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OSU Extension - Auglaize County Weekly Horticulture Newsletter – 3-20-20

Planning Ahead For Lawn Care

Spring will officially here in a few days and the lawn has started to green up. Temperatures look to be variable for the next two weeks. Spring weather will be returning so it is time to discuss what should be done to obtain a healthy lawn for the season.

If you did not aerate your lawn in the fall, now through April is an acceptable time. Use a core aerator and not a spike aerator. Be sure soils are moist, but not wet and not too dry to properly operate an aerator. Aeration relieves soil compaction, improves water and nutrient movement and reduces thatch build up.

Once we begin mowing set the mower to cut at a height of 3 inches to reduce stress on plants and provide a thicker lawn to compete against weeds. Mow frequently enough to remove only 1/3 of the length of a grass blade. This will reduce mowing stress on the lawn.

It is not necessary to apply fertilizer to your lawn, however for the most aesthetically appealing and most competitive against weeds, some minimum amount is beneficial. If you have never taken a soil test of your lawn, now is a good time to get it done. To determine the pH of the soil take a 2 to 4 inch soil sample. To determine phosphorus and potassium levels in the soil take an 8-inch soil sample. Therefore it is best to take two soil samples, but one at 6” would be a good compromise. The closest soil analysis lab is Brookside Laboratories in New Bremen.

Once you obtain your soil test report look for the soil pH and phosphorus and potassium levels. The levels of the other nutrients should be sufficient, unless the soil is too acidic or basic or the soil is sandy. If the soil pH is below 6, then add some lime.

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If the phosphorus level is below 10 parts per million (Mehlich III extraction) add phosphate (P_2O_5) fertilizer at a rate of 1 pound of P_2O_5 per 1000 square feet. If the phosphorus level is between 11 and 25 ppm, then apply 0.5 pounds P_2O_5 per 1000 square feet. If phosphorus level is greater than 25 ppm or you have no soil test to prove the level of phosphorus, then DO NOT apply phosphorus fertilizer to the lawn! Applying too much phosphorus is harmful to the environment.

If the potassium level is 0 to 50 ppm, apply 3 pounds of potash fertilizer per 1000 square feet. If potassium level is between 51 and 100 ppm, apply 2 pounds of potash fertilizer per 1000 square feet. If potassium level is between 101 and 150 ppm, apply 1 pounds of K_2O per 1000 square feet. If potassium level is greater than 150 ppm, then apply no potash fertilizer.

Application of nitrogen fertilizer to the lawn depends upon whether you have a high (regular watering) or low (no watering) maintenance lawn, the aesthetic value, and whether grass clippings are recycled or removed. The greatest amount of nitrogen (3 to 5 pounds nitrogen per 1000 square feet per year) will be required in high maintenance lawns where grass clippings are removed. For these lawns apply nitrogen 4 to 5 times during the growing season starting now with a slow release nitrogen. For low maintenance lawns and recycling grass clippings apply 1 pound of Nitrogen per 1000 square feet per year in late September. For lawns between these maintenance levels apply nitrogen fertilizer at 0.5 to 1 pound per 1000 square feet 2 or 3 times during the year. Two nitrogen applications in the fall (early September followed by late October) can provide a lawn that is as healthy as making one application in the spring and one in the fall. Applying nitrogen fertilizer in the spring will cause excessive growth of grass. If applying nitrogen fertilizer once in the spring wait until late April. Slow release nitrogen fertilizers should be used in spring applications.

It is **too early** to apply any herbicides in lawns, therefore do not apply a weed and feed fertilizer at this time!

Purdue University has an excellent chart to determine how much and when to apply nitrogen fertilizer based upon maintenance levels. The website address is https://www.extension.purdue.edu/extmedia/ay/ay-22-w.pdf .

For help in calculating the amount of fertilizer needed based upon the rates provided above visit the following web site: https://turf.purdue.edu/calculating-the-pounds-of-fertilizer-to-apply-4/?cat=55

Calibrate fertilizer spreaders to ensure over application is not occurring since over application can lead to environmental issues and cost more money.

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Local Observations

Star-of-Bethlehem

Magic lilly

Good afternoon! I pray you are well.

We received rainfall 4 days this past week and some snow on Saturday. Total liquid precipitation on Saturday, March 14th ranged from 0.03 near Valley and Idle roads to 0.25" near Shelby-Fryburg and Santa Fe-New Knoxville Roads, near Uniopolis, and near Lock 2 and Tri-Township roads. Rainfall on Monday ranged from a trace near County Road 66A and State Route 66 roads to 0.07" near Shelby-Fryburg and Santa Fe-New Knoxville roads. Rainfall on Wednesday ranged from 0.68" near Santa Fe-New Knoxville and Kettlersville roads to 1.2" near Bloody Bridge. Rainfall on Thursday ranged from 0.2" near Mercer Line and State Route 197 and near Uniopolis to 0.51" near Valley and Idle Roads. Total liquid precipitation for the week ranged from 1.07" near Santa Fe-New Knoxville and Kettlersville roads to 1.68" near Tri-Township and Lock 2 roads. The average liquid precipitation for the week was 1.39", only 0.02" greater than last week.

The average high temperature now is 49 degrees F, 3 degrees higher than last week. Temperatures are continuing to change more rapidly! Temperatures were above normal for 2 days and below normal for 5 day. The average high temperature for the week was 48 degrees F which is 1 degree F lower than the historical average high. The range in high temperatures for the week was 38 to 65 degrees F with an average high temperature for the week of 48 degrees F, one degree below the average high temperature.

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VegNet

NO news this week.

BYGL

Start Planning for Pre-Emergence

Authors
Carri Jagger
Published on
March 20, 2020
I have had a few questions recently about when to apply pre-emergent herbicide to flower beds. Now is a great time to do it as long as you prepare the bed first. You want your beds to look like the picture below if you are planning on using pre-emergent herbicide.

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Pre-emergent herbicides are a great way to cut down on the amount of many annual and perennial weed seeds in flower beds. Pre-emergent herbicides control a variety of weeds but not all weeds. If your flower beds look like the picture below you need to make sure all of the perennial and annual broad leaf weeds and grass weeds are removed before applying pre-emergent. Because pre-emergent herbicide will not control weeds currently growing in the beds, thus the preparation. Pre-emergent prevents weed seeds from growing and maturing by inhibiting the root system development of the young weed seedling. This kills it before it matures.

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There are several brands of pre-emergent on the market including: trifluralin (Preen®), DCPA (Dacthal®), oryzalin (Surflan®), pendimethalin (Halts®) and isoxaben (Gallery®). Unfortunately, some of the previous are not readily available to home gardeners, since their primary use is by professional applicators. In all cases, careful reading of the herbicide label is important, since not all herbicides can be used among all ornamental plants and certain herbicides require special application techniques. In fact, some herbicides, particularly those for vegetables, may require a period of time post-planting before application. Therefore, clean the beds up first and apply at the proper time.

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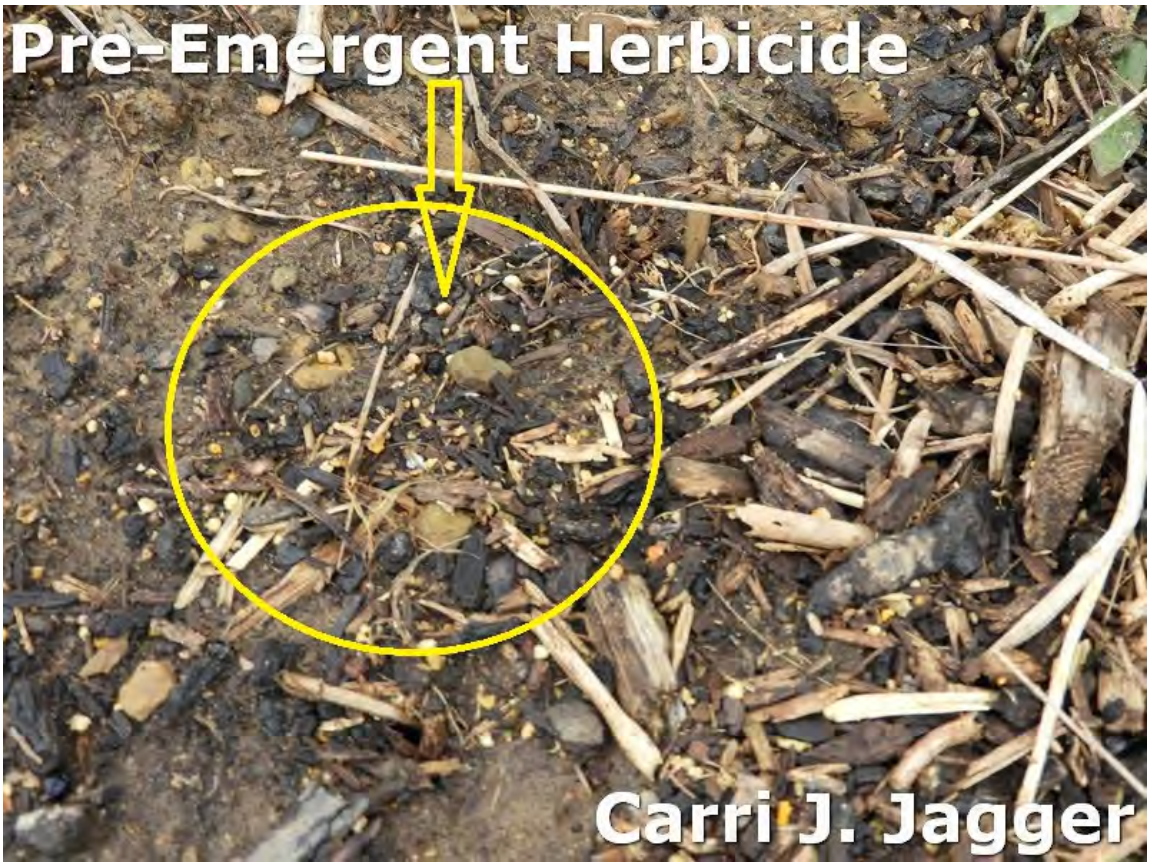

The pre-emergent herbicide are the little granules inside the yellow circle.

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Using pre-emergent herbicides is not a one and done treatment. It needs to be reapplied about every 3 months, depending on the product. If mulch is going to be used and annuals are planted, a pre-emergent application should be done after mulching. I usually use three applications a year. One at the end of March or the beginning of April, one in June after I mulch, and another at the end of September or beginning of October to control winter annuals. I actually spread mine the other day right before a rain. So now it is activated and protecting my flower beds from pesky little weed seeds that could be lurking in the soil. It is very important to water in pre-emergent herbicide once applied as this activates it.

Keep in mind that once pre-emergent herbicides are applied and watered in, they create a barrier thus preventing weed growth; if that barrier is disturbed from digging holes to plant or raking, the product will no longer be effective. Also, if annuals are started from direct seeding in the garden, avoid using pre-emergent herbicide in those areas. This would also include any perennials that you want to reseed and spread in your garden.

Information for this article came from Colorado State Extension, University of Missouri, and Purdue University Extension.

More Information
https://ipm.missouri.edu/MEG/2016/6/weed_control/
https://ag.purdue.edu/hla/pubs/HO/HO-217.pdf

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Spring….The Good, The Bad and The Ugly

Authors
Thomas deHaas
Published on
March 20, 2020

We celebrated the first day of Spring yesterday. It is a beautiful time of year. A time of rebirth, renewal, beauty. However, lurking in the background are the Bad and the Ugly!

The Good:
As of today, March 20, 2020, in Perry, Ohio we are Growing Degree Day 42. Mother Nature is waking up for spring. Snowdrops are in full bloom,

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Pussy Willows,

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tulips,

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hyacinths,

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and daffodils are right behind.

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Pachysandra is ready to bloom.

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Myrtle is blooming.

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Forsythias

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and Lilacs

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are elongating with Korean spice Viburnum close behind.

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The Bad:
Hairy Bitter cress

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and Henbit

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are just coming into bloom. Which means they need to be pulled before they go to seed or you will have it next spring unless you use a fall pre-emergent herbicide, as they are both winter annuals. Just showing signs of life are invasives like privet,

multiflora rose,

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European Alder,

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and Oriental Bittersweet.

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The Ugly:

All the weeds from last year have left seed behind. Horse nettle,

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Marestail (horseweed)

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and others

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are waiting to return for this growing season. You may want to remove above ground portions if possible but the seed may still be there.
Happy Spring!

Infectious Disease Host Range: How Wide Can It Be?

Authors
Jim Chatfield
Published on
March 20, 2020

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Infectious disease is on our minds these days, but let us at least step away from our human infectious disease waking nightmare, to talk about infectious *plant* diseases (see also https://bygl.osu.edu/index.php/node/1450). Yes, as horticulturists know, plants have pathogenic fungi, bacteria, oomycetes, nematodes, phytoplasmas, plants (such as mistletoes), and even viruses, such as the tobacco mosaic virus and the impatiens necrotic spot virus, that cause plant diseases. With that in mind, let us discuss several curious aspects of infectious plant diseases and beyond.

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A 'Julia Child' rose

As often is apropos, let us start with Shakespeare, from Sonnet 35: *"Roses have thorns, and silver fountains mud;/Clouds and eclipses stain both moon and sun,/And loathsome canker lives in sweetest bud,/All [plants] make faults."* He was right that all "plants" (actually he said "men") make faults; no plant or animal is without its fair share of diseases and disorders.

The Bard was not quite right about "thorns" at least to a botanist, who define roses' thorn-like structures as "prickles", outgrowths of the epidermis of stems, containing no vascular tissue. Thorns are modified stems arising from the axil of a leaf. In a way of course this distinction may be described as "*full of sound and fury, signifying nothing*" in light of the reality of "*if you prick us do we not bleed*" , to mix a few Shakespearean metaphors. Nor considering modern terminology would be consider buds to have "cankers", since this term is generally reserved for symptoms of disease on stems.

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Rose "prickles". Ouch.

But that is beside the point, so to speak. I spoke of this recently to a group in Tiffin (back in ancient days when we all mingled in groups). It was part of an exercise I often do about infectious plant diseases. As with human diseases, when we talk about infections we talk about host-parasite relationships inside host cells and about the range of susceptible host organisms affected by a particular pathogen. These are topics we are all becoming attuned to in the news these days as we talk about the COVID-19 disease, the CDC, and pandemics.

In the case of plant diseases, of course, we talk about plant disease clinics, rather than hospitals dealing with infectious diseases of humans. With that in mind, I posed the question to the group: are there any plant pathogens that have a *host range* so wide that they will also infect humans? Host range is something we talk about all the time with plant diseases since it helps us understand the risk of a particular disease to a particular crop. For example, plum black knot, caused by the fungus, *Apiosporina morbosum*, only occurs on plums and related plants in the genus *Prunus,* such as cherry and peach and almond.

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Plum black knot. I cannot tell a lie: Joe Boggs actually took this picture.

Bacterial fireblight, caused by the bacterium *Erwinia amylovora*, occurs only on plants in the rose family, such as apple (*Malus*), pear (*Pyrus*), and rose (*Rosa*), and so on. It is a useful way to assess risk when diagnosing plant diseases. Most plant pathogens have a narrow host range, occurring only on one species, one genus, or one family of plants. Other plant pathogens have a wide host range, such as the *Botrytis* gray mold fungus, with hundreds of different host plants.

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Bacterial fireblight on Callery pear.

So, is there any pathogen with so wide a host range it affects both plants and animals such as humans? I tend to say – no. The closest is certain minor flower and leaf pathogens such as the *Alternaria* fungus that are one of the reasons doctors prohibit well-wishers from bringing flowers into ICU units. These fungi, however, do not infect humans; they simply clog up respiratory tissue with spores; cells of humans are not infected by *Alternaria*. So that is not a pathogen that has a host range so wide that it affects both humans and plants.

Also, toxins, such as those produced by, for example, the ergot of rye fungus, *Claviceps purpurea,* though they affect humans with gangrenous and hallucinogenic ergotism, do not *infect* human cells, though they certainly can *affect* humans. The ergot fungus is a plant pathogen, but not a human pathogen. Sometimes people mention allergens, but they do not infect humans (or plants); they simply cause an allergic reaction for humans, not an infection.

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Ergoted rye grain. Black structure is fungal sclerotia, that if in a high enough percentage with healthy grains, has toxic effects for humans. Image from APS.net

One possible caveat to all this: how about our growing awareness of immune-compromised people, something the public became more aware of due to diseases such as AIDS or with the use of drugs to deliberately suppress the immune system when transplants are needed? There may be some case to be made that certain mold fungi that cause plant diseases can cause human infections of severely immune-compromised humans, but this is still at the edge of our scientific understanding thus far. Rest assured, though, you will never get Dutch elm disease and elm trees will never catch the common cold! Their host ranges are simply not that broad.

Which brings us to this example to make the point: rose gardener's disease. The fungus that causes this disease of humans is *Sporothrix schenckii*. Rose gardener's disease qualifies as a human disease, as the spores of this fungus infect human skin, and rarely more seriously if inhaled, leading to systemic infections. This fungal pathogen of humans occurs in soil, on sphagnum peat, and on rose "thorns", which if you are pricked and the pathogen is present may cause you to become infected. So, is this not a case of both a human and a plant disease?

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No, *Sporothrix schenckii* is not a plant pathogen, it does not infect rose prickles or any other plant tissue, it is simply an occasional fellow traveler if splashed from soil onto prickles. So at least for plants, this fungus does not join with plant pathogens that cause plant diseases, such as rose black spot, bacterial crown gall, or rose rosette virus disease. Never the twain shall meet on us humans.

These kinds of distinctions can aid in our critical thinking as we learn more about infectious disease, certainly our topic *du jour*, and for many future days, weeks, months and years. Pathogens and disease are ever with us: it is just one way that organisms (naturally) interact. Natural, but often to our despair and always a topic of our desire to manage.

By the way, the rose-gardener's disease can be quite serious if left untreated by antibiotics prescribed by a human (not a plant) doctor. Especially if the person pricked by that rose has a compromised immune system. So, if you develop sporotrichosis from *Sporothrix schenckii*, and have symptoms of discolored lesions where prickles penetrated the skin, check with your physician.

BTW: I have not included any images of rose gardener's disease for two reasons: 1.) I do not have any of my own and try not to use too many images that are not mine; and 2.) They are rather gruesome. You can google them, though, if you are curious. So, let us close with a rosier image.

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Now that's a rose. A 'Julia Child' rose. From the garden of Lynne Sherwin of Akron.

Growing Degree Days, Part 2

Authors
Amy Stone
Published on
March 20, 2020

Earlier this week, a BYGL Alert was written as an intro or refresher to growing degree days, *Growing Degree Days (GDD) – What Is Your #* , (March 16, 2020). As promised, here is part two.

Here is a look at GDD accumulations across the state as of March 20, 2020. While I couldn't do every Ohio zip code – *but you can easily do your own* – this gives you a taste of where others are at in Ohio.

Toledo (43615) - 26 GDD
Cleveland (44120) - 48 GDD
Canfield (44404) - 61 GDD
Athens (45701) - 92 GDD
Ironton (45638) - 101 GDD

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Cincinnati (45223) - 95 GDD
Lima (45804) - 31 GDD
Mansfield (44906) - 46 GDD
Columbus (43210) - 59 GDD
Chillicothe (45601) - 96 GDD

Once you have your own GDD, you can click on the 'summary' tab and it will provide the last 6 years of GDD accumulations on that same date. I used the zip code of the office in Toledo as an example.

Toledo (43615) – this year, plus 6 past years

2020, March 20 - 26 GDD
2019, March 20 - 74 GDD
2018, March 20 - 109 GDD
2017, March 20 - 152 GDD
2016, March 20 -152 GDD
2015, March 20 - 41 GDD
2014, March 20 - 49 GDD

Just as you can change the zip code on the website, you can also manipulate the date if you would like to explore what was the GDD on a specific date in the past. If you have any questions, or need additional guidance to navigate the website if you are a newbie, send an email to stone.91@osu.edu and in the subject line include: GDD

Digging Deeper
Nature's Notebook
https://www.usanpn.org/natures_notebook
National Phenology Network
USGS (U.S. Geological Survey) Video
https://www.usanpn.org/usa-national-phenology-network

Asian Giant Hornet in the Northwest U.S.

Authors
Joe Boggs
Published on
March 19, 2020

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The Asian Giant Hornet (AGH) (*Vespa mandarinia*) **has not been found in Ohio**. In fact, it has not been confirmed anywhere in the U.S. beyond the extreme northwest corner of Washington State.

Previous BYGL Alerts noted that AGH had never officially been confirmed in North America. That changed September 18, 2019, when an AGH nest was found and destroyed in the town of Nanaimo on Vancouver Island, British Columbia. The identity of the hornets was confirmed by Canadian entomologists and international experts contacted by the British Columbia Ministry of Agriculture. It was the first confirmed report of AGH being found in North America.

In December 2019, the Washington State Department of Agriculture (WSDA) confirmed that a dead hornet collected by a resident in Blaine, WA, was AGH. Blaine is on the U.S. – Canadian border almost directly across the Strait of Georgia from Nanaimo, B.C. It was the first confirmation of an AGH adult being found in the U.S.; however, no nests were discovered.

Subsequently, WSDA was notified of three more potential AGH sightings near Blaine and in Bellingham, WA, which is located around 10 miles south. Although specimens were not confirmed, two of the sightings were made by experienced beekeepers. The WSDA will be deploying detection traps this season in the Blaine and Bellingham areas.

You can read more details about the confirmations by following the hotlinks listed under "The Confirmations" below.

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The Hornet

AGH is the world's largest hornet with a body length of 1.5 – 2" and a wingspan from 1.5 – 3". Two of its most notable features are its large orange or orangish-yellow head and distinct orangish-yellow and reddish-brown bands on its abdomen.

AGH produce annual underground nests often taking advantage of cavities created by burrowing rodents and other animals. Their seasonal development matches that of our own North American yellowjackets (*Vespula* spp.) and bald-faced hornets (*Dolichovespula maculata*) with the nests only being used for one season.

Despite the social media hype and dubious web postings, experts consistently note that AGH is not particularly hostile towards humans, pets and large animals. As with our native yellowjackets and bald-faced hornets, AGH generally goes about its business unless its nest is threatened. Of course, swatting at an AGH may also elicit a painful introduction to its 1/4" stinger.

However, AGH is a predator of other insects and **extremely aggressive towards European honey bees** (*Apis mellifera*). AGH will mass-attack honey bee hives and quickly dispatch the workers primarily by clipping off their heads. They then rip out the honey bee larvae and pupae, fly back to their underground nests and feed the *mellifera* meat morsels to their young.

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This discriminating taste for honey bees is a two-edged sword. On one hand, AGH can be highly destructive by quickly devastating honey bee hives. On the other hand, their strong preference for honey bee meat means bee hives are highly effective in revealing undetected AGH populations. For this reason, **beekeepers will most likely be the first to observe AGH** in an area where this non-native has established new outposts.

PLEASE NOTE: A possible AGH discovery is meaningless unless it's **officially confirmed by a regulatory agency** such as the Ohio Department of Agriculture (ODA) or the USDA Animal and Health Inspection Service (USDA APHIS). A specimen is required for an official confirmation. Thus, it's very important to collect a specimen (dead specimens kept frozen) and contact the ODA if you live in Ohio.

While photographs can't serve as official confirmations, efforts should still be made to take pictures because they help to separate AGH from various look-a-likes. Likewise, "sightings" carry no official recognition unless backed by a photograph or more importantly, a specimen.

Look-A-Likes

The two insects most commonly mistaken for AGH are European Hornets (*V. crabro*) and our native Cicada Killer Wasps (*Sphecius speciosus*). Cicada killers are the largest native wasp found in Ohio. They appear with the arrival of their namesake food item, Annual Dog-Day Cicadas (*Tibicen* spp.; family Cicadidae), and disappear once annual cicada activity concludes for the season.

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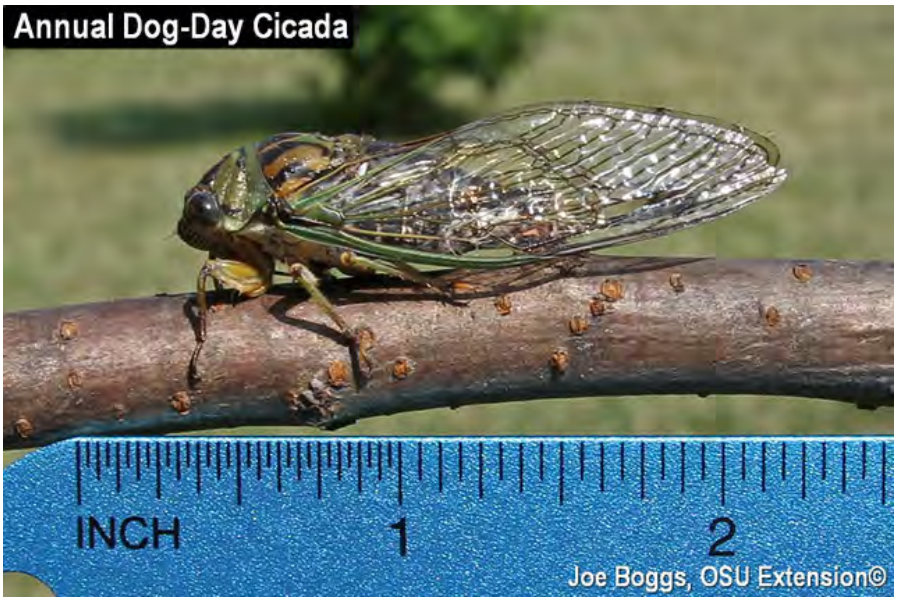

European hornets were first found in the U.S. in New York State around 1840. Since that time, the hornets have spread to most states east of the Mississippi and a few states to the west. European hornets are impressively large, measuring 1 - 1 1/4" in length. Their black and yellow markings on their abdomen make them look like yellowjackets on steroids; however, their head and thorax have distinct chestnut-colored markings. Yellowjackets have black and yellow markings on the head and thorax.

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Technically, European hornets are now the only "true hornet" found in Ohio. Taxonomically, our native bald-faced hornets are not hornets; they are grouped with yellowjackets which is why they are in the same genus as native Aerial Yellowjackets (*D. arenaria*).

Unlike our native yellowjackets and wasps, European hornets can cause noticeable girdling damage to twigs and branches of trees and shrubs by stripping bark to the white wood. It is speculated that the hornets are extracting

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sugar from the phloem tissue. Although the damage may be noticeable, it's seldom significant enough to cause concern.

European hornets construct paper nests that may look similar to the bald-faced hornet nests. However, they are most often found in hollow trees and sometimes in the walls of homes. They do not produce underground nests.

Normally, European hornets overwinter just like our native bald-faced hornets, paper wasps, and yellowjackets with only the queens that are produced this season surviving the winter. The new queens leave the nests to seek protected overwintering sites; old nests are not re-used. However, occasionally the entire European hornet nest will survive the winter if they are sufficiently protected. Indeed, although it is rare, nests in Ohio have been observed surviving through three winters.

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European hornets are reputed to be highly aggressive and their large size does make them look pretty scary. However, during past encounters with this hornet, I was able take close-up images and move branches with hornets on them without being stung or even charged. Still, landscapers should be cautious around these large stinging insects. Like wasps and yellowjackets, they are capable of stinging repeatedly.

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The European hornets may also fly at night and are attracted to porch lights or lights shining through windows. They have been known to repeatedly charge windows at night inducing panic in homeowners.

The Confirmations

The following websites document the AGH discoveries in Washington State as well as British Columbian and also provide additional helpful information:

WSDA Pest Alert: Asian giant hornet
https://wastatedeptag.blogspot.com/2019/12/pest-alert-asian-giant-hornet.html

Washington State University Extension, Additional Information on Asian Giant Hornet
https://extension.wsu.edu/wam/asian-giant-hornet-found-locally-what-we-know/

WSDA Asian Giant Hornet Reporting in Washington State
https://agr.wa.gov/departments/insects-pests-and-weeds/insects/hornets

British Columbia Ministry of Agriculture, Three Asian giant hornets found in Nanaimo
https://news.gov.bc.ca/releases/2019AGRI0102-001759

British Columbia Ministry of Agriculture, Asian giant hornet nest eradicated in Nanaimo
https://news.gov.bc.ca/releases/2019AGRI0106-001818

British Columbia Ministry of Agriculture, Pest Alert: Asian Giant Hornet
https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/animal-and-crops/plant-health/pest_alert_asian_hornet.pdf

Secrest Arboretum: Just Before Spring

Authors
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Published on
March 19, 2020

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This is your mid-day almost-spring wakeup call from OSU's Secrest Arboretum in Wooster. It will be the earliest vernal equinox in 124 years tonight at 11:49 in our time zone. "Equinox" comes from the Latin *equinoxium*, for the "almost" equal amount of day and night. Two more earliest years are coming in the leap years of 2024 and 2028. So, is it an early spring, phenology-wise?

Cornus mas in all its emerging glory

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Phenology is the matching of biological and environmental events, such as plant flowering and insect activity. That match is a useful metric because organisms respond to the buildup of growing degree days (GDD) for a given growing season. In Wooster and Secrest Arboretum, in northeast Ohio, the growing degree days are pretty normal for the last few years. As of this morning, they are at 43, in 2019 they were 57, and in 2018 they were 36. It was certainly a mild winter, but not too many days exceeded 50.

Once more with feeling: the chartreuse flowers of corneliancherry dogwood

You can calculate the increase of GDD (they never go down no matter how cold it is) by taking the high temperature for the day over 50 divided by 2, so our predicted high in Wooster today of 61 will increase GDD by 5.5 to 48.5 (61-50/2) today and of 67 tomorrow by 8.5 to 57 (67-50/2). What does this mean for plants? Corneliancherry dogwood (*Cornus mas* = there's that Latin again!) has its first bloom (1 of 20 flowers are out) at 40, so it has started to bloom in Wooster already, silver maple (*Acer saccharinum*) is at full bloom (19 of 20 blooms are out) at 42, and red maple (*Acer rubrum*) has its first bloom at 44, so it shall happen in Wooster today. Coming up 'Northern Lights' forsythia = 58; border forsythia = 86.

Cool stuff. Where can you get a phenological calendar? We are fortunate in Ohio as we have a great resource for all Ohio zip codes, thanks to the Ohio State Phenology Calendar developed at OSU by Dan Herms, Denise Ellsworth, and John Cardina with the website programming, development, and weather station integration by Dave Lohnes (https://www.oardc.ohio-state.edu/gdd/). Keep up to date on what is here and yet to come – depending on the weather.

So, what is happening at the great socially-distant outdoors of Secrest Arboretum?

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The lovely strap-like flowers of witchhazel

Well, those corneliancherry dogwoods are glorious and a touch less intensely yellow-orange as the dandelions, out for some time. Witchhazels (*Hamamelis*): our native *Hamamelis vernalis* and the many cultivars of the Chinese and Japanese hybrids (*Hamamelis* x*intermedia*), are soon to start fading from their earlier winter blooming, and spring beauty wildflowers are at now showing their foliar prelude to their delightful blooms.

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Buttery soft yellow flowers of a witchhazel

Of course things will soon move forward with our two degree-day accumulating days in the 60s today and tomorrow, followed by a potentially plant-damaging plunge in Wooster tomorrow; high of 68 low of 28, then colder yet with a low of 23 on Saturday, followed by degree-day buildups again next week. And, of course, all of this differs for your zip code reality further south and further north in Ohio.

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Bagworm: Her eggs are only waiting for their moment to arrive

There are also some stark reminders of winter with their own sort of beauty. Check out the remnant bagworms not singing in the dead of winter; *they are only waiting for their moment to arrive* (GDD= 630 for initial bagworm egg hatch) adorning trees. See how baldcypress and dawnredwood look now before spring green-up in April and May, look at the ominous aspect of hardy orange (*Poncirus trifoliata)*.

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Baldcypress against a gloomy sky

An uplifting view of dawnredwoods at Secrest

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Hardy orange looking ominous

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Hardy orange: See what I mean?

And note that OARDC'S grounds manager Roger Hamilton and his colleagues continue their winter and soon spring work, including needed pruning of Taxus (with beautiful wood) and other plants. Finally, the *Pieris japonicum (GDD = 60)* is ready to pop!

Roger Hamilton with winter pruning work at OARDC and Secrest Arboretum

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Beautiful Taxus wood

Pieris set to pop out in a few days. GDD = 60

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News from OSU Extension - COVID-19

Authors
Amy Stone
Published on
March 19, 2020

The information below was taken from a news release that was recently sent out to Extension Offices across the buckeye state. While you will see that offices have been closed and staff will be implementing teleworking options, know that the Buckeye Yard and Garden Line (BYGL) will continue business as usual and alerts will continue to be posted. It is an interesting time - stay safe, practice social distancing, and continue to stay updated on BYGL!

OSU Extension offices throughout Ohio will implement teleworking options for staff amid current coronavirus disease 2019 (COVID-19) outbreak concerns

Governor DeWine recently issued a state of emergency for the state of Ohio, and along with the Ohio Department of Health, has implemented a variety of strategies to reduce the spread of coronavirus disease 2019 (COVID-19). To do our part in reducing risk to Ohio State University Extension employees or clientele, we have implemented a teleworking plan effective immediately, and all OSU Extension offices will be closed to the public until further notice.

This mirrors The Ohio State University's decision earlier this week to close university buildings and facilities on all of its campuses to "critical services" only (such as law enforcement and public safety; hospitals and health services; facility utilities; and a few others).

While our physical offices will be closed, we are committed to continuing to conduct our work as fully as possible. Our employees are prepared to telework and are ready to serve their local clients and communities. In recent years, OSU Extension has invested in the technology needed to facilitate effective teleworking for our organization; and we will utilize our resources during this challenging situation to remain engaged with Ohioans. Clients, stakeholders, and other community members should continue to connect with any OSU Extension staff member via phone or email as usual.

Reopening of any county office facilities will depend on decisions from the governor and the state of Ohio, as well as The Ohio State University. The exact date when normal operations are expected resume in county Extension offices is unknown at this time. Until then, OSU Extension office staff will be working remotely and will remain accessible and available via email and phone. The health and well-being of our stakeholders, event participants, and employees is of utmost importance.

Each OSU Extension office has developed a business continuity plan that outlines how Extension staff will operate during situations such as the coronavirus outbreak. All staff will continue to work and serve local clientele through normal office hours (as previously determined by each county), and they will remain accountable for program management needs.

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Please note that most Extension-planned activities from now through April 20 are now postponed, scheduled to be held virtually, or cancelled. If you have not already been contacted about an event or activity in which you were scheduled to participate and you have a question, please check with your local contact for that event. The good news is that the Buckeye Yard and Garden Line (BYGL) Alerts will continue to flow, and with the change of how we are doing business, you will likely see an increase in activity. So hang on and watch your emails as alerts are posted.

Thank you for your cooperation and collaboration related to the coronavirus disease (COVID-19). The Ohio State University remains committed to the health and well-being of our community; and OSU Extension remains committed to serving our communities in each county as this situation evolves. These are unprecedented times, and we sincerely appreciate your flexibility and support.

You can visit extension.osu.edu/lao for office phone numbers and a direct link to each office's website and staff directory. If you reach voice mail, please leave a message with your name and contact information, and you will be contacted as soon as possible. For information on the coronavirus and how to prevent its spread, or learn how the state of Ohio and The Ohio State University are working to keep our communities safe, visit:

Ohio Department of Heath
https://coronavirus.ohio.gov/wps/portal/gov/covid-19/
https://coronavirus.ohio.gov/wps/portal/gov/covid-19/home/resources/How-You-Can-Prevent-and-Prepare

Coronavirus Disease 2019 (COVID-19)—Centers for Disease Control and Prevention (CDC)
https://www.cdc.gov/coronavirus/2019-ncov/index.html

The Ohio State University
https://wexnermedical.osu.edu/features/coronavirus

Ohio State University Extension
We create ***opportunities*** for people to explore how ***science-based knowledge*** can ***improve social, economic,*** and ***environmental conditions.***

Pathogen vs. Disease: Why Terms Matter

Authors
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Published on
March 18, 2020

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What's in a term or a name - clarity of thought and communication. When discussing plant diseases, I always make a point, *ad infinitum* or *ad nauseum* (your choice), that the pathogen is not the disease. This is a key precept of the Plant Disease Triangle, that for an infectious disease to occur, three things must coincide: a virulent pathogen, a susceptible host plant, and an environment conducive to disease.

Disease is a process. Rose black spot will not occur unless there is the virulent pathogen (*Diplocarpon rosae*), a susceptible host (certain taxa in the genus *Rosa)*, and a certain number of hours of wet foliage at a given temperature. There are roses resistant to *Diplocarpon rosae*, thus they do not get rose black spot disease.

Planting those resistant roses is a great disease management strategy because it means that not all three components of the disease triangle are present. Of course, the pathogen, working 24/7 like everything in nature, tends to mutate, overcoming resistance to the pathogen in certain roses, so the eternal "Nature red in tooth and claw" always applies.

A case for the idea that names and terms matter occurred this past summer in Ohio and other states when lilacs and rhododendrons and other nursery plants susceptible to the *Phytophthora ramorum* water mold pathogen escaped plant regulatory quarantine in the Pacific Northwest, were shipped to Oklahoma and then shipped eastward to Walmart and Rural King outlets. A terminology problem occurred with the use of the term Sudden Oak Death for infested plants.

A better term for this disease is PRAM disease. Since *Phytophthora ramorum* occurs on many hosts, it is best not to use the term Sudden Oak Death when this pathogen is causing diseases on other host plants. The statement "Sudden Oak Death confirmed in Ohio" muddied the waters, since no oaks were shipped, no oaks have ever been

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found to have Sudden Oak Death in the East, and the pathogen has not been shown to have become established in the East, even on these other hosts, except in this shipped nursery stock.

Of course the possibility exists that the lilacs and rhododendrons that escaped interception here and were then planted in Ohio can be a source of inoculum leading to the establishment of this pathogen here. However, we have not yet detected that yet in the past two decades when this pathogen was identified in the Pacific Northwest, and therein lies the connection to the Disease Triangle. It is suspected that the Environment Conducive to Disease component of the Disease Triangle will not be satisfied in Ohio, compared to the high-humidity coastal forests of California and Oregon where hundreds of thousands of oaks died from SOD, starting in the 1990s.

Nothing is guaranteed, of course, and vigilance and the highly professional regulatory efforts of the Ohio Department of Agriculture are essential, but remember that the presence of the pathogen is not the same as the presence and establishment of the disease. Terms matter!

Which brings us to the current focus of all our lives: what about COVID-19? Recently, it occurred to me that I did not know what it stood for: the CO (corona) seemed obvious, and the VI (for virus) seemed obvious, but what is the D? Duh, it is for D (disease), and the 19 is for its discovery in 2019. As per our discussion, COVID-19 is the name for the disease. The pathogen's name, the term for the virus, is SARS-CoV-2.

So to close, a little bit more of our continuing education: according to the CDC there are currently seven coronavirus pathogens (crownlike spikes on the surface of the virus particle) known to infect humans.

four of these viruses cause common cold symptoms
SARS-CoV causes SARS: Severe Acute Respiratory Syndrome
MERS CoV causes MERS: Middle East Respiratory Syndrome
And now SARS-CoV-2, causing COVID-19. Be safe.

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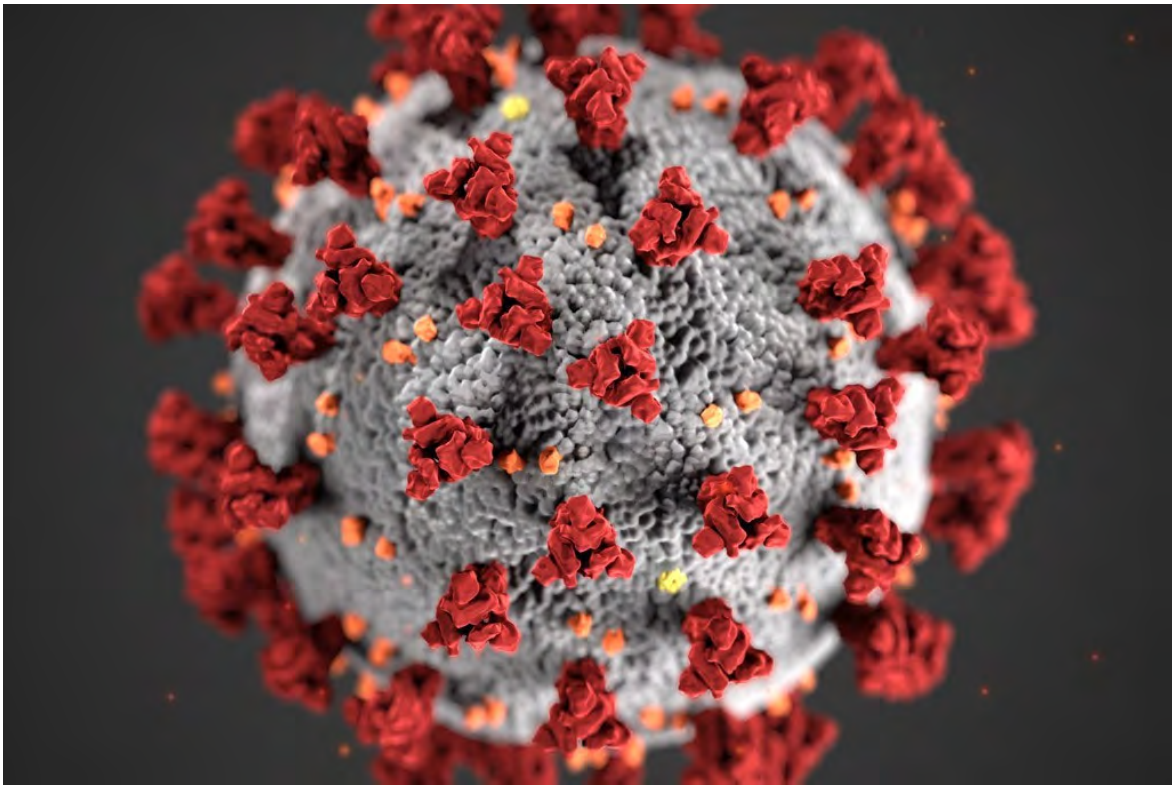

From the City of Dresden.com: An electron micrograph of the SARS-CoV-2 pathogen of humans

White Pine Weevil Report

Authors
Joe Boggs
Published on
March 17, 2020

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White Pine Weevil (*Pissodes strobi*) is a native conifer pest with a wide host appetite. Its host range includes Scotch, jack, red, pitch, and eastern white pines as well as Douglas-fir and all spruces. Indeed, the weevil's love of spruce is exemplified by its alternate common name, Engelmann Spruce Weevil, or simply Spruce Weevil.

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The weevil has long been common in northeast Ohio; however, it is also becoming more common in the central and southern parts of the state. Of course, it is not just found in Ohio; it ranges from the east coast west into the Rockies.

Female white pine weevils spend the winter out of sight cooling their six heels in the duff beneath their pine or spruce targets. As temperatures warm in the spring, they climb their hosts to feed and lay eggs in the terminals. Sap oozing from small holes in the terminals is a calling card of this weevil.

Females begin to emerge from their winter abodes when the accumulated Growing Degree Days (GDD) reach 84. This roughly coincides with the full bloom of northern lights forsythia (*Forsythia* x *intermedia*), speckled alder (*Alnus incana*), and cornelian cherry dogwood (*Cornus mas*). We are just about at the magic GDD number of 84 in southern Ohio and phenological events indicate the weevils should be stirring.

The females use their chewing mouthparts located at the tip of their long snout (rostrum) to chew small holes through the bark to feed on the sugar and nutrient-rich phloem. Eventually, they will turn around and deposit an egg in some of these holes.

The resulting white, legless, slightly curved, grub-like larvae tunnel downward side-by-side just beneath the bark feeding on the phloem. Pupation later this season is marked by the construction of so-called "chip cocoons" by the larvae prior to entering the pupal stage.

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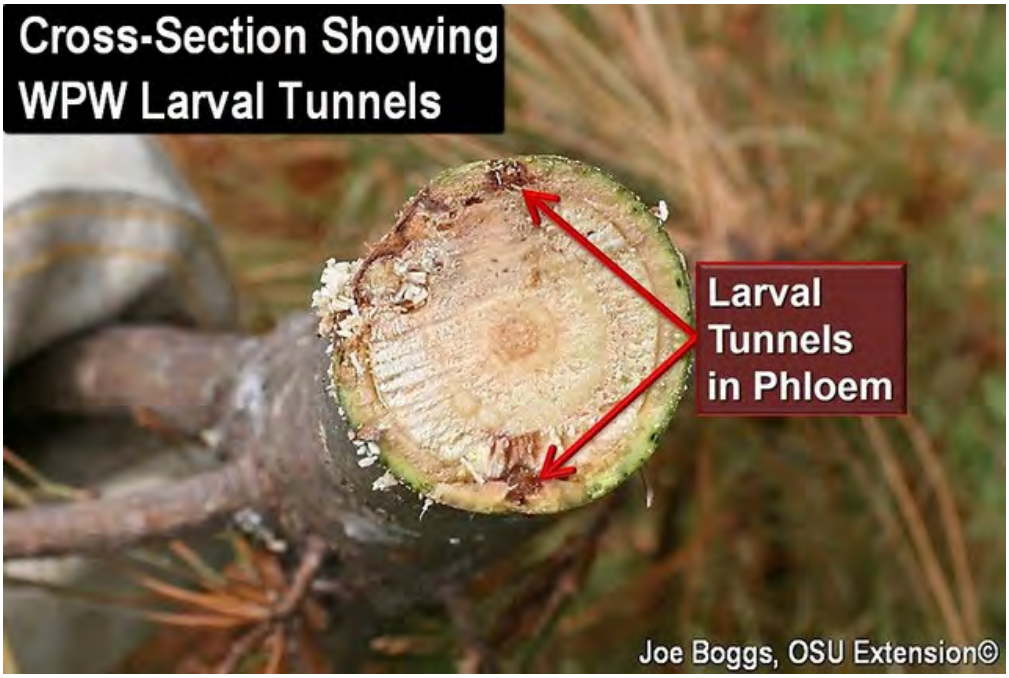

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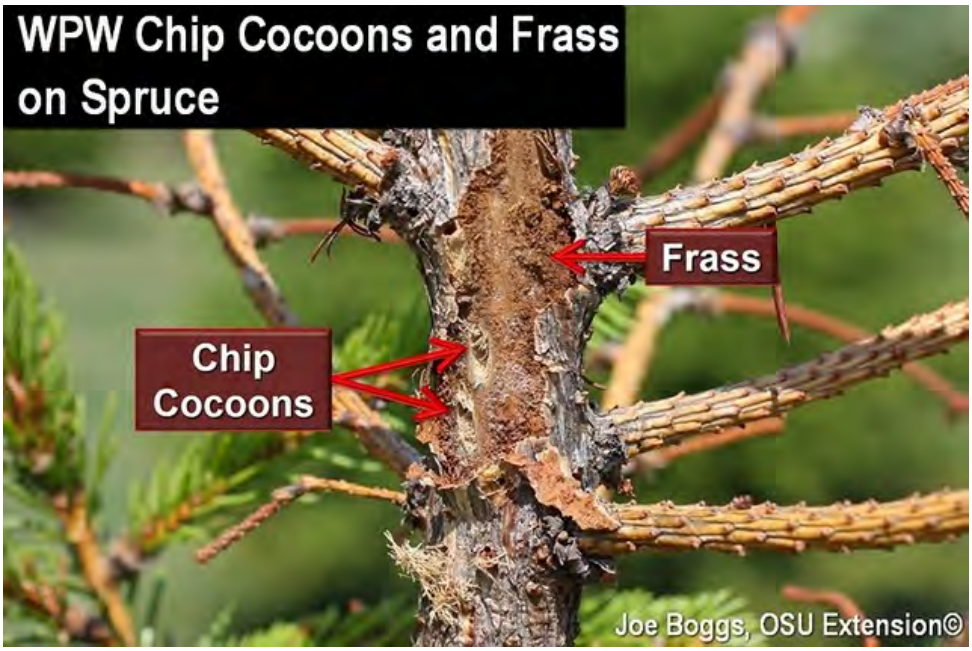

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Infested leaders wilt, turn brown, and die. Dead leaders occurring in mid-summer which sometimes have a curved "shepherd's crook" appearance is another calling card of this weevil. New adults emerge from the infested terminals late in the season to feed and mate. Females of this second generation then crawl to the duff to spend the winter in preparation for sneaking up on us next spring.

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The weevils are capable of killing small trees less than 3' in height, but it does not kill large trees. However, years of successive damage to terminal leaders will eventually create "cabbage trees" which are short, squat trees with

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multiple terminal leaders in landscapes and woodlots. Of course, the loss of main leaders presents a serious production problem in nurseries and Christmas tree plantations.

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A Word from Management

There are three effective suppression tools for reducing damage. The first is the application of a "borer spray" to the terminals to kill the females before they lay eggs. Effective products include those based on the active ingredients bifenthrin (e.g. Onyx), permethrin (e.g. Astro), or cyfluthrin (e.g. Tempo). A second application may be required depending on spring weather conditions and product label recommendations.

If female weevils make it through the terminal insecticide applications, the second suppression tool is to remove and destroy infested terminals prior to the emergence of the next generation of adults later this season. This will reduce the localized weevil population which is particularly effective where there are few conifer hosts growing in nearby forests or landscapes. I'll post a complete "how-to" on this method later this season.

The third weevil management strategy is to make preventative systemic insecticide applications in the fall that target the weevils as they feed on the phloem the following spring. The systemics will also kill early instar larvae as they begin tunneling in the phloem but before they produce serious damage. Systemics such as imidacloprid (e.g. Merit, Xytect 2F, etc.) may be applied using soil drench or soil injection applications. This preventative control measure should be reserved for landscapes, nurseries, or Christmas tree plantations that have a history of significant white pine weevil activity.

Growing Degree Days (GDD) - What Is Your #?

Authors
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Published on
March 16, 2020

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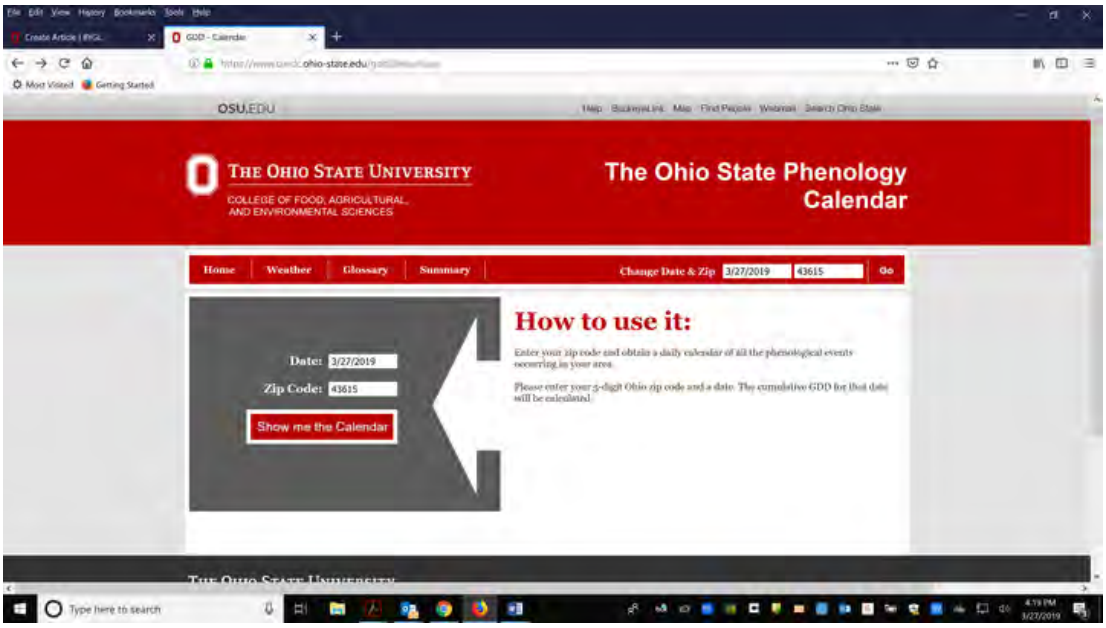

While we are living in a world with cancellations, postponements, and social distancing, the spring season has not been canceled, and as a matter of fact the season is progressing. A great way to track that progression is through Growing Degree Day (GDD) Accumulations and the Plant Phenology Network.

While many of you might be familiar with GDDs and Plant Phenology, this initial alert will serve as an introduction. It might be new-news for some, or a refresher for others. Additional BYGL Alerts will follow as we track the progression of spring, and ultimately summer, in the buckeye state.

GDD are a measurement of the growth and development of plants and insects during the growing season. This development does not occur unless the temperature is above a minimum threshold value, or a base temperature. The base temperature varies for different organisms and is determined through research and experimentation. The actual temperature experienced by an organism is influenced by several factors. These factors will ultimately affect the growth and development.

Here are some examples:

*If you take a walk outside, you will notice there are areas in your own landscape that are warmer than others. Exposure to the sun, or lack of sun, wind, or protection from the wind, can create a microclimate that could accelerate plant and insect development, or reversely, slow that process of development down. Simply put, a plant in full sun will likely begin flowering sooner than that same plant in a location that is shaded. Proximity to buildings and driveways can also be factors.

*Fertility and nutrient content of the soil can have a direct affect on the growth rate of plants. While we want healthy plants, too much of a good thing is not good. There has been some research that has shown that plants that are overly fertilized and pushing a lot of vegetative growth can have an increase of pest pressure in some cases.

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*There are other factors that can also have an impact on plant and insect development including the presence of weeds or unwanted plants in a given area, or too much or too little water either through irrigation, hand watering or mother-nature.

Because of these factors and the variability within even a landscape and some other scientific considerations, a base temperature of 50 degrees Fahrenheit is considered acceptable for all plants and insects. If you are curious about the base temperature and math behind how GDDs are calculated, check out this webpage on the OSU Growing Degree Days site at: https://u.osu.edu/ohiophenologycalendar/glossary/

Here is where you can dig in and how this site can helpful at the local level. All you need is an Ohio zip code. With that said, remember the examples described earlier and how micro-climate conditions can have an affect on the rate of development. Check out the information online, but ground truth what is happening locally. What I find fascinating is that whether you might be a little head of the curve, right on, or a little lagging, the sequence of events is the calendar remains the same.

Calendar? What calendar you say? The calendar is a chronological list of plants – first bloom and full-bloom; and insect activity. A HUGE shout out to Dr. Dan Herms for his work on this during his time at OSU. If it wasn't for Dan and others in the Department of Entomology and Master Gardener Volunteers who volunteered in phenology gardens across Ohio to record first and full bloom, this resource wouldn't be available for use to access today.

So how does this work?

*Click on this website: https://www.oardc.ohio-state.edu/gdd/

*The date will default to today's date. Type in your Ohio zip code.

*Click on "Show me the Calendar" rectangle.

*You will be shown a snapshot of what is happening in your zip code with the GDD accumulation and upcoming phenological events. The snapshot includes the GDD number, the species, and what is happening with that species (i.e., first bloom, full bloom, emergence). If you would like to see the calendar in its entirety along with where the current GDD number is, click on "View Full Calendar".

*You will have a lot of information at your fingertips. It is important to do some ground truthing to make sure the information that is on the website matches what you are seeing locally.

*So today, in Toledo, we are at 23 GDDs.

*With that information, I headed outdoors. Just outside my office is a row of corneliancherry dogwoods (*Cornus mas*). I observed buds swelling and you guessed it – first bloom! It is important to note that these shrubs are planted alongside a blacktop driveway, but most importantly that can be a slight variation for the website to what is happening on the ground. But again, no matter the variation in progression, the order will remain the same.

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Corneliancherry Dogwood in First Bloom at Toledo Botanical Garden
Photo Credit: Amy Stone

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Corneliancherry Dogwood in First Bloom at Toledo Botanical Garden
Photo Credit: Amy Stone

I am hopeful that everyone will click-on the website and find out what their GDD is. Tomorrow we will continue this conversation and will highlight GDD accumulations across the state to illustrate the differences from north to south and east to west, and I will be highlighting a feature that will allow you to compare where we are today, to last year, and to several years ago. It is something that I am sure you will love to explore more, and I promise you will find very interesting – at least I do!

The Rise of Poison Hemlock

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Published on
March 16, 2020

Poison hemlock (*Conium maculatum*) is one of the deadliest plants found in North America. Plants contain highly toxic piperidine alkaloid compounds, including coniine and gamma-coniceine, which cause respiratory failure and death in mammals.

All parts of the plant are poisonous: leaves, stems, seed, and roots. However, the toxins must be ingested or enter through the eyes or nasal passages to induce poisoning; they do not cause skin rashes or blistering. Regardless, this plant should not be handled because sap on the skin can be rubbed into the eyes or accidentally ingested while handling food.

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Poison hemlock was imported into the U.S. as an ornamental in the late 1800s from Europe, West Asia, and North Africa. Rogue plants remained relatively rare until around 30 years ago. Since that time, poison hemlock has moved from an uncommon oddity to a common threat.

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Unfortunately, this dangerously toxic plant is becoming more common throughout Ohio including growth in landscape plantings where close proximity to people increases poisoning risks. Part of the problem is not recognizing the management challenges as well as opportunities presented by the two-part life-cycle.

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Poison hemlock is a non-native biennial weed that spends its first year as a low-growing basal rosette; the stage that is currently very apparent. During its second year, plants produce erect, towering stalks and multi-branched stems topped with umbrella-like flowers. Mature plants can measure 6-10' tall and are prolific seed producers.

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Despite its common name, poison hemlock is not a tree; it is a member of the carrot family, Apiaceae (formerly Umbelliferae). It shares floral characteristics with other non-native members of the carrot family such as Queen Anne's lace (*Daucus carota*) and the wild parsnip (*Pastinaca sativa*) which is notorious for its skin-blistering sap.

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All stages of the poison hemlock plant have bluish-green leaves that are 3-4 times pinnately compound. The deeply cut parsley-like leaflets have sharp points. Flowering plants have hairless, light-green to bluish-green stems that are covered with obvious purplish blotches. Clusters of tiny white flowers are borne on structures called umbels that look like upside-down umbrellas.

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Poison hemlock can be partially managed by mowing and tilling; however, the current rosettes are largely too low to mow. However, mowing is highly effective in cutting down the second-year flower stalks before blooms are produced.

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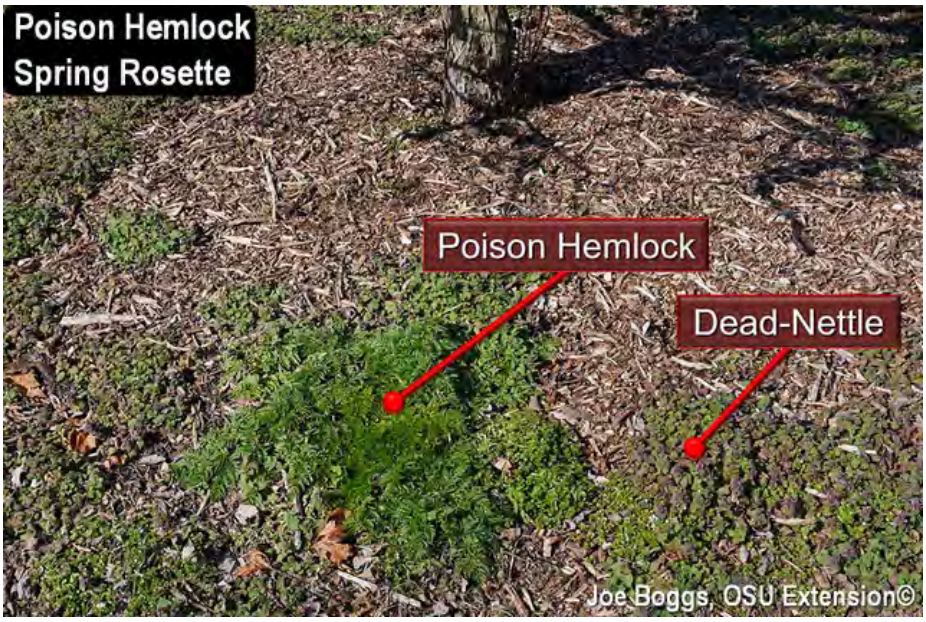

Currently, the most effective control approach involves applications of selective or non-selective post-emergent herbicides including glyphosate (e.g. Roundup). Poison hemlock is a prolific seed producer, so applications of herbicides made now will control both the first season rosette stage and the second season flowering stage before seeds are produced.

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The Rise of Lesser Celandine

Authors
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Published on
March 16, 2020

Lesser Celandine (*Ficaria verna* (previously *Ranunculus ficaria*)) is now very evident in southern Ohio. Blooms have not yet appeared; however, this conspicuous life-cycle stage is just around the corner.

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This non-native highly-invasive weed belongs to the buttercup family, Ranunculaceae, and is sometimes called "fig buttercup." The "fig" refers to the shape of the underground tubers and "buttercup" describes the flowers.

Lesser celandine is known as a "spring ephemeral" owing to the time of year when the short-lived plants and flowers are present. The majority of this weed's hide-and-seek life-cycle is spent hidden from view as underground tubers.

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The taxonomy of this Eurasian native has long been debated with some sources indicating there are subspecies, varieties, and geographical genotypes. Part of the confusion stems from a seasonal variation in flower parts with early-flowering plants having more flower parts compared to late-flowering plants.

Another source of confusion stems from the occurrence of plants with different numbers of chromosomes. Diploid plants have two sets of chromosomes; tetraploid plants have four sets. When diploids and tetraploids occur together, triploids are found with three sets of chromosomes. The number of chromosomes affects more than just academic interest. Diploid plants reproduce sexually; they produce seed. Triploid and tetraploids reproduce vegetatively by producing above-ground bulbils.

I've never observed seed production on lesser celandine in southwest Ohio. Of course, this does not mean diploid plants do not occur in my part of the state or elsewhere in Ohio. In fact, seed production may account for some of the rapid spread of lesser celandine observed in various parts of the state. However, I have no doubt that plants in southwest Ohio produce bulbils; I've frequently observed and photographed these structures.

A Beautiful Plant Turns Ugly

Lesser celandine is native to Europe, northern Africa, western Asia, and Siberia. It is believed to have been first introduced to North America as an ornamental in the mid-1800s and escapes were reported in Pennsylvania in 1867.

The shiny dark green heart-shaped leaves are borne on fleshy, white, tightly clustered leaf stalks. New leaves are noticeably mottled with light and dark green patches.

Profuse glossy, butter-yellow flowers that are about 1" in diameter rise singly on stalks slightly above the foliage. The overall effect of a massive colony of lesser celandine is a magical-looking dark green carpet speckled with flecks of bright yellow.

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It's a beautiful sight unless you consider that the magic carpet rolls over native spring wildflowers. Although lesser celandine plants seldom rise more than 4 – 5" above the soil, they have dense root systems and plants grow together to form mat-like impenetrable canopies. I've observed lesser celandine rolling over Trillium (*Trillium* spp.), mayapple (*Podophyllum peltatum*), cutleaf toothwort (*Cardamine concatenate*), Dutchman's breeches (*Dicentra cucullaria*) and Virginia springbeauty (*Claytonia virginica*).

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For this reason, lesser celandine appears on the Ohio Department of Agriculture's "List of Invasive Plants." Plants on the list were prohibited from being sold or distributed in Ohio.

Take care not to confuse native Marsh Marigold (*Caltha palustris*) with lesser celandine. Both are spring ephemerals that belong to the buttercup family with plants sporting similar-looking yellow flowers. However, lesser celandine flowers have 3 green sepals and 7–12 yellow to faded yellow petals. Marsh marigold flowers have 5–9 yellow petal-like sepals. Marsh marigold leaves are also much larger and plants lack underground tubers and above ground bulbils. Of course, as its common name implies, marsh marigold does not wander far from wet environs.

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Survival and Spread

Lesser celandine has three effective secret weapons for survival and spread. The first is a stockpile of underground tubers produced in the spring that is used to store carbohydrate shipped down from the leaves during their brief spring appearance. The energy cycle reverses the following spring with the tubers supporting new leaf growth. Of course, the tubers can also serve as a foundation for new infestations if they are moved around in contaminated soil.

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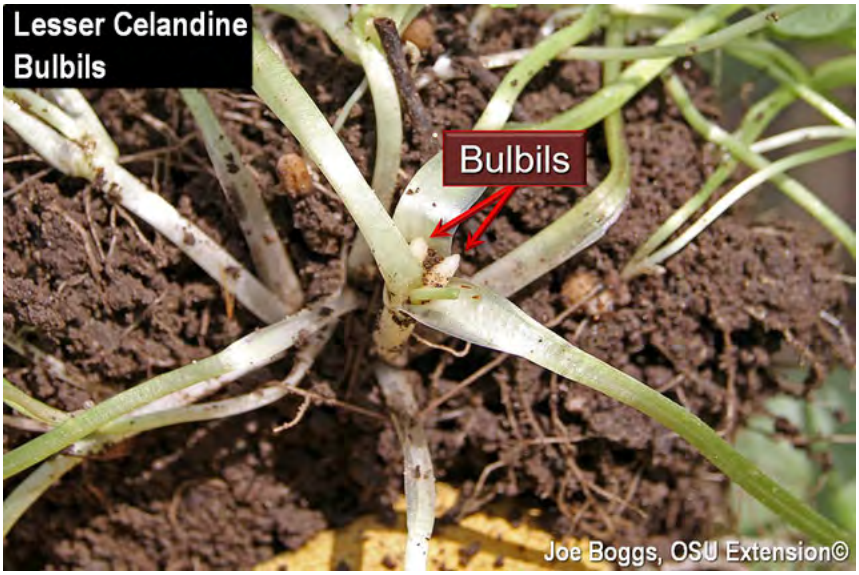
A close examination of leaf axils near the base of mature plants later this spring will reveal the second secret weapon: the aforementioned football-shaped protuberances called bulbils. Bulbils can give rise to new plants and are perfectly suited for being picked-up in the dewclaws of deer. Indeed, deer have been implicated as a major mover of lesser celandine with new plants often sprouting on or along deer trails.



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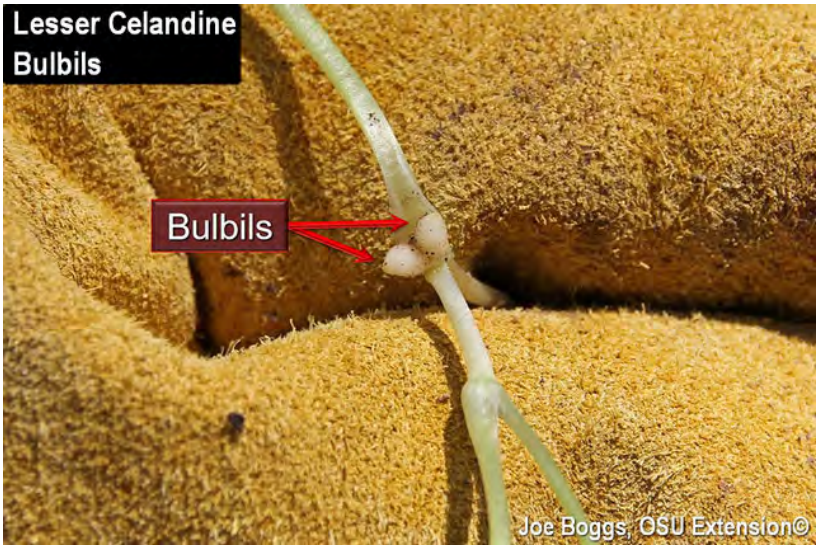
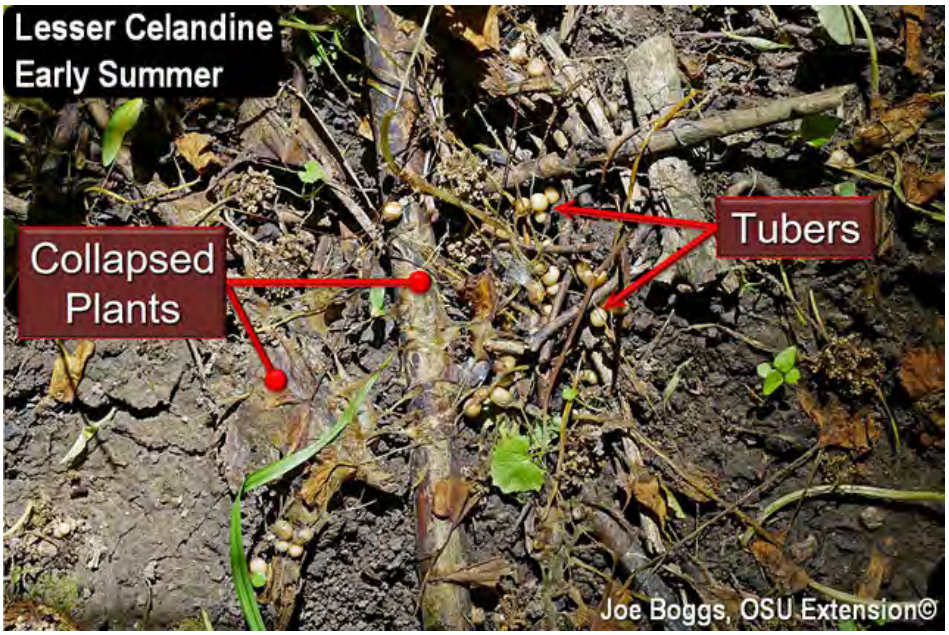


Lesser celandine's final secret weapon is its extreme ephemeral nature. Plants collapse and disappear from view in late-spring to early-summer depending on environmental conditions. It's amazing how rapidly a broad expanse of lesser celandine can completely vanish. However, the weed is not gone; it's just biding its time in the form of recharged tubers that will support ever-expanding colonies next season.



Monitor and Eradicate

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Given the environmentally disastrous consequences of allowing lesser celandine to spread unchecked, this non-native invasive weed should be eradicated as soon as you spot it. Management becomes more problematic once it becomes widely established. Also, spread from neighboring locations where lesser celandine is not being managed represents a constant re-supply of this stubborn weed.

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Recommendations for eliminating small colonies include digging and destroying plants along with the tubers. Unfortunately, based on my own observations and reports I've heard from frustrated landscape managers and gardeners, this effort usually morphs into an ongoing game of whack-a-mole. It can be very difficult to remove all of the tubers from the soil.

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Herbicide applications remain the most effective method for combating this highly-invasive non-native weed. However, dense well-established colonies are almost never eliminated with a single application.

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Mowing lesser celandine that has crept into turfgrass appears to have little impact on this aggressive weed. However, many of the selective post-emergent herbicides labeled for use on turfgrass are highly effective against lesser celandine. These include 2,4-D, MCPA, MCPP, dicamba, and triclopyr. It is generally recommended to use products that contain at least 2 of these herbicides. Sulfentrazone products (e.g. Dismiss) that are most often used for nutsedge control have also provided good suppression of lesser celandine in turfgrass.

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Of course, keep in mind that established colonies are supported by huge numbers of underground tubers. Thus, multiple applications over a number of years may be required to exhaust their energy input.

The same is true for managing lesser celandine in landscapes and wooded areas. The larger the infestation, the longer it will take to wipe-out this stubborn weed. The non-selective post-emergent herbicide glyphosate (e.g. Roundup) is an effective choice given its ability to translocate from the targeted leaves to affect the tubers. As with the application of any pesticide, you must read and follow label directions. For example, if applying to wetland, you must use a product labeled for wetland sites (e.g. Rodeo).

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Research conducted in Wolf Trap National Park in Virginia and published in 2017 focused on glyphosate applications made in the spring at three early phenological phases: pre-flowering, early flowering, and 50% flowering.

Treatments made 2 years in a row targeting the early flowering and 50% flowering stages produced 90% and 95% control, respectively. A single-season application made at the pre-flowering stage produced 60% control. A second-year pre-flowering application could not be made in the study owing to environmental conditions.

Anecdotally, landscapers have also had success with pelargonic acid (e.g. Scythe). Although this non-selective contact herbicide does not translocate, it may have a lower impact on preferred plants. Landscapers using the highest labeled rate have had some success and combination products containing glyphosate plus pelargonic acid or glyphosate plus diquat have also been used effectively. Multiple applications made per year, starting before plants flower, and continued over multiple years are required.

Finally, managers of landscapes, parks, and forests should not overlook combining the elimination of lesser celandine with suppressing other non-native invasive weeds. For example, this is also an excellent time of the year to apply herbicides aimed at controlling Poison Hemlock (*Conium maculatum*).

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Other Articles

Irish Eyes Daisy Is a Cheerful Addition to the Garden

MEGHAN SHINN

MAR 16, 2020

Virtues: 'Irish Eyes' is a quick-growing daisy that boasts unique green discs at the center of its yellow rays. It brightens up the border or a container planting and it can handle dry spells with ease. Its midsummer to fall flowers add eye-catching color and

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attract butterflies, bees and other fliers. These flowers are also great for cutting, and picking them will encourage more to develop.

Common name: 'Irish Eyes' black-eyed Susan, gloriosa daisy

Botanical name: *Rudbeckia hirta* 'Irish Eyes'

Exposure: Full sun to part shade

Flowers: Daisy-type flowers have yellow rays and unique greenish central discs.

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Foliage: Medium green, lance-shape leaves form a basal clump and occur intermittently along the flowering stems.

Habit: This daisy grows to about two feet high and wide. Technically it is a short-lived perennial, but it's often grown as an annual.

Origin: 'Irish Eyes' is a selection of *Rudbeckia hirta*, which is a coneflower species native to western portions of North America. The species has naturalized across much of the continent however and it's a familiar site in prairies, fields, wood edges and at the roadside.

How to grow it: Site 'Irish Eyes' glorious daisy in full sun to part shade and in average to poor soil with good drainage. This is an easy, adaptable plant that can cope equally well with short periods of drought and wet conditions, although even moisture spurs the best performance. Although it is a perennial (usually lasting about three years), it is often treated as an annual, especially in colder regions. That said, its hardiness rating is USDA Zones 4–9, and propagation is by division or seed.

Prepared by Jeff Stachler
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