Plant Health Care Report

Scouting Report of The Morton Arboretum

April 7, 2023 **Issue 2023.1**

Welcome to the first issue of the Plant Health Care Report (PHCR) for 2023. My name is Sharon Yiesla. I am on staff at The Morton Arboretum Plant Clinic, and I will be responsible for compiling the newsletter again this year. For comments regarding PHCR, or to subscribe to email alerts regarding posting of new issues, contact me at syiesla@mortonarb.org.

Our report includes up-to-date disease and insect pest reports for northeastern Illinois. We are continuing last year's format: full issues alternating with growing degree day (GDD) issues; focus on more serious pests; alerts issued for new major pests. As we dId last year, we will extend the season with 2 full issues in September (no GDD issues); an index that gets updated with each new full issue; a list of insects that might be emerging at the growing degree day range occurring when each full issue is published; comparisons of current growing degree days, base 50 (GDD_{50}) with the same date in past years; a report on rainfall to look not only at the total for the year, but also the distribution of rain from month to month; and soil temperatures across the state.

This is our "Start the Season" issue. It will get us back in the habit of thinking about growing degree days, resources, weather and other spring basics. Issue 2 will also be a full issue and then we will start alternating between full issues and GDD issues.

Quick View

What indicator plant is in bloom at the Arboretum? (see article about indicator plants on page 6)

Cornelian-cherry dogwood (*Cornus mas*) is in flower (Figure 1). It can serve as an indicator plant for a variety of pests. In early flower (0-30 GDD), it can indicate the time when pine bark aphid is active. In later flowering (50-100 GDD), it can indicate Cooley and Eastern spruce gall adelgid activity.

Accumulated Growing Degree Days (Base 50) at The Morton Arboretum: 7 (as of April 6). We have had several days where were off just a degree or so from accumulating a GDD so the actual count is probably slightly higher than this.

Spring start-ups

- Winter weather
- Using growing degree days
- What do indicator plants tell us?
- Tools you can use
- Timing use of fungicides
- Crabgrass preventer
- Weather, climate and water
- Insects, diseases and stress

Insects/other pests

- Cicadas
- Spotted lanternfly
- Egg masses and more

Figure 1 Cornus mas in flower

Oak and Elm Pruning Advisory: Updated

Sap and bark beetles, the insects that spread the pathogens that cause oak wilt and Dutch elm disease, will soon be active. The beetles are attracted to pruning wounds. Historically, we don't prune oaks and elms between mid-April and mid-October, when the beetles are active. If you must prune close to or outside that time frame, seal the pruning cuts immediately.

For oak wilt: Wisconsin DNR offers this guideline about the emergence of the oak wilt vectors: As a rule of thumb, "temperatures above 60 degrees for 7 consecutive days" is considered to be warm enough for the emergence of *C[olopterus] truncatus* [sap beetles]. These are the beetles that can carry the oak wilt fungus. UW Extension has an online Oak wilt thermal model, which can help determine risk in your location. **Note that this model uses growing degree days base 41, not base 50.**

Soil temperatures around Illinois (from Illinois State Water Survey)

This information will be provided all season. For data from other reporting stations, go to https://warm.isws.illinois.edu/warm/soil/ (you will need to set up an account to access data.) Crabgrass does not germinate until soil temps are above 55 degrees for 5 to 7 days (use more shallow depth for this). Root growth on trees/shrubs occurs when soil temps are above 45 degrees (use deeper depth).

Max. Soil temps For 4/6/2023*	St. Charles reporting station (north)	Champaign reporting station (central)	Carbondale reporting station (south)
2-inch, bare soil	60.1	59.1	60.1
4-inch, bare soil	55	54.8	57.3
4-inch, under sod	49.5	57.3	60
8-inch, under sod	48.2	54.8	59.2

* This is the maximum soil temperature recorded the day prior to publication of PHCR.

Seasonal precipitation

Seasonal precipitation (rain and melted snow) in inches.			
	2023	2022	Historical average (1937-2022)
Jan	2.85	1	1.935
Feb	4.88	2.61	1.775
Mar	2.29	3.88	2.536
April	1.39 (thru 4/6)	3.88	3.667
May			
June			
July			
Aug			
Sept			
Year to date	11.41 (thru 4/6)	11.37 (thru April)	9.91 (thru April)

Degree Days (current and compared to past years) and rainfall

As of April 6, we have 7 base-50 growing degree days (GDD) at The Morton Arboretum. The historical average (1937-2022) for this date is 0 GDD_{50}. The table below shows a comparison of GDD in different years. We are comparing the GDD_{50} reported in this issue with the GDD reported in the first issue of 2022, 2017 and 2016. These years were selected since publication dates of the first issue were within a day or two of each other. Glencoe, and Waukegan (60085) were not used in 2017 and 2016, so there is 'no report' from those stations.

Location	GDD as of 4/6/2023	GDD as of 4/7/2022	GDD as of 4/6/2017	GDD as of 4/7/2016
Carbondale, IL*	170	125	242	215
Champaign, IL*	58	44	130	102
Chicago Botanic Garden**	28	21	24.5 (4/5)	31.5
Glencoe*	7	2	No report	No report
Chicago O'Hare*	26	28	63	53
Kankakee, IL*	29	28	69	71
Lisle, IL*	23	32	63	59
The Morton Arboretum	7	20.5	33.5	35.5
Quincy, IL*	67	72	162	146
Rockford, IL*	17	9	40	22
Springfield, IL*	73	63	142	119
Waukegan, IL* (60087)	11	15	32	32
Waukegan, IL (60085)	20	19	No report	No report

**Thank you to Chris Henning, Chicago Botanic Garden, for supplying us with this information.

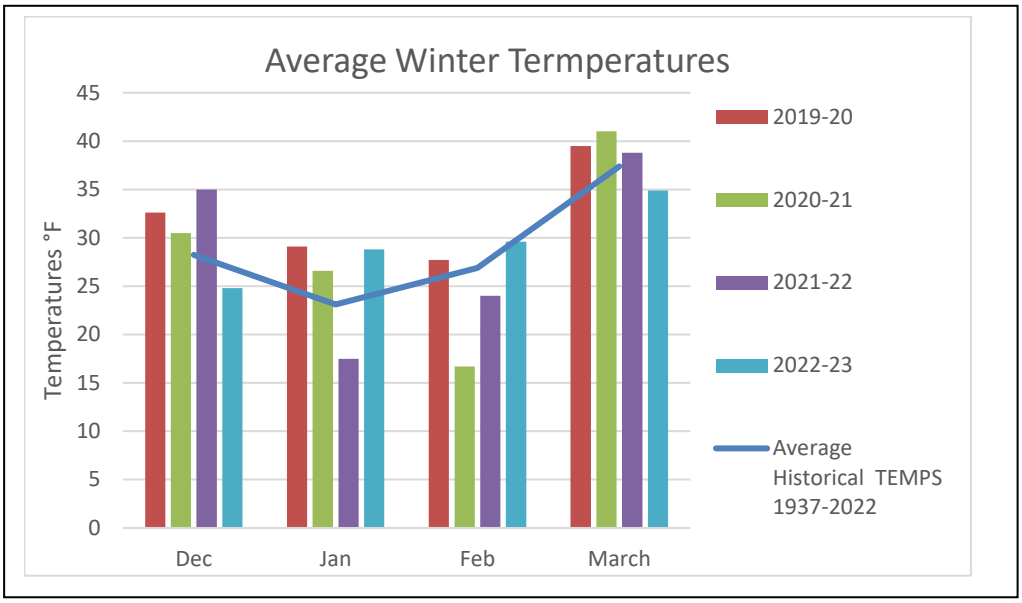
*We obtain most of our degree day information from the GDD Tracker from Michigan State University web site. For additional locations and daily degree days, go to https://gddtracker.msu.edu/

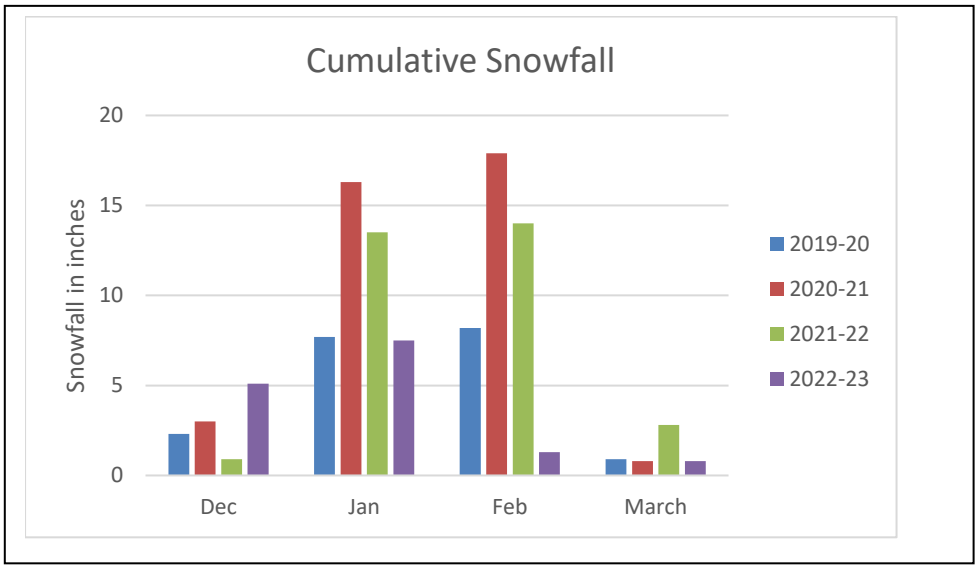
How serious is it?

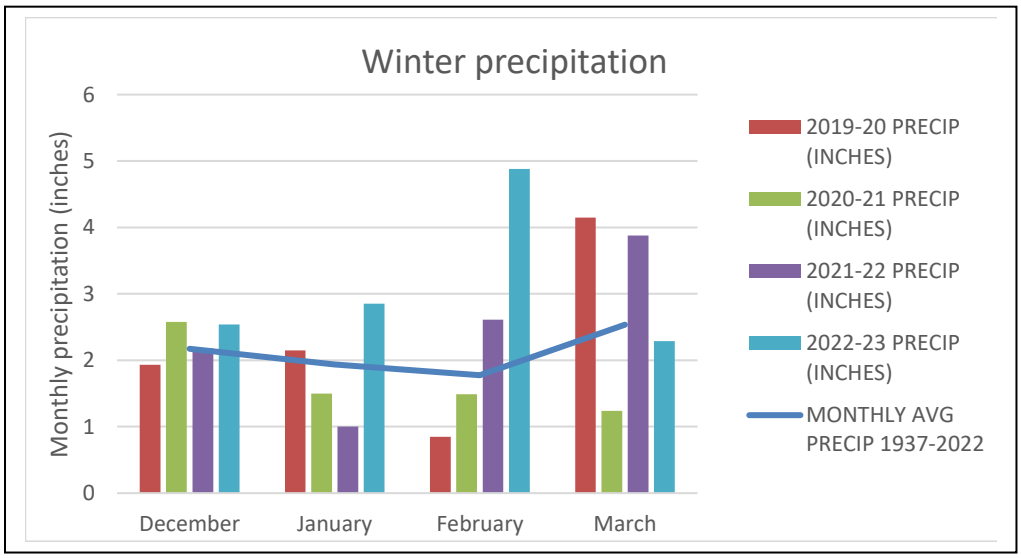
Problems that can definitely compromise the health of the plant will be marked "serious". Problems that have the potential to be serious and which may warrant chemical control measures will be marked "potentially serious". Problems that are seldom serious enough for pesticide treatment will be marked "minor". "Aggressive" will be used for weeds that spread quickly and become a problem and "dangerous" for weeds that might pose a risk to humans.

Spring start-ups:

Winter weather: The charts show 2022-23 winter weather and compares it to previous years.







Using growing degree days

In every issue of the Plant Health Care Report, we list growing degree days, base 50 (GDD_{50}) accumulated at The Morton Arboretum and other sites throughout Illinois. This article will explain what they are and how we can use them.

The development of plants, insects and fungi is dependent on heat. Development speeds up as the temperature increases and slows as temperature decreases. Many plants and insects have been studied in regard to this relationship between heat and development. We can anticipate the flowering of a shrub or the emergence of an insect based on how many growing degree days (units of heat, not actual days) have accumulated. We can give this information to our scouts and ask them to look for specific problems based on GDD. This helps to refine the process of scouting. Making those GDDs available to our readers helps them plan for pests and diseases.

Accumulation of GDD can vary quite a bit from year to year, and by tracking that information we can be more accurate than if we just look at the calendar. Here is an example: Eastern tent caterpillars begin to hatch out of their eggs when GDD_{50} is between 100 and 200. In 2014 we had accumulated 100 GDD by May 9. We often do expect to see this pest in early May, so 2014 was fairly 'average'. In 2012, we had accumulated 100 GDD by March 19 (nearly two months earlier than 'normal'). If we had gone with the calendar method and waited to deal with this pest in May, we would have missed it completely.

GDD days are fairly easy to calculate. We use base 50 and the averaging method of calculation. Add the maximum temperature to the minimum temperature for a day, divide by two, and subtract 50 (the base number). If the number resulting from this calculation is above zero, then that is the number of degree days for that day. If the result is zero or below, then the number of GDD is zero for that day. This is a very simple method, but there are other methods that utilize computer modeling. They are more precise than the averaging method.

These growing degree days (again, think of them as units of heat if the word "day" confuses you) are cumulative. We count them each day and add them to the total from the previous day. When we have accumulated 100 GDD, we expect certain insects to begin emerging (and certain plants to be in flower). When we get to 500 GDD, there will be different insects emerging and different plants flowering. We use base 50 because 50 degrees F is the temperature at which most plants and pests begin to grow.

Resources: Don Orton's book Coincide
http://www.ipm.msu.edu/agriculture/christmas_trees/gdd_of_landscape_insects
http://extension.unh.edu/resources/files/Resource000986_Rep2328.pdf

What do indicator plants tell us?

We always give an indicator plant in each issue of the PHCR. These plants tie in with our use of growing degree days (explained above). The development of both insects and plants is influenced by the accumulation of heat units, or growing degree days (GDD). At a certain accumulation of GDD we can expect certain insects to be present at a certain stage of their life cycle. At that same level of GDD, a particular plant will be in flower. Here is an example: Between 100 and 200 GDD_{50}, we can expect to see Eastern tent caterpillars emerging from their eggs. At that same number of GDD we will also see redbud (*Cercis canadensis*) beginning to flower. The redbud can be used as an indicator plant. Its early flowering stage indicates that we have had enough GDD to cause the Eastern tent caterpillars to hatch out. Now we know when to look for them. The redbud, and other indicator plants, are good visual cues for GDD that are easy to spot in the landscape.

Tools you can use

As we start our seasonal battle to protect our plants, it is a good idea to gather our tools. By tools, I don't mean pruners and shovels, I mean online resources that help us. For years, we have tapped into Michigan State's GDD tracker to help us track GDD across the state. The Illinois State Water Survey website helps us keep tabs on soil temperatures. Let's look at some other online tools that can be very useful.

This was noted in the article above about pruning elms and oaks, but it bears repeating. University of Wisconsin Extension has an online Oak wilt thermal model, which can help determine risk in your location. It tracks the emergence of the beetles that can carry oak wilt. This model can be useful in term of helping us know when the beetles are emerging and the risk is high enough that we should discontinue pruning oaks. **Note that this model uses growing degree days base 41, not base 50.**

NC State, partnering with USDA, has a website called SAFARIS. It has a number of modeling tools including PestCAST, which forecasts the life stages of certain pests (including spotted lanternfly) using real time weather data from NOAA weather stations.

USA National Phenology Network (USA-NPN) is a collaborative effort of several groups that forecasts the emergence of various pests and also tracks the status of spring. This site tracks GDD of more than one base number, so check each forecast to see which base is being used.

EDDMapS (Early detection and Distribution Mapping System) documents the presence of invasive species and the distribution of various pests.

Timing use of fungicides

By the time we write an article on a disease for the Plant Health Care Report, the time to treat has often passed. In the interest of being proactive, let's talk about fungicide applications. Many fungicides are applied as protectants to keep fungi from penetrating into plant tissue. Often this application process needs to start at the time new foliage is emerging and may require 2 to 3 applications as the leaves continue to emerge. The weather, as usual, has been very up and down. We had a couple of promising warm days and then back to cooler temperatures, cool enough to keep leaf buds closed for the most part. But a few days of warm weather could bring about a quick change. The weather for the next week or so forecasts high temps in the 60s and 70s. Watch the weather and be ready to start fungicide applications.

Crabgrass preventer

If you've been in the hardware stores lately, you might have noticed bags of crabgrass preventer (perhaps as early as February or March). Does that mean it is time to put them down? Not necessarily. March offered us some up and down temperatures, as well as some nice days, but the time was not right. Now, April is here and we should start planning. We do want to get the crabgrass preventer down before the germination starts, but many of these preventers only last about 60 days, so if you apply in February or March you may not get the most use from it. Crabgrass seed will not germinate until SOIL temperatures are greater than 55 degrees F for 5-7 consecutive days. We are close to that in northern Illinois (soil temps at the reporting station in St. Charles went above 50 degrees twice in the past week). In an 'average' year we might be applying crabgrass preventer in mid-April (hopefully a couple of weeks before germination). With the warmer high temps predicted for next week, we may get there. Iowa State gives this guideline: "Crabgrass seed germination usually begins … when redbud trees reach full bloom", and that is often late April into mid-May. Since we want to get our preventer down before germination begins, don't wait for redbud to be in full flower. Watch for the flower buds to be swelling. Do NOT use forsythia as an indicator plant. Forsythia is not reliable as it tends to flower whenever it feels like it. Depending on the weather, it can start to flower any time between December and April.

One last thought on crabgrass. We often get reports in early spring of green clumps of crabgrass established in the lawn. Crabgrass is an annual, so it died with the frost last fall. If you see green clumps in your lawn right now, it is most likely tall fescue.

Weather, climate and water

The old saying goes that if you don't like the weather in the Midwest, wait 10 minutes and it will change. Does it seem more like 5 minutes these days? The environment has become one of the biggest challenges for horticulture. We have always had up and down temperatures in spring and fall, but now we are seeing more extremes and often for a good part of both spring

and fall. In the last 10 years, we have had several severely wet springs that lead to root damage. These were often followed by droughty summers. Drought after flooding does not even out the situation. Instead, it potentially adds damage on top of damage.

Environmental problems do not stand alone. The stress they cause leads plants to be more open to attack by diseases and insects. Sometimes we treat for the disease or insect, but forget that we need to try to alleviate the stress that invited them in. For more about this, see the next article. We also have to realize that the stress under which our trees and other plants live is not due to weather (what is happening today), but rather to climate (what is happening over the long term). Stress builds up over time, and we are seeing a lot of trees and shrubs struggling due to ten or more years of an ever-changing climate.

We really need to keep all this change in mind, for several reasons:

- Climate does affect the health of our plants. As noted above, a tree may be struggling today because of what has occurred in the environment for the last several years, rather than something that happened this week.
- We can't rely on the calendar entirely for scheduling garden activities. We need to look at the stage of development of our plants, as well as the current and upcoming weather.
- With the number of dry summers we have had recently, we are always talking about watering to keep our trees and other plants healthy. That is important, but so is our water supply. Water is a precious commodity, and we need to use it wisely. Water plants by observed need and not the calendar. Rain does not always come when we want it to, or in the quantity we need. In some years, we may have average to above average rainfall, but when we look at when that rain fell, it might reveal a different picture. We have had a few years when we had excess rainfall in spring, followed by a deficit in the summer and fall months. That makes for water stress over most of the year. So, keep a watch on the rainfall month by month and not just the year's average. For more about watering, look at the Arboretum's new online watering resource.

Insects, diseases and stress

Stress, environment and level of care can make insect and disease problems worse or can minimize some of them. Back in 2012, when we were having that unusually hot, dry year, entomologist Dr. Fredric Miller told me to expect increases in the populations of scale insects and wood-boring insects. He was right! In the years following that stressful year, scale populations (fig. 2) exploded. Borers have been more prevalent since then as well. Why is that?

It turns out that stressed plants become more favorable targets for some insects and more beneficial to some of them as well. A tree that is in drought stress has less water in its tissues. That increases the concentration of sugars and nitrogen in the tree's cells. This more concentrated food source is beneficial to scale insects, enabling them to reproduce and develop at a faster rate, leading to a larger population in a shorter time.

Many wood-boring insects are attracted to trees that are stressed. There are exceptions to this, like the emerald ash borer, which can attack very healthy trees, as well as those in decline. So why do so many borers attack stressed trees? Trees can naturally produce chemicals that help to deter attack by borers. Trees under drought stress have a decreased capacity to do this and as a result they become more susceptible to borer attack. In addition to that, drought stressed trees also produce volatile chemicals that actually attract borers. The borers can detect these chemicals and use them to find stressed trees.

Figure 2 Lecanium scale populations have risen in the past few years

When we see a tree attacked by scale or borers or bark beetles, we need to take a few minutes and think about why these insects are there and what we might be able to do to lessen their impact. Even better, let's be proactive and try to prevent some of these problems before they happen. Proper watering can help prevent or at least minimize some of these problems. A properly watered tree will have sap with a lower concentration of carbohydrates and nitrogen, making it less beneficial to scale. A properly watered tree will be able to produce the chemicals that help deter borer attack and will be less likely to produce the volatile chemicals that will attract borers.

It is important to realize that an insect may not always be the only problem a tree has. Again, we want to take a more holistic look and see what else is impacting the tree. The same could be said for many diseases. There are a number of diseases that have been around for a long time that have really become more prevalent in the last few years. A couple of examples of this: *Diplodia* tip blight on Austrian pine and *Cytospora* canker on blue spruce. These diseases have become more prevalent due in part to environmental stress weakening the host trees and making them more susceptible to infection. We are seeing large numbers of blue spruce declining from *Cytospora*. Blue spruce comes from a native habitat that is cooler and that has good drainage. Our hot, humid weather and poorly drained clay soils put it into stress. The up-and-down weather we have been experiencing has added to this stress. A third factor adding

to the situation is that we have planted a lot of blue spruces in our landscapes. Having a lot of any one plant sets the banquet table for diseases and insects (think Dutch elm disease, emerald ash borer). As part of the holistic look at PHC we need to consider selecting trees (and other plants) that are well adapted to our environment, and we need to diversify our plantings with a variety of different species.

Pest Updates: Insects

Examples of insects that may emerge soon in northern Illinois (based on growing degree days)			
GDD (base 50)	insect	Life stage present at this GDD	Type of damage
20-90	Magnolia scale	Overwintering nymphs become active	Feeding on sap
100 (possibly less)	Viburnum leaf beetle	Larvae (may be feeding when leaves are half expanded)	Chewing leaves
100-200	Eastern tent caterpillar	Caterpillars	Chewing leaves
100-200	Pine sawfly	larvae	Chewing needles
145-200	Spongy moth (formerly gypsy moth)	Caterpillars just hatching	Chewing leaves

Cicadas (minor damage, but very annoying)

The periodical (17 year) cicadas are not due to emerge in the Chicago region until 2024. However, there are often some early emergers. We could see some early emergers in 2023, but there is no way to predict what areas may see them or how many will emerge.

I am writing about cicadas because we are getting questions about planting new trees and shrubs. There is concern that planting of new trees and shrubs should be postponed until after the cicadas have come and gone. They will be here in early summer of 2024. That is a long time to wait to plant! We are not recommending that you wait.

Over the last few years, the region has lost a lot of trees. The emerald ash borer has killed millions of ash trees, in both landscapes and natural areas. Several areas have been hit by tornadoes and strong storms and have lost trees. We are seeing decline in trees across the region due to environmental stress. For more mature trees, their age works against them in this situation. We need to be thinking about planting trees, now, more than ever. The Morton Arboretum planted nearly 3000 trees across the Chicago region in 2022 to celebrate our centennial. More will be planted this year. Trees provide an amazing number of benefits.
It is true that cicadas can do some damage to smaller trees and shrubs by cutting into their stems to lay eggs. The population of cicadas that emerge in 2024 will vary by location. Places that have experienced a lot of new construction in the last 17 years may see much smaller populations. Construction digs up the soil and destroys many of the cicadas underground.

Once the cicadas emerge in 2024, they are only present for about 6 weeks. We can protect small trees and shrubs from their damage by wrapping them in fine netting for that time period. Last time around, many people wrapped their small trees and shrubs in tulle (yes, tulle, as in a ballerina's tutu). So, think about having some netting on hand to protect young trees and shrubs. More mature trees can tolerate some cicada damage. If you are thinking about planting new trees, go ahead and do it (and have some netting on hand).

Spotted lanternfly (Potentially serious to serious)

Spotted lanternfly (SLF) (*Lycorma delicatula*) has been a pest in Pennsylvania since 2014. Since that time, it has spread to other eastern states like New York, Maryland and Virginia. In the last year or two, there have been isolated reports of this pest in Ohio, Indiana, and Michigan. So far, there are no confirmed reports of the pest in Illinois. We need to be alert to the possibility that it may be here and be watching for it.

SLF overwinters as egg masses (fig. 3). The female insect lays these non-descript looking egg masses on host plants, but also on hard surfaces, like bricks, wood pallets, and vehicles. The nymphs hatch out in spring and early summer. Newly hatched nymphs are white, but soon become black with white spots. Late stage instar nymphs will be red with white spots. The nymphs mature into adults beginning in mid-summer. The adult is not a true fly, but rather a planthopper. It is about one inch long. When at rest, the pinkish-gray wings are folded over the insect's back. The wings are marked by small black spots. In flight, the bright red hindwings can be seen. They are also marked with small black spots. The adults begin to lay egg masses in September and may continue to do so until a freeze.

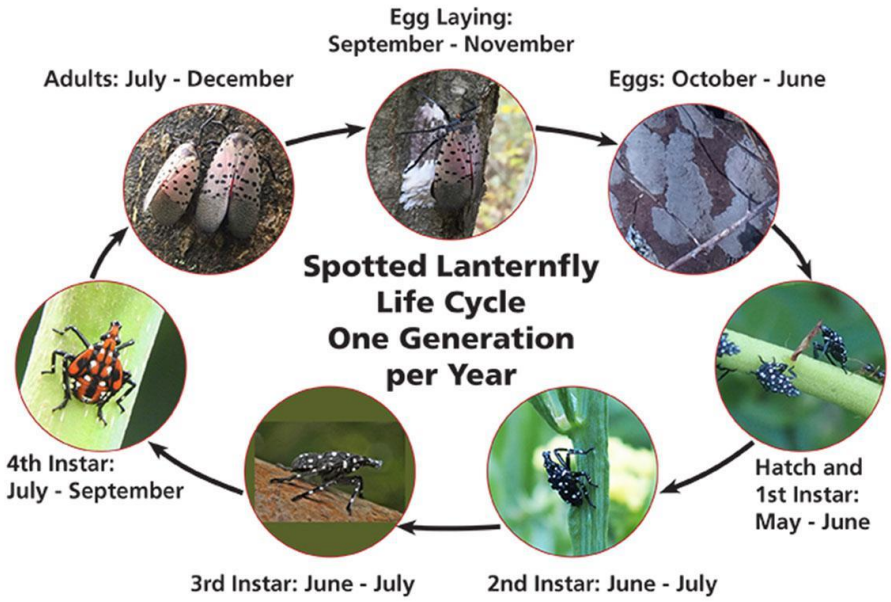


Figure 3 Illustration by Cornell CALS

The host range for SLF is large, more than 70 species. Preferred hosts include Tree of heaven, grapes, black walnut, hops and tuliptree. Other hosts include maple, willow, birch, and sycamore. This is a sap-feeding insect and it can feed very heavily on a host plant and weaken it. This is a major issue for grape producers. Like other sap-feeders, this insect will produce honeydew, which is a sticky substance. Spotted lanternfly differs from other sap-feeders in that it can produce extremely large amounts of honeydew. This can become a nuisance for any activity being conducted under infested trees. Sooty mold, a dark colored fungal problem, grows readily on the honeydew. The honeydew also attracts other insects like bees and wasps.

If you suspect spotted lanternfly in your area, take a photo and send a detailed email to: lanternfly@illinois.edu including when, where, and specifics of the location.

Good websites: https://ilpestsurvey.inhs.illinois.edu/pest-information/most-unwanted/
https://agr.illinois.gov/insects/pests/spotted-lanternfly.html
https://cals.cornell.edu/new-york-state-integrated-pest-management/outreach-education/whats-bugging-you/spotted-lanternfly

Egg masses and more

Winter and early spring is a good time to look for eggs, like those of the spotted lanternfly, mentioned above. There is still some time to look for other insects in their overwintering stage. The best time to look for egg masses like those of Eastern tent caterpillar, spongy moth (formerly gypsy moth), viburnum leaf beetle and bagworm is before the season gets going. Look for egg masses now and destroy them to reduce the population for the coming season.

Figure 4 Spongy moth egg masses

Eastern tent caterpillar egg masses are dark gray to black and are wrapped around twigs that are about the diameter of a pencil. Prune out branches with egg masses attached. Spongy moth egg masses (fig. 4) are buff colored, covered with hairs, and about 1 1/2 inches long. Each female usually lays one egg mass, which could contain as many as 1,000 eggs. Egg masses can be carefully scraped off bark and destroyed before they hatch. Viburnum leaf beetle eggs are laid in the tips of twigs and covered with caps of chewed wood (fig. 5). Clip off the ends of twigs that show the egg laying sites. Bagworm eggs spend the winter in the bag (fig. 6) that was made by the caterpillar last season. The bags are made from leaves of the host plant and can be found

Figure 5 Egg-laying sites of viburnum leaf beetle

hanging from branches. Pull the bags off the host plant. Any egg masses that you remove should be destroyed. Don't just drop them on the ground by the host plant.

Since we will soon be working on spring clean-up in the garden, this would be a good time to look at groundcover euonymus. If yours is infested with scale insects, prune out heavy infestations now. There are eggs under those overwintering scales, so once again we are getting rid of the pest before the eggs can hatch later this season. Reducing the population now will make insecticides more effective when it is time to treat in summer.

Figure 6 Bagworm bag containing eggs

***Bartlett Tree Experts, Presenting Sponsor of the Plant Clinic*.**

The Plant Health Care Report is prepared by Sharon Yiesla, M.S., Plant Knowledge Specialist and edited by Stephanie Adams, Ph.D., Plant Health Care Leader; Fredric Miller, Ph.D., Research Entomologist at The Morton Arboretum; Julie Janoski, Plant Clinic Manager; and Carol Belshaw, Arboretum Volunteer. The information presented is believed to be accurate, but the authors provide no guarantee and will not be held liable for consequences of actions taken based on the information.

Thank you...I would like to thank all the staff and volunteers that report disease and pest problems when they find them. Your hard work is appreciated. Our volunteer scouts for 2023 are Deb Link, Maureen Livingston, Loraine Miranda, and Molly Neustadt.

Literature/website recommendations:
Indicator plants are chosen because of work done by Donald A. Orton, which is published in the book Coincide, The Orton System of Pest and Disease Management.

Additional information on growing degree days can be found at:
http://www.ipm.msu.edu/agriculture/christmas_trees/gdd_of_landscape_insects
http://extension.unh.edu/resources/files/Resource000986_Rep2328.pdf

This report is available as a PDF at The Morton Arboretum website at https://mortonarb.org/about-arboretum/plant-health-care-report/

For pest and disease questions, please contact the Plant Clinic. You can contact the Plant Clinic via email at plantclinic@mortonarb.org . Emails will be answered during business hours Monday through Friday. You can call the Plant Clinic by phone (630-719-2424) or visit in person, Monday thru Friday 10 am to 4 pm. On weekends and national holidays, Arboretum members need a timed entry ticket to enter the Arboretum and visit Plant Clinic in person. Non-members need a timed ticket every day and must pay the entry fee.

Inquiries or comments about the PHCR should be directed to Sharon Yiesla at syiesla@mortonarb.org .

2023 Plant Health Care Report Index

The Morton Arboretum® | THE CHAMPION of TREES

Following is an index of the various subjects in this year's report. The number after each subject is the report number. For example, using the chart below, Cicadas….. 1 means that it was discussed in the PHCR 2023.01 or the newsletter dated April 7, 2023. The index is updated with the publication of each full issue and is included at the end of each full issue.

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