UNIVERSITY OF MARYLAND EXTENSION

TPM/IPM Weekly Report

for Arborists, Landscape Managers & Nursery Managers

Commercial Horticulture **June 18, 2021**

In This Issue...

IPMnet
Integrated Pest Management for Commercial Horticulture

extension.umd.edu/ipm

If you work for a commercial horticultural business in the area, you can report insect, disease, weed or cultural plant problems **(include location and insect stage)** found in the landscape or nursery to sgill@umd.edu

Coordinator Weekly IPM Report:
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Regular Contributors:
Pest and Beneficial Insect Information: Stanton Gill and Paula Shrewsbury (Extension Specialists) and Nancy Harding, Faculty Research Assistant
Disease Information: Karen Rane (Plant Pathologist) and David Clement (Extension Specialist)
Weed of the Week: Chuck Schuster (Retired Extension Educator)
Cultural Information: Ginny Rosenkranz (Extension Educator, Wicomico/Worcester/Somerset Counties)
Fertility Management: Andrew Ristvey (Extension Specialist, Wye Research & Education Center)
Design, Layout and Editing: Suzanne Klick (Technician, CMREC)

Japanese Beetle Adults Are Out

By: Stanton Gill

With all of the distraction by the 'Cicada Palooza', some of the regular insect visitors have gone unnoticed. We had the first report of Japanese beetle adult activity on Wednesday, June 16. Bill McGee, Outdoor Creations, found them causing a little bit of damage on 'Pink Velour' crape myrtles in La Plata on June 16. Marie Rojas, IPM Scout, is reporting that Japanese beetle adults are starting to emerge in Laytonsville this week. Marie noted that she always finds them hanging out on evergreens before starting to feed on plant material. Here at the research center in Ellicott City, the first adult was spotted on June 17.

Reports of Japanese beetle adult activity have started coming in this week
Photo: Bill McGee, Outdoor Creations

In our trials, 8 oz /100 gallon rate of Acelepyrn or Mainspring gave excellent control of adults for 2 – 3 weeks.

More on Brood X Periodical Cicadas

By: Paula Shrewsbury and Mike Raupp, UMD

Fungus changes behavior of Brood X cicadas: *Magicicada* spp. and *Massopora cicadina*

Periodical cicada defense is all about numbers. A strategy called predator satiation used by periodical cicadas overwhelm the countless hungry predators, intent on filling their bellies with these nutritious insects. There are so many that predators just cannot eat them all. In addition, the cicada's long life span may also enable periodical cicadas to elude short-lived predators such as birds and small mammals that simply track their prey through time. Who can wait 13 or 17 years for their next meal? But one very patient long-time nemesis of periodical cicadas has evolved a diabolical plan for making the most of the cicada bounty.

***Massospora* turns the cicada's abdomen into a fungus garden**
Photo: M.J. Raupp, UMD

In the soil beneath trees where cicada nymphs spend their youth sipping sap from plant roots, resting spores of the fungal pathogen *Massospora cicadina* lay in wait in the soil for 13 or 17 years. During April and May as cicada nymphs escape from the earth, spores of *Massospora* adhere to the exoskeletons of nymphs. Compounds on the surface of the cicada send a signal to the spores that it is time to germinate. Like an invading army, the fungus penetrates the skin of the cicada and multiplies, turning the cicada into a fungus garden. In a short suspense, the infection turns the abdomen of the cicada into a buff-colored mass of fungus. At this stage of their life cycle, tens of thousands of newly molted adult cicadas populate the landscape to begin the courtship rituals. The fungal infection sterilizes both male and female cicadas, but does nothing to quell the libido of the sex-crazed male cicadas determined to pass on their genes. Infected males continue to seek and attempt to mate with females despite their contagious infection. In a game of tit for tat, female cicadas infected with *Massospora* remain attractive to healthy males that soon become infected as they attempt to mate with females. At this point in time *Massospora* becomes a cicada STD and is transmitted from one cicada to another, thereby increasing fungal numbers each day. While the STD is strange enough, *Massospora* has one more trick to ensure maximum transmission of its spores. In the cicada mating game, after the male cicada puts on his best singing performance, the female signals her willingness to mate with an audible series of wing flicks. By a still not fully understood physiological mechanism, *Massospora* exerts mind control over an infected male cicada, causing him to mimic the female's wing flick behavior. This results in eager male cicadas attempting to mate with *Massospora* infected males, further spreading the fungus through the cicadas' populations.

Cicadas wandering about with hollow abdomens missing abdominal segments are hallmarks of the fungal infection
Photo: M.J. Raupp, UMD

A recent discovery of psychoactive compounds produced by *Massospora* suggests that these neuromodulators may play a role in altering the male's behavior, contributing to the active transmission of the fungus by the

cicada. Infected cicadas are flight capable and their travels carry the fungus to new habitats as cicadas fly about. In low density populations of cicadas, mortality rates caused by *Massospora* range < 5% to ~ 25%. A second, more sinister wave of infection follows the first. In this stage, fungus-laden abdomens of infected cicadas and dying infected cicadas inoculate the soil with the resting spores of *Massospora* where they will lay in wait for another 13 or 17 years.

While the loss of an abdomen would result in instant death for a human, this is not the case for a cicada. Sensory and integrative neurological functions in the head and locomotory functions of flight and walking directed by the thorax remain intact despite the loss of the abdomen. As the season of the cicada progresses, keep an eye out for male and female *Massospora* victims as they walk about missing their abdomen, reminders of a very clever fungus.

Click here to watch a video (by Raupp and Shrewsbury) that shows different phases of Massospora infection of cicadas. You will see early in the *Massospora* infection cycle males and females with distended, distorted abdomens appear. Soon, fungal spore masses replace terminal abdominal segments. Sterile infected cicadas walk around and fly about, attempting to mate with uninfected cicadas and spewing spores into the environment while infecting their brood mates. Nearby, a healthy male cicada becomes entangled with an infected cicada in a bizarre interaction. In a strange twist of mind control, *Massospora* causes male cicadas to mimic the female's wing-flick behavior, her signal of willingness to mate. Watch as a male uses his courtship call and attempts to woo a fungus-infected cicada that had just flicked its wings. His overactive libido will likely end in a lethal infection further spreading *Massospora* through cicada land.

Acknowledgements
The wonderful articles "A specialized fungal parasite (*Massospora cicadina*) hijacks the sexual signals of periodical cicadas (Hemiptera: Cicadidae: *Magicicada*) by John R. Cooley, David C. Marshall, and Kathy B. R. Hill, "The ecology, behavior, and evolution of periodical cicadas" by K. S. Williams and C. Simon, and "Behavioral betrayal: How select fungal parasites enlist living insects to do their bidding" by Brian Lovett, Angie Macias, Jason E. Stajich, John Cooley, Jørgen Eilenberg, Henrik H. de Fine Licht, and Matt T. Kasson were used to prepare this article.

Cicadas This Week

By: Stanton Gill

The torrential rains that hit parts of Carroll, Baltimore and Frederick Counties on Monday night really quieted down cicada singing that carried into Tuesday morning. On Tuesday night, temperatures dropped into the 60s (°F) which impacted cicada activity into Wednesday. They got a late start singing until it warmed up later in the day. Pictures of damaged tip growth are rolling in as we move into mid-June. Marie Rojas, IPM Scout, is finding a lot of damage on oaks in Gaithersburg and noted that the trees with heavy oviposition damage are oozing sap out of the egg laying wounds. Marie is also reporting a large amount of oviposition damage on 'Satyr Hill' and 'Dragon Lady' hollies in Laytonsville.

Look at the damaged areas along small stems for the periodical cicada eggs
Photo: Geoff Rinehart, UMD

One of the mating predaceous stink bugs in this pair is also feeding on a periodical cicada
Photo: Tom Rojas

Wire Basket Problems When Planting Trees

Todd Armstrong, The Davey Tree Expert Company, reported the following: "I was called out to look at a 20 year old cryptomeria that is showing dieback. I noticed that it is mainly on one side of the tree indicating a reduction of vascular flow. I thought that it may be a girdling root. I excavated around base of the tree on that side showing damage. At about 6" below grade (which means the tree was originally planted too deep), I found the wire planting cage that the tree had around its rootball while planting. The tree had grown into the basket cutting into its vascular system causing dieback. I commonly hear that it's okay to leave the wire basket on a tree's rootball when planting because it will rust before it could cause damage. This wire cage that's been underground for over 20 years looks as good as a wire basket that is new. I recommend to anybody planting trees to remove the wire basket when planting trees!"

When trees are declining, be sure to excavate around the roots when searching for a possible cause to the problem
Photos: Todd Armstrong, The Davey Tree Expert Company

European Elm Scale on Ulmus 'Princeton'

Marie Rojas, IPM Scout, found European elm scale on *Ulmus* 'Princeton' in Laytonsville. This scale has one generation per year in our area and produces eggs from May into July. Look for the yellow crawlers along veins on the undersides of leaves from now through fall. Heavy infestations of this scale will produce large amounts of honeydew.

Control: Beneficial insects can do a good job controlling this scale. However, if large populations are found on leaves, treat with foliar applications of pyriproxyfen (Distance) or buprofezin (Talus) mixed with 0.5 - 1% oil mixture when crawlers are present.

Female European elm scale tend to be found in tree forks
Photo: Marie Rojas, IPM Scout

Azalea Bark Scale

By: Stanton Gill

Connie Bowers, Garden Makeover Company, sent in a pieris heavily loaded with scale this week. The scale is *Eriococcus azaleae*, commonly called azalea bark scale. This felted scale is found on azaleas, pieris, and occasionally rhododendrons. Infested plants often become darkened with sooty mold, a fungi that grows on the honeydew excreted by these sucking pests. You will see the sooty mold on the samples Connie submitted this week. Eggs were laid in the early part of May, and the scale will be a very noticeable white color through the summer. Systemics such as dinotefuran or Altus as a drench would work for control.

Azalea bark scale produces a lot of honeydew on which sooty mold grows
Photos: Connie Bowers, Garden Makeover Company

Indian Wax Scale

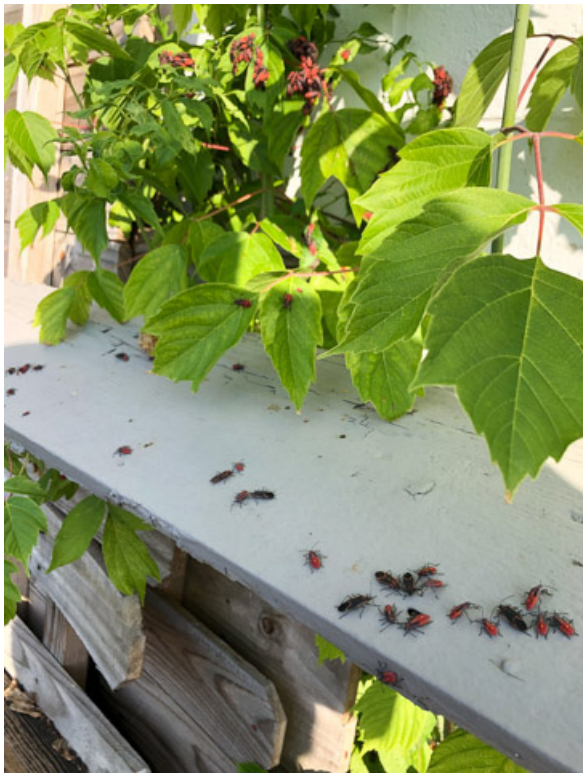
On June 8, Heather Zindash, The Soulful Gardener, found some eggs under the female covers of Indian wax scale in Gaithersburg. Look for crawlers of this scale on on holly, Japanese maple, winterberry, pyracantha, and camellia. Crawlers will be active into July.
Control: Use insect growth regulators such as Distance or Talus when crawlers are active.

These Indian wax scale eggs were found on June 8, so now is the time to look for crawlers
Photo: Heather Zindash, The Soulful Gardener

Boxelder Bugs

By: Stanton Gill

Here is one we have not seen a lot of activity from for a awhile – boxelder bugs. Mark Schlossberg, ProLawn Plus, Inc., sent in this picture of hundreds of boxelder bugs swarming in a customer's landscape this week. They are very active feeding on boxelder trees (*Acer* species) this week. These bugs are not significant in the amount of damage they cause. The adults will attempt to overwinter in houses in the fall and be a bit of a nuisance.



More of of a nuisance for people than a problem for plants, all stages of boxelder bugs are active now
Photo: Mark Schlossberg, ProLawn Plus, Inc.

2021 MDA Pesticide Container Recycling Program

See the brochure for dates and locations

Ambrosia Beetles

By: Stanton Gill

On June 14, we found 11 *Xylosandrus crassiusculus* (granulate ambrosia beetles) and 4 *Xylosandrus germanus* in the trap we are monitoring here at the research center in Ellicott City. On June 15, Richard Uva found 6 camphor beetles in a trap in Federalsburg. We are still seeing ambrosia beetle activity, but it has declined from earlier in the season. If you are seeing any damage, please let me know at sgill@umd.edu.

Spittlebugs

Marie Rojas, IPM Scout, found spittlebugs on arborvitae in Laytonsville this week. Only the nymphs produce spittle as protection from desiccation and predators. Adults quickly jump if disturbed. Generally, control is not necessary for this insect.

Spittlebug nymphs were feeding on arborvitae foliage
Photo: Marie Rojas, IPM Scout

Catalpa Sphinx Moth Caterpillars (Catalpaworms)

Marie Rojas, IPM Scout, found catalpa sphinx moth caterpillars on catalpa this week. There are multiple generations so caterpillars will be found throughout the summer.
Control: Spray applications are often not practical, and parasites pretty efficiently take care of this colorful caterpillar. If you have to treat, then use Bt in the early stages.

Parasitic wasps help to keep populations of catalpa sphinx moth caterpillars under control

Weather Impacts Insects and Spiders

By: Stanton Gill

In Victoria, Australia, they recently experienced major flooding. The interesting thing is that they have pictures of miles and miles of land and city areas covered in spider webs. There is a spider called sheet web spider (*Stiphidion facetum*, family **Stiphidiidae)** that normally likes to feed and live on the ground. With the flooding, they put out silk from their spinnerets and floated in the wind to higher ground. They are moving en masse to higher ground and the webbing is now all over trees, shrubs, houses, and anywhere they could find high ground. It is not too much different from people searching for higher ground in a flood situation. Township people were not overly impressed with the massive webbing going on, but it is just temporary, at best.

The other interesting one is Ben Beale, Extension Agent in St. Mary's County, sent us pictures from a nursery that found a snake-like grouping of insect larvae moving across areas with landscape fabric in the nursery. We get similar pictures every couple of years from nursery and greenhouse growers, usually after a thunderstorm and torrent of rain. These insects are larvae of Sciaridae, likely *Lycoriella* species. They will move over surfaces in a snake-like formation to move to new territory. Their activity is similar to geese when migrating in large flocks. It is just an interesting side effect of the impact of extreme weather on arthropods.

Larvae of fungus gnats can be found moving across areas en masse in a snake-like manner
Photos: Ben Beale, UME

Watch Your Pumpkins and Squash for Squash Vine Borer

Jerry Brust, UME

I have gotten several emails from gardeners in different areas of the state reporting they are seeing the beginnings of squash vine borer problems in their pumpkins or squash crops. Squash vine borers can be difficult for gardeners to manage.

Fig. 1 Adult squash vine borer
Photo: G. Burst, UME

Squash vine borer adults, *Melittia cucurbitae*, are moths that look like wasps. They are about 1/2 inch long with an orange abdomen with black dots (fig. 1). These moths are day flyers and can easily be spotted flitting about a squash or pumpkin field. The adults emerge in mid or late June in our area. Adults lay most of their eggs in the first 12-15 inches of the stem. Pumpkins and summer and winter squash are preferred plants, rarely have I seen them in watermelon, cucumber or cantaloupe. The eggs hatch in about one week at which time larvae bore directly into stems and feed. The large cream-colored larvae are 1 to 1 1/2" long and 3/8" wide (fig. 2). Their feeding blocks the flow of water to the rest of the plant. Larvae feed for 4-6 weeks, then exit the stems and burrow into the soil to pupate, where they overwinter.

Fig. 2 Squash vine borer larvae in stem
Photo: G. Brust, UME

The first symptom of a borer attack is the wilting of plants, which usually occurs in July. The wilting may occur at first only when in direct sun, but the plants eventually die. At the base of the plant you can find greenish-yellow sawdust like material (frass) and often the stem is swollen (fig. 3) and eventually rots away.

Squash vine borers can be difficult to prevent in a garden situation because once larvae are in the stem, it is too late to do much. When squash vines begin to run or you see adults you can treat the base of the stem with a pyrethroid insecticide (just the first 15-18 inches of stem) every 7-10 days, 3 times over the next few weeks. You could also use Bt insecticide (it is OK but not great) or Entrust which is better and both are OMRI approved.

Fig. 3 Frass (arrow) and stem damaged by borer
Photo: G. Brust, UME

Beneficial of the Week

By: Alina Avanesyan and Paula Shrewsbury, UMD

Green lacewings to the rescue!

Green lacewings, *Chrysopa sp.*, in the family Chrysopidae, are important beneficial insects and good "friends" to plant managers. They are flexible in terms of habitat, and they have a wide food range which consists primarily of plant pests. Green lacewings are important predators of aphids, whiteflies, the caterpillars of many pest moths, and other soft-bodied insects. There are about 1200 species of Chrysopidae described; of these, 92 species are recorded in North America (excluding Mexico).

Green lacewing egg.
Photo: M. J. Raupp

The adult green lacewing has a bright green to pale green body and delicate transparent wings (1/2-3/4 in long) with a lot of tiny interconnected veins. The adults are not good fliers, and they are mostly active at night. The adult has chewing mouthparts and long slender antennae. Many species have golden eyes. The adults primarily feed on pollen, nectar and honeydew (which is the excretion produced by aphids and other piercing-sucking insects that feed on phloem sap). The honeydew is a sweet sugary substance which has strong odor as it degrades. This odor comes from the plants infested by aphids, and it is highly attractive for the adult green lacewing and helps in its search for food. In some species in the family Chrysopidae, however, the adults can be predators, too.

Green lacewing larvae.
Photo: Bradley Higbee, Paramount Farming, Bugwood.org

There are multiple generations per year and adults are active through all the summer months. Each adult lives 4-6 weeks, depending on climatic conditions, and can lay up to 1000 eggs. The eggs are laid in groups on the top of individual slender stalks, which are about ¼ in long; this prevents hatched larvae from eating each other. The larvae hatch within 3-4 days, they are tiny when they hatch but quickly grow to about 3/8 in long. The larva continues to grow for 2-3 weeks and then it transforms to a pupa (a cocoon) which is attached to a plant; a few weeks later the adult emerges. One or two developmental stages of green lacewings (often cocoon, most often adult depending on species) in temperate climate can overwinter tolerating low temperatures, although little is known about the green lacewing tolerance to cold.

Green lacewing larvae are also known as "aphid lions" and they are voracious predators; a single larva can consume up to 200 aphids in a week. The name "aphid lion" comes from the larva's body shape and two sickle-shaped jaws. Green lacewing larvae aggressively attack aphids, pierce prey with their sickle-shaped jaws, inject a paralyzing venom (certain enzymes), and consume the prey's body juices. The long tail section of the larva's body provide stabilization during their attack.

The larvae are also predators on other small insects such as mites, thrips, mealybugs, scales, and small caterpillars, as well as the eggs of most pests. Earlier in the season, you might also see brown lacewings, which are cousins to green lacewings but a little bit smaller; their larvae have similar structures and are also fierce predators (please see this cool video of the brown lacewing larvae hunting aphids).

Green lacewings are highly beneficial, and seeing them in our gardens would be a welcome sight. While we are waiting for them to "work", however, we could help the green lacewings find their prey. The lacewings can be successfully attracted to a garden by planting more nectar-producing plants, such as Queen Anne's lace, coreopsis, dill, and sunflowers.

The larvae can also be purchased commercially and are commonly released predators for augmentative biological control (to boost natural populations of lacewings earlier in the season). The green lacewing larvae effectively reduce pests in landscapes, nurseries, greenhouses, and on some houseplants, as well as in some agricultural crops.

Green lacewing pupa.
Photo: Bradley Higbee, Paramount Farming, Bugwood.org

Adult green lacewing.
Photo: M. J. Raupp

Weed of the Week

By: Chuck Schuster

Sometimes the plants that garden centers offer are certainly best kept in containers. An example that most of us certainly know is bamboo. Another one that you might be seeing is chameleon plant, *Houttuynia cordata,* also known as rainbow plant because of its ability to have multi-colored leaves.

It is labeled as invasive in Maryland, as it is in many other states. This plant is an aggressive grower that is often used as a groundcover. It has the ability of growing up to two feet in total height. It is a native of Asia that was brought to the United States and introduced as an ornamental. It prefers moist soils and will survive in areas where the water table is high, and will survive in standing shallow water. It is shade tolerant. It spreads by way of rhizomes, which are very fragile and break apart easily, making removal very difficult. The leaves are in the shape of a heart, thus its Latin name *Houttuynia cordata.*

Control of this plant can be accomplished, but do not expect it to be done quickly. Removal is often unsuccessful, but can be done if one keeps the plant cut back and attempts to remove the roots every late August. Remember that any portion of the rhizome will allow this plant to regrow. Chemical control can be

obtained using glyphosate products that are labeled for brush and stump. Cut the plants back which decreases leaf area until late June. Then, allow the plant to regrow and apply glyphosate to the young leaves. Another alternative is to allow the plants to grow, and during an active growth period, cut the plants down, and apply glyphosate directly to the cut stems. Remember that glyphosate will damage desired ornamental plants so caution must be exercised during use. As always, correct PPE is a must.



Chameleon plant, *Houttuynia cordata*, is labeled a invasive in Maryland, but is often used as a groundcover
Photos: Mark Schlossberg, ProLawn Plus, Inc.

Plant of the Week

By: Ginny Rosenkranz

Agastache Poquito™ Lavender is another dwarf hummingbird mint in the Poquito™ collection that thrives in USDA zones 5-10 and grows best in fertile but well drained soils with especially good winter drainage. The term ‘Poquito’ means "little bit" in Spanish, but the impact of the plant is anything but. The Poquito™ collection is from Terra Nova® Nurseries and includes Butter Yellow, Orange, and Dark Blue to go with Lavender. This plant likes a neutral soil pH and is salt tolerant, making it a good choice to plant near sidewalks and driveways. The pink-lavender, tiny, 2-lipped arching tubular flowers are arranged on sturdy thick flower spikes that allow the flowers to bloom from May through October. Because the flower spikes are so thick and sturdy, the plant is very showy and attracts butterflies, hummingbirds, and other pollinators. The plant itself is dwarf with a bushy habit, growing 11 inches tall and 15 inches wide with fragrant leaves and flowers. Once established, it is very drought tolerant. Both rabbits and deer do not seem to like to feast on this Agastache which can be planted as massed or mixed beds, naturalized in pollinator gardens, added to herb beds, and used as a filler in container gardens next to the thriller and spiller plants. No serious pests were listed.

***Agastache* Poquito™ Lavender blooms May through October**
Photo: Ginny Rosenkranz

Pest Predictive Calendar "Predictions"

By: Nancy Harding and Paula Shrewsbury

In the Maryland area, the accumulated growing degree days (**DD**) this week range from about **905 DD** (Cumberland) to **1335 DD** (Reagan National Airport). The Pest Predictive Calendar tells us when susceptible stages of pest insects are active based on their DD. Therefore, this week you should be monitoring for the following pests. The estimated start degree days of the targeted life stage are in parentheses.

- Cottony maple scale – egg hatch / crawlers (872 DD)
- European fruit lecanium scale – egg hatch / crawlers (904 DD)
- Mimosa webworm – egg hatch 1st gen (1002 DD)
- Japanese beetle – adult emergence (1056 DD)
- Cryptomeria scale – egg hatch / crawlers (1101 DD)
- Fletcher scale – egg hatch / crawlers (1105 DD)
- Indian wax scale – egg hatch / crawlers (1145 DD)
- Oriental beetle – adult emergence (1147 DD)
- Fall webworm – egg hatch 1st gen (1173 DD)
- Green June Beetle – adult emergence (1539 DD)
- Pine needle scale – egg hatch / crawlers 2nd gen (1561 DD)

See the Pest Predictive Calendar for more information on DD and plant phenological indicators (PPI) to help you better monitor and manage these pests.

Degree Days (as of June 16)

Aberdeen (KAPG)	914
Annapolis Naval Academy (KNAK)	1127
Baltimore, MD (KBWI)	1176
Bowie, MD	1187
College Park (KCGS)	1033
Dulles Airport (KIAD)	1098
Ft. Belvoir, VA (KDA)	1117
Frederick (KFDK)	1050
Gaithersburg (KGAI)	1038
Greater Cumberland Reg (KCBE)	905
Martinsburg, WV (KMRB)	918
Natl Arboretum/Reagan Natl (KDCA)	1335
Salisbury/Ocean City (KSBY)	1158
St. Mary's City (Patuxent NRB KNHK)	1247
Westminster (KDMW)	1210

Important Note: We are using the Online Phenology and Degree-Day Models site. Use the following information to calculate GDD for your site: Select your location from the map Model Category: All models Select Degree-day calculator. Thresholds in: Fahrenheit °F Lower: 50 Upper: 95 Calculation type: simple average/growing dds Start:Jan 1

Conferences

2021 Greenhouse Growers Field Day
July 8, 2021
Location: Catoctin Mountain Growers, Keymar, MD

Save the dates...

Cut Flower Tour
September 14, 2021

MNLGA Field Day
September 16, 2021

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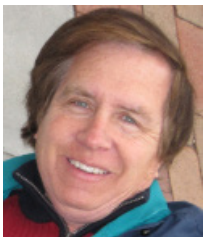

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Photos are by Suzanne Klick or Stanton Gill unless stated otherwise.