-36	4.3 2-5	4.1 2-5	4.7 2-5	8.9 7-37
Delphinium 'Blue' Sakata	4.0 1-15	12.2 6-20	3.8 1-5	3.1 1-5	3.1 2-5	6.0 5-7
Delphinium 'Light Pink' Sakata	3.2 1-12	10.8 6-18	2.2 1-5	2.4 1-4	2.9 1-5	5.5 5-7
Marigold 'Babuda Gold' AmeriSeed	11.6 5-30	15.1 12-36	3.5 2-5	3.6 3-5	4.7 4-5	11.4 6-16
Marigold 'Babuda Yellow' AmeriSeed	11.7 8-30	15.8 12-36	3.1 2-4	3.3 2-5	4.8 4-5	9.9 6-14
Marigold 'Jedi Deep Gold' AmeriSeed	13.7 6-22	17.6 12-36	3.8 2-5	3.8 2-5	4.9 4-5	11.2 6-14
Marigold 'Jedi Gold' AmeriSeed	12.2 5-20	16.4 12-36	3.6 2-5	3.4 2-5	4.9 4-5	11.0 6-14
Marigold 'Optiva Orange' AmeriSeed	10.6 5-50	15.3 12-36	3.1 2-5	3.5 2-5	4.2 3-5	13.4 10-15
Snapdragon 'Calima Deep Pink' Sakata	6.2 1-14	18.5 12-32	4.0 4-5	4.2 3-5	3.8 3-5	6.2 5-8

¹ 1 to 5 scale, with 5 being the best. Market ratings are based on sales to wholesales, retailers, or final consumers direct.

2014 ASCFG Seed Trial Results. The first row of data for each cultivar is the average and the second row is the range of responses. Note when only one response is listed, either only one person responded for that category or several responded and all gave the same rating. The single highest score and the single lowest score in each category for each cultivar have been dropped.

Species Cultivar Company	Yield (stems/plant)	Stem length (inches)	Market appreciation rating ¹	Repeat again rating ¹	Ease of cultivation rating ¹	Average postharvest life (days)
Sunflower 'Jua Inca' PanAmerican Seed	1.0 1	34.1 24-120	3.5 2-5	3.4 2-5	4.2 2-5	4.3 3-11
Sunflower 'Jua Maya' PanAmerican Seed	1.0 1	30.6 24-63	3.5 3-5	3.3 2-5	3.9 2-5	5.4 3-13
Zinnia 'Queen Lime' Gro 'n Sell/Floragran	13.7 6-25	17.8 12-24	4.7 4-5	4.3 4-5	4.7 4-5	7.3 5-10
Zinnia 'Queen Lime-Red' Gro 'n Sell/Floragran	12.7 6-25	16.2 12-24	4.7 4-5	5.0 5	5.0 5	6.7 4-8
Zinnia Cupcake 'Deep Orange' Gro 'n Sell/Floragran	7.7 3-14	12.3 10-14	2 1-3	2 1-3	4 4	7 7
Zinnia Cupcake 'Red' Gro 'n Sell/Floragran	7.3 2-14	12.3 12-14	2 1-3	2 1-3	4 4	7 6-14
Zinnia Cupcake 'Yellow' Gro 'n Sell/Floragran	10.5 7-14	12.8 10-14	2.5 3	2.5 2-3	4 4	7 7

For more cut flower information, including twenty years of trials reports, postharvest research, and production material, spend some time at John Dole's NCSU cut flower site.

The screenshot shows the NCSU Cooperative Extension website. At the top, there is a search bar with the text "Search below or ask an expert" and "Enter Your Keywords Here". Below the search bar is a navigation menu with links: Home, About, Contact Us, Meet Our Staff, Events, NC A&T, and Our County Centers. The main content area features a large image of various cut flowers (purple, red, white, and orange) with the text "Cut Flowers" overlaid. Below the image is a breadcrumb trail: Welcome > Cut Flower Trials > Postharvest Trials > Production > NC Cut Flowers > Publications. There is a "Print Content Only" icon to the right. Under the heading "LINKS OF INTEREST", there are three links: "Association of Specialty Cut Flower Growers", "North Carolina Commercial Flower Growers Association", and "Chain of Life Network". Below this is a "DEPARTMENTS" section with a link to "Horticultural Science". The "Postharvest Information" section is highlighted, with the text: "A crop is at its highest quality at the time of harvest and must be properly handled to minimize the loss in quality. To maintain quality during marketing and in the final consumers location, cut flowers must be handled and stored at the correct temperature (as cold as possible), have a high carbohydrate level (use floral preservatives), and be free of water stress, ethylene, and microbial contamination."

<http://cutflowers.ces.ncsu.edu/welcome-2/>

POSTHARVEST TREATMENT OF SPECIALTY CUT FLOWERS

North Carolina State University Report for 2014

Alicain S. Carlson, Christiane Martins, John M. Dole, and Ingram F. McCall
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This project was supported by the Association of Specialty Cut Flower Growers Research Foundation, the American Floral Endowment, and numerous suppliers.

The authors would like to thank Kendyl Finley and Logan Haislip for assisting with growing and harvesting the cut flowers.



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.