Lichens:

By: Diane V. Steiner

Looking around your landscape you notice some of your trees that have a greenish/gray "fungus" on the trunk and maybe even some branches. It is especially noticeable after a rainfall. Are the trees sick or dying? Will it spread to other trees? Is it killing my trees?

What are growing on your trees most likely are lichens which consist of unrelated organisms; an algae and a fungus. They have a symbiotic relationship each one providing the other with what is needed for each one to survive.

Interestingly is the color that they exhibit determines what kind of algae is present. Green algae are most common in our environment and have photosynthetic abilities which provide energy for the lichen. They enable the means to convert carbon dioxide in the atmosphere to oxygen through photosynthesis.

There are an estimated 13,500 types of lichens that exist in the world with many different colors and forms.

Lichens are important because of their ability to absorb everything in the environment especially pollutants including heavy metals, carbon or sulfur, which they are extremely sensitive to. Therefore if you have lichens on trees you have good air quality.

Beside trees, you may see them growing on rocks, walls, tombstones and in woodlands. They grow rapidly when exposed to full sunlight which explains why they are common on dead or dying trees.

Enjoy the beauty they can add to your landscape.

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ARBOR NEWS

This newsletter has adapted articles and graphics from the publications of the following organizations in addition to our original pictures and stories.

2019

Don't Change EAB Plans Due to Cold Weather

By: Bill McNee, Forest Health Specialist, Oshkosh, bill.mcnee@wisconsin.gov, 920-360-0942 • reprinted from the Wisconsin DNR Forest Health News, February 2019

The recent frigid temperatures in late January and early February are likely to kill many overwintering emerald ash borer (EAB) larvae, but the tree-killing pest isn't going away. The insulating properties of tree bark keep the larvae warmer than the outdoor air temperature, and wind chills do not affect the larvae because they are sheltered. The pest is also adapted to subzero temperatures based on its native range in eastern Asia where cold winters are common. On the morning of January 31, many parts of Wisconsin had low air temperatures between -30 and -35 degrees F. In places where it was this cold, scientific studies predict that most EAB larvae will be killed. Where low temperatures were between -20 and -30, larval mortality is likely to be lighter. Overwintering larvae were examined about 1 week after the cold snap in Brookfield (Waukesha County), where the low was -26, and few of the larvae were observed to have physical signs of freezing damage. Many of the larvae began moving within three days of being brought indoors. However, physical damage to the larvae may not yet be apparent, and normal-looking larvae may ultimately die from the cold temperatures.

Populations of the pest are likely to rebound, since each female beetle that emerges this summer will lay as many as 200 eggs. It is not currently known if larval mortality will significantly delay ash tree decline and mortality, although this may occur in areas that experienced the lowest temperatures. A cold spell in early 2014, that was not quite as cold, had no noticeable impacts on EAB spread or ash decline/mortality in areas known to be heavily infested.

The introduced biological controls of EAB, commonly known as "EAB wasps," are at least as cold-tolerant as EAB. It is expected that these wasps will persist in and around release sites and continue parasitizing EAB eggs and larvae. Forestry experts do not recommend changing EAB management plans solely due to the cold weather.

- Continue to look for EAB in ash trees. Woodpecker damage is a good sign that an ash tree is infested with EAB or other pests.
- Insecticide treatment of high-value ash trees near known infestations should be continued this spring.
- Don't delay tree removals or timber harvests that are already scheduled. Giving non-ash tree species more time to grow means that the future impacts of EAB will be reduced.
- Continue planting non-ash tree species.
- To help slow the spread of EAB, review firewood rules in Wisconsin. Buy firewood in the local area where you plan to burn it or buy Wisconsin certified firewood that has been treated to eliminate pests. Certified firewood is often available at DNR managed properties or you can buy from an independent certified firewood dealer.

Extreme Trees!

By: Kevin Nolan, Certified Arborist # MW-4399A

The weather in Wisconsin can be punishing, so how do our trees and shrubs survive? Native plants are well adapted to their environments, even if they need a little help from time to time. Plants translocated from outside our growing area tend to suffer the most injury from weather extremes. Even within a species, tolerance can vary. For example, redbud trees (Cercis canadensis) are hardy in Wisconsin when a particular variety, or ecotype, is planted. A redbud transplanted from a more southern location would suffer winter injury and may not survive. This is a common problem with plants obtained from "big box" stores and a good reason to purchase your landscape plants from local nurseries or trusted providers.

Let's begin with cold hardiness. Air temperatures dipped into -20F and colder, with windchills as low as -50F this year! On average, we get a blast of extremely cold air every few years. Trees that are marginally hardy or belong to warmer ecotypes are likely to suffer some damage or even plant death. There are several ways our hardy trees adapt and overcome this extreme cold. Trees enter a dormant period each winter, this is brought on by cooling temperatures and shortened day length. Deciduous trees respond by dropping leaves, evergreens show fewer changes but go dormant nonetheless. Certain evergreens, particularly cedars, can show color change during dormancy.

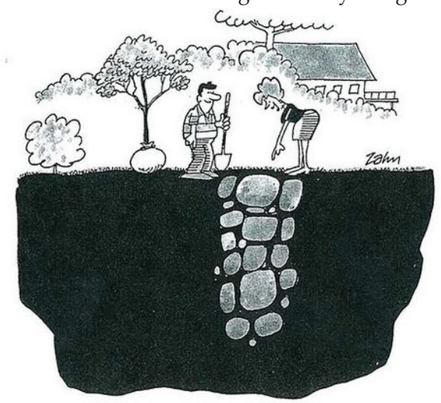
During dormancy, trees reduce excess water in their cells and the spaces between (called interstitial space). Ice crystals are the real problem with winter cold, once crystals rupture the cell walls then injury occurs. Plant cells have a thickened exterior wall which helps reduce rupture damage along with the reduction of water in this area. The cells are also filled with chemicals such as sugars, carbohydrates, proteins, and enzymes. By reducing the water content, the cells become super concentrated. Much like salt water freezes at a lower temperature, these concentrated cells resist freezing solid. Plants that respond in this way are known as "freeze avoiders" which represent the majority of trees in our area. A smaller group of plants can freeze without harm; these are known as "freeze tolerators". Redosier dogwood is a common example of a freeze tolerator in our area.

Snow is actually a great benefit to our trees and shrubs during cold weather. Root injury is more harmful than limb injury, a blanket of snow helps insulate the soil from low temperatures and reduce root injury. When the temperature drops rapidly with out snow, winter injury occurs. This is a great reason to mulch around your trees; the decaying mulch helps maintain soil temperatures.
From snowshoes to bermuda shorts, our trees take it all! When the heat is on, trees protect themselves in a variety of ways. The first step is to reduce water loss by closing leaf pores called stomata.

This also leads to reduced cellular functions like photosynthesis; however it is not much of a problem in most cases. When day and nighttime temperatures remain over 85F for prolonged periods of time some tree injury can result. Species less tolerant of heat may begin to drop leaves during periods of very high temperatures. By reducing the amount of leaves they reduce water needs and help to preserve the plant. This is very common with birch trees. As with cold injury, root damage is usually a bigger health issue.

High soil temperatures can lead to the death of the small "feeder" roots that are largely responsible for gathering water and nutrients. When soil dries to the point of cracking, roots can be torn apart by mechanical injury. Supplemental watering during hot, dry periods can really help reduce injury and plant stress. The effects of drought and heat stress can take several years to manifest in the canopy of the tree. Trees that are adapted to wet soils, such as birch, freeman maple, and willow, are particularly susceptible to root injury. Mulch helps reduce drought stress as it can maintain soil moisture content in the upper layers of soil where these feeder roots operate.

A few common threads link both cold and heat hardiness. The first is selecting trees of an appropriate species and ecotype for your property. Field grown trees from reputable local nurseries are the best option. Some marginally hardy trees (usually from southern locales) may do well for a few years until we get a very cold winter then suffer injury or plant mortality as a result. Trees brought in from more northern areas may suffer from heat injury in the summer. Mulch is also a common factor. Mulch mimics the forest environment by stabilizing soil temperature, moisture content, and encourages beneficial fungi that can improve root function. It tends to be an unpopular opinion, but I advocate leaving fallen leaves in place and cleaning them up in spring instead. Doing so creates a natural insulating layer to protect against weather extremes and maintain root health. The neighbors may disagree!



Wood Decay Fungi

By: Kevin Nolan, Certified Arborist #MW-4399A

Mushrooms are everywhere! While this is great news if you're a Hobbit, it may be an indication of a serious problem with your trees. We get numerous calls regarding mushrooms growing from limbs, trunks, roots, and in the soil near the base of trees. Some fungi are harmless or even beneficial, but others could be causing a lot of harm.

The decay of all woody tissue is a result of fungal activity. There are two primary groups of fungi that cause decay, basiodiomycetes and ascomycetes.

Basidiomycetes are the larger of the two groups and include nearly all gilled mushrooms, growths, and conks that are readily identified as fungi. Ascomycetes are largely found on leaves and are present in stems as cankers. There are a few ascosmycetes that cause considerable rot but their fruiting bodies are not as visible.

Most fungal infections are a result of spores landing on a suitable site such as an open wound, leaf, or dead limb. Some fungi will invade through the root system through special structures called rhizomorphs. As soon as the fungi make contact they begin to dissolve specific tree tissues and proliferate. Trees will attempt to stop an infection through a process of compartmentalizing internal decay in trees (CODIT) which can be done with varying degrees of success. Some fungi can move faster than the tree can compartmentalize, or they may be able to break through the trees defenses. Others may be easily contained by the tree and cause only localized decay. Once an infection has taken hold, the fungi continue to break down tissues until it can produce a fruiting body. These fruiting bodies are often what we notice growing on, around, or out of our trees. The fruiting bodies are usually only a small part of the larger organism and serve the purpose of spore production. Removing the fruiting body does little to slow the progress of a fungal infection.

Fungal decay is divided into three main categories mainly differentiated by which tree tissues are being dissolved. White rot fungi are the most common groups and primarily attack lignin in the cells. This can result in a bleached appearance to the impacted tissues. In advanced decay, a darkened zone line is visible in cut wood which makes white rot quite easy to identify. White rots cause a lot of injury; however they cause less strength of wood loss than brown rots.

Brown rot is more common in conifer trees and attacks the cellulose tissues. This results in a dramatic loss of strength and a darkened, cubical appearance to the impacted wood. The popular "chicken of the woods" mushroom is one of the few brown rots commonly found on deciduous trees.
Soft rot is caused by ascomycete fungi, though a few are associated with basidiomycete. Soft rots also attacks cellulose but in a different way than brown rot. Soft rot disturbs the links between cells and causes a major loss of holding strength. In observation, soft rot causes a very similar pattern of decay as brown rots do.

Decay is also named for the areas of the tree that are impacted. The pathogen is not limited to the area it is named for and many can cross into multiple portions of the tree. Root rot is decay that appears to be limited to the root zone. Butt rot is in the main stem up to about 4' off the ground where trunk rot can be found anywhere along the trunk and in larger scaffolding limbs. Heart rot is decay in the center of the tree (causing them to be hollow) while sap rot tends to impact the vascular system of a tree.

Typically we are called when a fruiting body is noticed, 11 but cause relatively little harm. A common example of this would be Polyporus squamosus. This large, highly visible mushroom is commonly seen on old pruning sites on Norway Maple trees. The decay is largely limited to the area and is rarely a cause for removal. Depending on the location of this fruiting body, pruning or limb removal may be recommended. However when Armillaria spp. is found on urban trees the tree should be carefully examined and removal may be recommended even if the tree appears healthy.

Several steps can be taken once a fungi is identified and the extent of the damage assessed. In some case we may be able to spray or inject the tree with antifungal agents to help preserve the tree. Proactive antifungal injections are common with American Elm to protect against Dutch Elm Disease. Pruning out infected tissue is often an appropriate response, however sometimes removal is the only viable option.

Homeowners can help reduce the risk of fungal infection by keeping their trees healthy. Proper watering, fertilization, and treatment for harmful pests also help maintain plant vigor. Mulch rings around the base keep lawn trimming equipment away from the trunk and help reduce potential points of infection. Fungal infection is also a factor in pruning times and the main reason we only prune oak and elm trees in the dormant season.

This article is just the tip of the iceberg when it comes to fungi and trees. There are many factors to consider when examining fungal growths or damage to trees, often samples need to be sent to that pathology clinic to get a 100% confirmation of a fungal infection.