Issue: 22-01
February 2, 2022

THE PURDUE LANDSCAPE REPORT

In This Issue

Agriculture Census Survey

(Janna Beckerman, jbeckerm@purdue.edu) & (Kyle Daniel, daniel38@purdue.edu)

The Indiana Green Industry is a 6.855 billion dollar agricultural enterprise. However, it is not often considered or included in the federal programs and state programs that support agriculture. One way to improve that support is to respond to the Census of Agriculture. The Census survey informs everything from crop insurance to disaster loan funding to H-2A programs, including what is supported and how much support it receives. All of this ends up tied to the Farm Bill, and helps determine funding for critically important research and outreach programs for our industry like the Specialty Crops Research Initiative and State Block Grant funding programs to address everything from Asian longhorn beetle, emerald ash borer, boxwood blight, and sudden oak death. It even plays a role the funding Land Grant Universities (each state has more than one) receive. So take some time to let your voice and economic impact be heard. If you need assistance, in most states the county or regional Cooperative Extension office or Farm Service Agency office will be glad to assist.

https://www.nass.usda.gov/AgCensus/

Invasive Species Awareness Week Special: Insects to watch for this summer

(Elizabeth Barnes, barne175@purdue.edu)

It can sometimes feel like the struggle with invasive species is never ending but equipping yourself with the right knowledge can go a long way to lessening their impact. Each species has its own quirks, but there are common themes that explain why these species are a problem, how to slow their spread, and how to manage them. This Invasive Species Awareness Week take a few minutes to read on and refresh your invasive insect knowledge!

What are invasive species?

When talking about invasive species, we tend to group organisms broadly into three categories: native, non-native, and invasive.

Natives species are ones that live in a given area because of non-human means. Generally, these insects, plants, and other organisms are tightly woven into the ecosystem. They may provide benefits to other organisms (e.g. native plants are a food source for beneficial insects) and, outside of outbreaks, their population size is kept from going out of control through the checks and balances of the ecosystem (e.g. predators that only eat certain types of insects).

Non-native species are those that were transported long distances by humans to a new area. They are separated from the ecosystem that they developed in and its checks and balances. Non-native species can have a positive, neutral, or negative impact on their surroundings, though they most commonly have either a neutral or negative impact.

Invasive species are a type of non-native species that were moved long distances by humans, escaped out of captivity or cultivation, established a reproducing population in the wild, and, importantly, cause harm to people and/or the environment. Therefore, the key trait that differentiates invasive species from other non-native ones is that they cause harm. For example, apple trees are not native to North America but even when they grow outside of cultivation they do not cause any significant harm to humans or the broader ecosystem. Apples are therefore simply referred to as a non-native species. In contrast, callery pear spreads aggressively in woodlands and pushes out other plants thereby causing harm to both people and the environment. Thus, callery pear is a non-native species that is invasive.

Why are invasive species a serious problem?

Invasive insects cause a wide range of problems for people and the environment: some expected and some surprising. For example, the loss of a yard tree to an invasive insect can cause a decrease in home value and a loss of food for beneficial insects. However, it can also lead to an increase in flooding because the

roots no longer take up water during heavy rainfall and a decrease in bird population because of a reduction in the insects birds feed their chicks.

How are invasive insects spread?

Invasive insects primarily spread through people moving their food, shelter, or eggs. Organic matter, like leaves, soil, or wood can all provide invasive insects with food or shelter. Insects can stay hidden inside these materials and remain completely undetected by the person transporting them. Some invasive insects are also undiscerning about where they lay their eggs. Lawn chairs, trucks, and outdoor lightbulbs are all places where invasive insect eggs have been found. You can help prevent bringing these invasive insects to new areas by:

- Buying or cutting firewood near where you plan to burn it.
- Cleaning dirt off of shoes and equipment before going to a new area.
- Checking plants for insects when you receive them.
- Checking your outdoor equipment and vehicles before traveling to a new site.
- Checking your outdoor belongings before and after moving to a new area.
- Reporting them if you find them!

Insects to Watch Out For

Photo credit: Penn State Extension | Photo credit: Penn State Extension | Photo credit: Elizabeth Barnes, Purdue University

First instar, forth instar, and adult spotted lanternfly with egg mass.

Spotted Lanternfly

Damage: Spotted lanternfly kills grapes and some small trees, weakens trees and shrubs, and creates a mess for businesses and homeowners alike. These insects drink the sap from over 100 different species of plants, but especially species like grapes, tree of heaven, black walnut, maples, and birches.

Signs: Spotted lanternfly damage is undistinctive but the insect itself stands out (image 1). In early summer, the nymphs are small with black and white spots. In mid to late summer they are nearly fuchsia with black and white spots. In late summer and fall, the adults are large (~1 inch) with black spotted forewings and flashy fuchsia, white, and black hind wings.

Management: In most cases, hold off on management until the lanternfly reaches your area. For plants, like grapes, that are highly susceptible to spotted lanternfly, best management practices often involve a combination of insecticides and trapping. Other plants can be protected using similar measures but these tactics may be unnecessary outside of outbreaks or special cases. However, spotted lanternfly management is a fast-changing field. The author highly recommends checking the Penn State Extension Spotted Lanternfly site for the latest suggestions.

Photo credit: USDA | Photo credit: Dennis Haugen, USDA Forest Service

Asian longhorned beetle and its signs. The first image shows an adult beetle. The second is of several perfectly round exit holes made by the beetle. The third image shows a typical amount of “sawdust” that accumulates in the crooks of trees infested by Asian longhorned beetle.

Asian Longhorned Beetle

Damage: Asian longhorned beetle infestation is a death sentence for a tree. This insect kills a wide range of trees (e.g. maples, buckeyes, elms) by hollowing them out.

Signs: The adult beetle is very eye catching (image 2). It is about 1 inch long and has a blue-black body with white spots. Their antennae are longer than their bodies and are black and white striped. The beetles also leave behind distinctive signs of their presence in their host trees. Look for trees with perfectly round holes about the size of a pencil, “crater” shaped scars in bark, and piles of “saw dust” in the crooks of branches (image 2).

Treatments: Report any signs or sightings of this beetle! An eradication plan will be put into place if the beetle is found to prevent it from spreading further. These efforts have been highly successful in the past and have kept the beetle from destroying our urban and rural forests.

Photo credit: Cliff Sadof, Purdue University | Photo credit: Joseph OBrien, USDA Forest Service | Photo credit: John Obermeyer, Purdue University

Emerald ash borer is more easily recognized by its damage than by the beetle itself. The first image shows the typical s-shaped patterns that appear under the bark of trees damaged by emerald ash borer. The second image shows how ash trees killed by emerald ash borer can break and shatter in unexpected ways. The third image is of the d-shaped exit holes emerald ash bores make in tree bark.

Emerald Ash Borer

Damage: Emerald ash borer only attacks ash trees. About 95-99% of trees that have been infested with this insect die with in 2-4 years.

Signs: Early warning signs of emerald ash borer infestation include dieback of the tree canopy and d-shaped exit holes in the tree bark (image 3). In later stages of attack, there is often a high amount of woodpecker activity around the trees and the bark may flake off revealing s-shaped patterns in the cambium (image 3).

Treatments: Insecticide treatments for emerald ash borer are highly effective and often cheaper than tree removal. If a tree has been killed by emerald ash borer, it is critical to have it removed by a certified arborist. These trees are highly unpredictable and

have caused serious injury and death even in calm weather conditions.


Photo credit: Elizabeth Barnes, Purdue University


Photo credit: Elizabeth Barnes, Purdue University

The soon to be renamed spongy moth (formerly gypsy moth) and the damage it can cause.

Spongy Moth (Formerly Gypsy Moth)

Damage: The soon to be renamed spongy moth feeds on the leaves of trees, especially oak trees. In outbreak years, they can defoliate the trees in an entire neighborhood (image 4). Healthy, deciduous trees (those that drop their leaves in the fall) can usually recover from one year of defoliation. Stressed, evergreen, and/or previously defoliated trees may suffer dieback or death from spongy moth attack.

Signs: The egg and caterpillar stages are the most recognizable (image 4). Egg masses look like brown lumps covered in fuzz. They can be found on anything from a house to a car to a shovel. Caterpillars are fuzzy with two rows of blue and red dots on their backs.

Treatments: Management options range from egg scraping to arial sprays but all are most effective when done by an entire neighborhood. You can find tips on choosing the right options here.

Want to learn more?

Purdue will be sharing invasive species information all week on twitter (@reportINvasive and @PurdueFNR) and Facebook (reportINvasive and Purdue Forestry and Natural Resources).

EABU will host two free webinars this week on invasive species this week. CEU credit will be available.

To learn more about invasive plants, check out the article on native alternatives in this Purdue Landscape Report Issue!

Seen an invasive species? Report it!

- The GLEDN Phone App
- EDDMapS
- 1-866 NO EXOTIC (1-866-663-9684)
- depp@dnr.IN.gov

Of Gnome Beards and Witch's Butter

(Janna Beckerman, jbeckerm@purdue.edu)


Figure 1. Hair ice in Denmark. Photo by Kristine Larsen.

Hair ice, also called ice wool, frost beard, and gnome beard is ice that appears like silky hair (Fig. 1) but forms on dead wood colonized by the fungus *Exidiopsis effusa*. It is fairly uncommon and not reported in Indiana…but who has been looking for it? Think of the bragging rights! It has been found as close as Tennessee and Kentucky (Carter 2013).

Indiana is host to several other members of closely related fungi: *Exidia glandulosa* is often found on oaks (Fig. 2), and *E. recisa* is found on many hardwoods (Fig. 3) as are many other types of jelly fungi in Indiana. Many of these jelly fungi are referred to a 'witch's butter', and may be cream, yellow or orange in color (Fig. 4).


Figure 2. Black oak jelly fungus. Source unknown.

Figure 3. Exidia recisa, a type of jelly fungus, commonly found in Indiana. In this photo, it was colonizing an injury on a sweetgum street tree. Photo by Janna Beckerman

Figure 4. Witch's butter. Photo taken in Shades State Park. Photo by Janna Beckerman.

Figure 5. Nisseskæg (gnome beard) and hair ice in Denmark. Photos by Kristine Larsen.

Hair ice (Fig. 5) forms on moist, rotting wood from broadleaf trees under humid conditions when temperatures drop slightly below 32 °F. The hairs appear emerging from wood ray cells (never on the bark), the same cells that give quartersawn oak its fascinating grain. Ice hair thickness is approximately the same diameter of the wood ray channels, meaning these are incredibly thin, delicate strands of about 0.0008 in (0.02 mm) diameter. Amazingly, these strands of ice can reach lengths of up to eight inches. Hair ice strands are surprisingly brittle, despite taking the shape of waves and curls, and keeping that shape for hours up to several days. This long lifetime for such a delicate structure indicated that an unknown chemical or process is prohibiting smaller ice crystals from recrystallizing into larger ones (recrystallization spontaneously occurs at ~32 °F). The fungus shapes the ice into fine hairs through an uncertain mechanism and likely stabilizes it by providing a recrystallization inhibitor; scientists suspect that dissolved fulvic acids, a by-product of fungal digestion of the wood, may be involved. Most cool of all: A piece of wood that produces hair ice once may continue to produce it over several years!

Hair ice was first described by meteorologist Alfred Wegener (who also first described the concept of continental drift), in 1918, and hypothesized that a fungus was involved in the formation of the structures. Almost 100 years later, in 2015, German and Swiss scientists identified the fungus *Exidiopsis effusa* was found with each hair ice sample. Next, they treated the wood with either a fungicide or hot water to kill the fungus, thereby preventing hair ice formation, further supporting the role of the fungus in hair ice formation (Hoffman et al. 2015).

Similar to the disease triangle, it appears we have a 'hair ice' triangle. We need the hardwood host in the form of beech(check), the fungus (check?), and the environment (check—It's Indiana. Wait 15 minutes and will happen!). Now, we need only luck, patience and persistence!

All of the images of hair ice were provided to me by Kristine Larsen, who lives in Denmark. She reports that most of her forests are beech and the weather is "very up and down", just like Indiana. Photos were taken in Rold Skov (Rold forest) in North Jutland. She said that they usually call the phenomenon **Nisseskæg** (gnome beard). She also said that "I was very lucky with this branch, the ice was long and had a cool shape, most of the time it's not as impressive as this one." A big thank you to Kristine for sharing this. Now, if only the weather would cooperate so I can begin looking for gnome beard!

For additional information:

Carter, J.R. 2013. Flowers and Ribbons of Ice. American Scientist. 101(5):

360. DOI: 10.1511/2013.104.360

https://www.americanscientist.org/article/flowers-and-ribbons-of-ice

Hofmann, D., Preuss, G., and Mätzler, C.: Evidence for biological shaping of hair ice, Biogeosciences, 12, 4261–4273, https://doi.org/10.5194/bg-12-4261-2015, 2015.

Planting for our Future: Landscaping with Natives

(Karen Mitchell, mitcheka@purdue.edu)

Throughout the decades, many landscape fads have ended in failure. Dame's rocket, wintercreeper, and purple loosestrife are a few examples of beautiful and vigorous ornamentals that have wreaked havoc on our natural ecosystems. Nursery professionals, as well as consumers, were unaware of the potential negative impacts of non-native species, often marketed as vigorous, hardy, or sterile. These species have been so detrimental to the environment, they are now illegal to sell, gift, or introduce in Indiana and more plants are expected to be added to this list of banned species[1].

Thanks to efforts like the National Invasive Species Awareness Week (NISAW)[2], more consumers are requesting native species, but they may not know where to begin or may have HOA guidelines to comply with. Callery pear (*Pyrus calleryana*) and burning bush (*Euonymus alatus*) have both been found to invade Indiana woodlands and yet are still commonly found in the home landscape.

Common ninebark (*Physocarpus opulifolius*) is a native replacement for burning bush that provides even better year-round interest (Photo 1). This fast-growing shrub makes an excellent hedge while providing a valuable nectar source for native pollinators.

Photo 1. Ninebark flower clusters turn to red seed capsules that persist into the winter. Photo credit: Ashley Adair

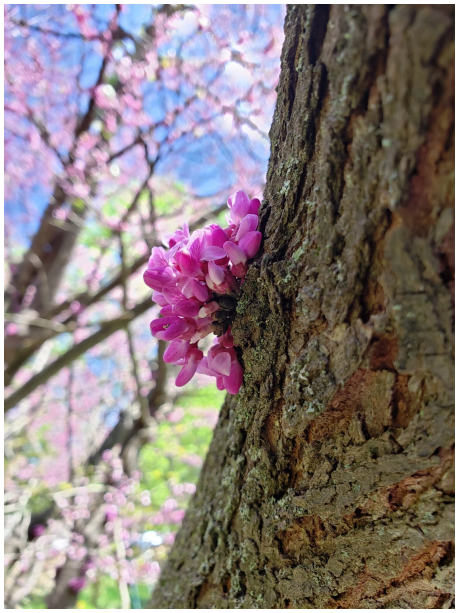

Photo 2. Eastern redbud flowers form clusters on the branches and trunk. Photo credit: Karen Mitchell

If you're looking for an early blooming tree, instead of callery pear, try Eastern redbud (*Cercis canadensis*). This native tree provides nectar early in the season for pollinators when food is otherwise scare (Photo 2) and avoids the invasive nature and other problems of callery pear, such as fire blight disease and breaking in wind storms.

Plant for our future. Native species can fulfill our need for a beautiful landscape while providing food and shelter for pollinators and birds. Every yard, easement, and ditch has the potential to either help or hurt our environment. As more individuals recognize this, we are seeing a paradigm shift away from the desire for a pristine landscape to a landscape that is a part of the natural ecosystem.

More information about replacing invasive plants can be found:

ID-464-W Alternative Options for Invasive Landscape Plants: https://www.extension.purdue.edu/extmedia/ID/ID-464-W.pdf

Indiana Native Plant Society:

https://indiananativeplants.org/landscaping/landscape-uses-of-native-plants/

State of Indiana Cooperative Invasive s Management:

https://www.sicim.info/landscaping-with-native-plants

References:

1. https://www.in.gov/dnr/rules-and-regulations/invasive-species/terrestrial-invasive-species-plants/
2. https://www.nisaw.org/nisaw-2022/