

Plant Health Care Report

Scouting Report of The Morton Arboretum

Sept 24, 2021

Issue 2021.13

For comments regarding PHCR, or to subscribe to email alerts regarding posting of new issues, contact Sharon Yiesla at syiesla@mortonarb.org.

Our report includes up-to-date disease and insect pest reports for northeastern Illinois. Plant Clinic staff and volunteers are now back to working onsite, with the Plant Clinic open to walk-in visitors. Questions can also be answered by email at plantclinic@mortonarb.org or by phone at 630-719-2424 (Monday thru Friday, 10 am to 4 pm).

This is our final issue for the season. This special issue focuses on the future and broader topics.

Quick View

What indicator plant is in bloom at the Arboretum?

Seven-Sons Flower (*Heptacodium miconioides*) is in flower (fig. 1).

Accumulated Growing Degree Days (Base 50): 2996 (as of Sept 23)

Special topics in plant health care

- Plant health care
- What about the weather?
- What happens when we water?
- Insects, diseases and stress
- Next season is now



Figure 1 Seven-Sons flower

Soil temperatures around Illinois (from Illinois State Water Survey)

For more data go to <https://www.isws.illinois.edu/warm/soil/>

Max. Soil temps For Sept 9, 2021*	St. Charles reporting station (north)	Champaign reporting station (central)	Carbondale reporting station (south)
2-inch, bare soil	76.8	72.3	77.2
4-inch, bare soil	73.1	74.6	71.6
4-inch, under sod	68.4	70.8	72.6
8-inch, under sod	67.1	70.0	69.5

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

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

As of Sept 23, we have 2996 base-50 growing degree days (GDD). The historical average (1937-2020) for this date is 2785 GDD₅₀. There is no comparison to other years as, we did not publish issues this late.

Location	GDD as of 9/23/21
Carbondale, IL*	3755
Champaign, IL*	3335
Chicago Botanic Garden**	3257
Glencoe*	2669
Chicago O'Hare*	3275
Kankakee, IL*	3145
Lisle, IL*	3276
The Morton Arboretum	2996
Quincy, IL*	3520
Rockford, IL*	3029
Springfield, IL*	62707
Waukegan, IL* (60087)	2978
Waukegan, IL (60085)	3112

**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/>

Seasonal precipitation (rain and melted snow) in inches.			
	2021	2020	average
Jan	1.5	2.14	1.952
Feb	1.49	.85	1.769
Mar	1.24	4.15	2.536
April	1.39	4.37	3.692
May	3.34	8.24	4.194
June	6.57	4.91	4.190
July	2.04	2.87	3.893
Aug	2.12	1.1	3.802
Sept	.87 (as of 9/23)	3.55	3.309
Year to date	20.56 (as of 9/23)	32.18 (as of 9/30)	29.33 (as of 9/30)

Special topics in plant health care

The articles presented here are meant to help us think more broadly about plant health care and to encourage everyone to take a deeper dive into some of these issues that impact plant health.

Plant health care

We call our newsletter the Plant Health Care Report, so we should talk about what that really means. We spend a lot of time chasing the insects and diseases, but plant health care (PHC) is more than that. PHC should be a more holistic approach, looking at proper site selection, proper planting and good maintenance. PHC focuses on stress and stress reduction. Many disease and insect problems are related to stress (see article below). A plant that is experiencing less stress will be healthier and less likely to succumb to problems. That is why we sometimes include articles on related topics like watering and weather. When we consider the health of the tree, we must also look at the environment in which it lives and consider the care that it receives. This issue of the newsletter will look at some of these things in more detail.

What about the weather?

Weather does impact trees (and other plants). Often when we talk about the weather, everyone immediately thinks about current weather. We need to look back further than that. The effects of weather are cumulative on trees. Let's look back at 2012. That year, spring temperatures rose very quickly, and many things flowered early and some flowered out of their normal sequence. That summer was very hot, and we experienced dry conditions. Trees that were not being watered were at risk for root damage. Going forward to the spring of 2013, our area experienced flooding rains (9.78 inches in April compared to the 3.7 inches average for

that month). One might be inclined to say that the heavy rainfall balanced out the dry conditions from the previous summer. But for trees that suffered root damage in summer of 2012, the floods brought additional root damage, not relief. Saturated roots (fig. 2) cannot function properly and if they are saturated long enough root rots can begin. So, we have damage piled up on top of damage.

In the years since 2013, we have had other very wet springs and hot dry summers. We have also had two polar vortices. We have seen weirdly fluctuating weather conditions. One example is April 2019, when

temperatures early in the month rose into the 80's and temperatures at the end of the month dropped to freezing. Plants struggle to deal with these temperature swings. A plant that leafed out early when the temperatures soared may have suffered some cold damage in late April when we hit the freezing mark. Another example is fall of that same year. October was a beautiful, warm month, and then it snowed on Halloween. That was followed by several days of brutally cold temps (the lows dropped into single digits for a couple of nights). The real issue for most plants was the cold temperature more than the snow. When those cold temperatures hit, many plants were not fully dormant and some may have suffered some cold damage.



Figure 2 Spruce sitting in water (photo: S. Yiesla)

Just thinking about all the extreme weather is a bit exhausting. Think about the trees and other plants that have to stand out in it all year! Inclement weather causes stress to our plants. This stress builds up and makes our plants more susceptible to disease and insect issues. As we diagnose plant problems, we have to factor in the weather and not just the current weather. Often when we see a plant in decline, it is not from what is happening now, but what has been building up for years. Anyone who works with plants should be aware of the weather of previous years.

What happens when we water?

The obvious answer to that question is that we keep our plants alive. But we need to dive deeper here. We don't just want our plants to survive, we want them to thrive. Water is

essential to all life forms, and the plants need water just like everybody else does. They need it to live and to grow (make new plant parts) and to reproduce (flower and produce seeds). When we turn on the garden hose or lawn sprinkler, we tend to have one eye on the water meter. This is wise, but instead of denying our plants water, we should make sure that every drop is used well by watering properly ([see issue 6, June 11, 2021](#) for a long article on watering properly).

I am not a researcher and this is not intended to be a scientific paper on plant physiology, but we are going to dig one layer deeper than most of us generally do. So, what does water do for our plants? Obviously, on a hot, dry day, watering the plant gives it water to take up so it does not wilt. But water is important to plants in so many other ways.

Water plays an essential role in photosynthesis, the process by which plants make their own food. This is not the 'food' we give plants when we fertilize (nitrogen, phosphorus and potassium). If there was suddenly a fertilizer shortage, the plants would carry on without it. Through photosynthesis, plants make carbohydrates that they burn for energy so they can complete various biological processes. Water helps the plant produce chlorophyll, the green pigment that is necessary for photosynthesis. Plants need to make new chlorophyll every day. If water is in short supply, chlorophyll is not formed and leaves turn yellow. Water is also involved in the photosynthetic process itself. Remember that formula for photosynthesis that the science teacher showed you in biology class? Don't stop reading, I won't show it to you here. Instead, I will tell you what it means: carbon dioxide molecules and water molecules, in the presence of light energy captured by chlorophyll are converted into sugar (carbohydrates) and oxygen molecules. So, no water, no carbs, no food (and also less oxygen for us to breathe).



Figure 3 Fruits won't develop well without water

Water also plays an important role in growth, partly because of its role in photosynthesis, but also because it is needed to help with the development and expansion of new plant parts. Trees form their leaf buds for next year in the current summer. If there is a lack of water during summer, bud formation will be affected, so that fewer buds may be formed and those that are formed may be smaller than normal. So, watering your tree in the summer not only keeps in

from wilting, it also helps with bud production for next summer. Watering is an investment in the future growth of that tree.

I mentioned in the article about the weather, that in a dry season, roots are at risk for damage. Roots that have been cut during construction have been damaged. A tree that is dug from a nursery field and planted in a new location has suffered root damage. In all these cases, the tree will need to produce new roots. Usually, the first question people ask in these situations is “Should I fertilize?” The answer is “No”. Water is the essential ingredient for root growth. We should tend to that need first and foremost. Water is needed so the remaining roots can keep supplying water to the tree, but it is also needed for the tree to develop new roots and expand its root system. The carbohydrates made through photosynthesis (remember that takes water too!) help with new root growth. We can consider if fertilizer is appropriate at a later date.

Water is also important in flowering and reproduction. Water is essential for the development of leaf buds, and it is equally important for the development of flower buds. Water also plays important roles in the development of fruits (fig. 3) and seeds. When a fruit starts to grow, plants start to send lots of carbohydrates to that fruit. Fruit production is a high priority on the list of plant parts that need carbohydrates. If water is lacking and carbohydrate production (photosynthesis) is decreased, fruits and seeds may fail to develop or may develop poorly. Also, fruits that are juicy, need water to make them so. You can’t get a good watermelon without water.

So, when we water our plants, we are doing so much more than just getting them through a dry spell. We are helping them carry out their day-to-day biological functions and helping them to grow and develop for the future. Watering your tree today is an investment for tomorrow.

Insects, diseases and stress

Even though we are looking at PHC in a broader scope in this issue, we can’t forget about the insects and the diseases. We need to take a broader view of these problems as well. Stress, environment and level of care can make these 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 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 (fig. 4), 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 4 Lecanium scale populations have risen in the last 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. If you took the time to read the really long article above about watering, you will realize that 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 keep the tree from producing 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.

Next season is now

Normally at this time of year we are gearing down from one growing season and planning for the next. Considering all the points covered in the articles in this issue, we may need to rethink that concept. The current growing season is impacted by the ones that preceded it and will have impact on the one coming up. Plants are living and growing in a continuum. Winter is not a holiday between growing seasons. In some years, our growing seasons are getting longer. Last autumn was warm and dry and went on through November, December and even a little into January. Timing on practices like watering and pruning need to adapt to these changes.

Hopefully the concepts covered in the articles in this 'end of season' issue, show us that the season doesn't really end. Take some time to consider these concepts and look at Plant Health Care as a more holistic process. We need to think about updating some of our practices.



Bartlett Tree Experts, Plant Clinic sponsor

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 and Professor at Joliet Junior College; 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.

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 online at <https://mortonarb.org/about-arboretum/plant-health-care-report/>

For pest and disease questions, please contact the Plant Clinic. The Plant Clinic building is now open to walk-in customers, Monday through Friday 10 am to 4 p.m. You can still contact the Plant Clinic via email at plantclinic@mortonarb.org. Emails will be answered during business hours Monday through Friday. Plant Clinic can also be reached by phone (630-719-2424), Monday thru Friday 10 am to 4 pm. Inquiries or comments about the PHCR should be directed to Sharon Yiesla at syiesla@mortonarb.org.

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2021 Plant Health Care Report Index



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, Cankers..... 1 means that it was discussed in the PHC report 2021.01 or the newsletter dated April 2, 2021. 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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