Issue: 21-10
June 22, 2021

THE PURDUE LANDSCAPE REPORT

In This Issue

New Pest Alert: Watch your boxwoods for this moth

(Elizabeth Barnes, barne175@purdue.edu)

What happened

Now is an important time to take a close look at your boxwoods. Plants infested with the invasive box tree moth (*Cydalima perspectalis*) may have been accidentally transported into Indiana. This moth is native to Asia and has long been the scourge of boxwoods (*Buxus* sp.) in Europe. It was first detected in North America in Canada in 2018. It has **not been found in Indiana** yet but due to recent potential introductions in nearby states heavy monitoring is underway. Any suspected sightings of box tree moth should be reported (1-866-NO EXOTIC (1-866-663-9684) or DEPP@dnr.in.gov) so that this destructive pest can be contained before it spreads.

Why it's a problem

The box tree moth causes serious defoliation to box woods (*Buxus* sp.) and may also eat burning bush and holly. The caterpillars feed on the bottom layer of leaves when they are small leaving behind a thin, papery membrane (figure 1). When they grow larger, they consume all of the leaf except for the midvein (figure 2). The caterpillars spin webbing in the foliage of the bushes they are feeding on (figures 3). Box tree moth can have anywhere from 1-5 generations per year depending on the climate, opening the potential for multiple defoliation events per season. Their lack of predators combined with their voracious appetite means that they can cause serious damage to the bushes they infest (image 4).

What to watch for

The box tree moth itself can be difficult to identify. The adult moth is easily confused with harmless native moths. The caterpillar stage of the moth is bright green and yellow, but it can be hard to spot because of its small size (~2 cm long). It is easier to spot signs of the caterpillars feeding. Heavy defoliation is unusual in boxwoods and may be a sign of the presence of box tree moths. Although other arthropods (e.g., spiders) construct webbing on boxwoods, webbing combined with leaf damage strongly points to the presence of box tree moth. All instances of boxwoods, burning bush, or holly with heavy defoliation or webbing should be reported to the Department of Natural Resources (1-866-NO EXOTIC (1-866-663-9684) or DEPP@dnr.in.gov).

Additional Resources

USDA Box Tree Moth Page

USDA Pest Alert

Damage done by small box tree moth caterpillars. Note the thin membranes left in the place of leaves. Image by Ferenc Lakatos, University of Sopron, Bugwood.org

Damage done by larger box tree moths. Note that all that is left of the leaves is the midvein. Image by Ferenc Lakatos, University of Sopron, Bugwood.org

The box tree moth caterpillars build webbing in bushes they feed on. These webs might be mistaken for spiderwebs but notice how they closely hug the twigs rather than forming a net between the twigs as might be expected from a spider. Image by AtelierMonpli.

Two examples of extensive damage to boxwoods from box tree moth. Notice that unlike more common types of defoliation where the twigs are left bare, here the dead parts of the leaves remain mostly on the plant. This is due to a combination of the nature of the damage and the webbing holding the dead leaves in place. Images by I. Sáček, senior and Hungchaka.

Field Day Returns!

(Kyle Daniel, daniel38@purdue.edu)

Figure 1. Purdue Turf and Landscape Field returns on July 13th.

The Purdue Turf and Landscape Field Day will be back July 13th! Join us at the Daniel Turfgrass Research and Diagnostic Center on the Purdue University West Lafayette campus. The Purdue Turf and Landscape Field Day is an annual one-day event with the objective of providing professional turf and landscape managers exposure and educational opportunities with the latest research and technical resources. The Field Day features research tours a tradeshow with over 40 exhibitors displaying equipment and turf and landscape products.

Registration can be found at: https://t.co/0l8ojrERDN?amp=1

We will be offering a morning session and afternoon session. Masks will be optional. For other Covid safety guidelines, please visit the registration site.

In addition to the in-person event, we will be having the talks recorded to view virtually later in the summer for those that aren't able to attend in person.

Trade show and sponsorship opportunities are still available.

Pre-registration ends July 7th, so don't delay!

Contact Brooke Ponder at bponder@purdue.edu with any questions.

Morning Session (9:00 - 11:00 am)
Talk 1: Is It Possible to Control Crabgrass Organically?, Aaron Patton
Talk 2: Managing Perennial Ryegrass Seedheads to Improve Turf Quality, Ross Braun
Talk 3: Billbug Detection and Management, Doug Richmond
Talk 4: Cool-Season Lawn Fertilization Strategies: What is the Best Timing for Low-Nitrogen Lawns?, Cale Bigelow & Jada Powlen
Talk 5: Diagnosing Herbicide Injury on Ornamentals, Kyle Daniel
Talk 6: From Cicadas to Borers: A Threat Based Approach to Managing Pests and Clients, Cliff Sadof
Talk 7: Tree Risk Assessment: Tools of the Trade, Lindsey Purcell
Talk 8: The Office of the Indiana State Chemist, More Than Pesticides, Joe Becovitz

Figure 2. Purdue Turf and Landscape Field Day schedule.

Bagworms are Easy to Find and Control in Early Summer

(Cliff Sadof, csadof@purdue.edu)

Early summer is a great time to protect trees and shrubs from bagworms. By this time, they have had a few weeks to feed and have become large enough to find, even though they try to hide by covering themselves with leaves. Typically, these insects are found on evergreen trees and shrubs, like junipers, spruce, pines and arborvitae. Some deciduous trees, however, like, maples, oak, elm and honeylocust are routinely attacked.

Bagworm life cycle

Bagworms are flightless moths who spend the winter as eggs laid by their mother in silken cases covered with dried leaves. Eggs hatch into small (1/8") caterpillars in late spring that dangle on silks as they drop to the foliage below the bag. Most of the caterpillars remain on the plant and start eating leaves and needles. Each young caterpillar covers itself with bits of leaves to hide from birds. Many will crawl toward the tops of trees and can be blown up to 30 feet to nearby plants. Caterpillars feed through mid-August before they become adults. Wingless adult females remain in their bags allowing winged males to fly to them to mate. After mating the females will lay eggs in the silken sack where bagworms spend the winter.

Summer Management of Bagworms

If you find bagworms feeding on your trees or shrubs you can control the problem with a foliar spray of an insecticide. There are simply too many small caterpillars for you to hand remove them from a plant. Delaying a spray allows the caterpillars to get larger, and remove more foliage. Evergreen trees and shrubs, the favored hosts of bagworms, are less tolerant of defoliation than deciduous trees that lose their leaves each fall. Unfortunately, while some systemic insecticides available to professionals (dinotefuran) can kill bagworms, they are only effective on smaller shrubs (< 6 ft tall), and have been associated with outbreaks of spider mites later in the season. There are no products homeowners can apply to the base of tall trees to control this pest.

Spinosad (Fertilome Borer and Bagworm killer, Captain Jack's Deadbug) can be applied to leaves and is very effective at killing caterpillars. Some formulations of this insecticide (eg, Monterrey Garden Insect Spray) are OMRI approved, and can be used by organic farmers. *Bacillus thuringiensis* (Dipel, Thuricide), is another effective caterpillar killer with OMRI approved products but is most effective when bagworms are < 1" long.

Other insecticides available to homeowners (eg, carbaryl, permethrin, lambda-cyhalothrin) will kill these caterpillars, but will also kill the beneficial insects that eat predators of spider mites, and scale insects. Early season use of these products have been associated with later season problems with these other pests. For a more complete listing of this products available to homeowners and professionals see our bulletin on bagworms.

Use the Purdue Tree Doctor app to get a diagnosis and a recommendation for bagworms and other pests.

Figure 1 Young bagworms that cover themselves with foliage can be difficult to see.

Figure 2 Bagworms are easier to see in early summer when they are larger and some leaf bits on the bag have turned brown.

Figure 3 Bagworms eating a maple leave and covering themselves with green foliage.

Figure 4 In late July, large bagworm caterpillars can rapidly defoliate a plant.

Summer Tree Care

(Lindsey Purcell, lapurcel@purdue.edu)

Finally, spring has sprung and summer is on its way. The hot days and warm nights are welcome for us, but summer isn't always so kind to our trees, especially in our urban forest and landscapes. Trees are dynamic living organisms that respond to external stimuli in very strategic ways and each season presents its own challenges and summer is no different.

During the summer, growth slows as some resources become limited and typically, this is water. As the summer season progresses, the likelihood of less rain means potential drought conditions. The primary responses of a tree to heat and drought are a reduction in photosynthesis and carbon assimilation rates. This translates to a reduction in energy production and food reserves. This reduction can increase vulnerability to health issues and reduced defense mechanisms against pests.

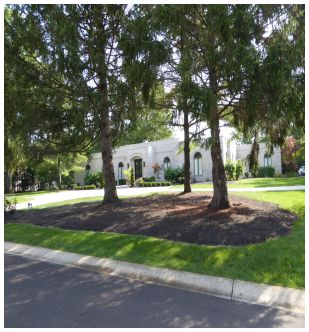
There are some key steps to summer tree care which can help trees through potentially challenging conditions in the summer.

1. Watch the water; be sure to supplement trees with additional watering when there isn't adequate rainfall that measures at least an inch per week. Mature trees need supplemental watering just as the younger, newly established trees. Be sure to know the symptoms of dry conditions and how much to water with more information here.
2. Refresh your mulch; adding mulch to tree rings or even better, expanding them is a great way to reduce water

requirements and competition for water and other resources. As trees grow, so do the roots under the tree and expanding mulching rings outward to the dripline of the crown is a great way to keep trees healthier. Also, this helps with those surface root issues as well.

3. Don't get bugged too much; summer brings out the best in pests too! Many mite and scale species love the heat and can cause major damage and even death to your trees. Look for signs and symptoms of scale infestations and mite damage on your trees and shrubs now. More information on scales can be found here. Additional details on mite damage can be found here.
4. A nip and tuck are fine; summer is actually a good time to prune as needed to meet objectives such as reducing risk, improving branch structure, and removing conflicts or improving aesthetics. Be sure to only remove what is necessary and reduce the amount of live, green tissue removal. Remember, this is what produces food for the tree. Additional tree pruning techniques are discussed in this publication.
5. Call in a professional; it is always a good idea to consult an ISA Certified Arborist for answers to tree questions. A reputable arborist trained in best practices and current research can provide the best solutions to keeping trees healthy and reduce potential risk for damage during those summer storms. Finding a qualified arborist can be a challenge itself. Refer to this website to find an ISA arborist near you.

For additional information on urban tree care check out all the publications at the Purdue Education Store.



Expanding mulch rings is a great way to improve tree root health and reduce surface root issues.

Drought symptoms should be monitored weekly to prevent decline and dieback during the dry months.

Proper pruning during the summer is a good way to improve aesthetics and stability during stormy weather.

Arborvitae Needle Blight

(John Bonkowski, jbonkows@purdue.edu)

We receive a lot of ailing conifers at the Plant and Pest Diagnostic Laboratory each year. We received 870 ornamental plant samples in 2020 and 190 (21.8%) of them were conifers.
While arborvitaes (Thuja spp.) do not beat out spruce in the number of samples we receive in a given year, they make up 20% of our conifer samples (39 in total 2020). They are widely planted in the landscape, especially in rows as a privacy hedge, which may explain why we see so many problems on them.

Arborvitae require quite a bit of attention until they become established and often show the stress of poor care during and after installation. Arborvitae tend to suffer and decline quickly when experiencing soil moisture extremes, whether too dry or too wet, which becomes apparent as the tree starts browning from the bottom up.

The majority of problems we see are associated with these evergreens are due to environmental stress, transplant shock, spider mites, deer browsing, and bagworms, but when we do find a disease it is a rare treat to us pathologists. Arborvitae needle blight, caused by two different fungi which are occasionally found together on the same plant at the same time, is one of the very few diseases that we encounter on this host. Symptoms associated with needle blight include browning, death, and desiccation of the branch tips, leading to branch dieback (Figure 1, 2, 3, 4). Infection occurs as the needles are emerging in the spring and show up at multiple sites lower in the tree canopy. Since both fungi, Phyllosticta and Pestalotiopsis, produce spores that are moved by wind and water splash, infection also takes place during wet, rainy
weather. Phyllosticta and Pestalotiopsis both produce dark fungal fruiting structures on affected tissue that produce asexual spores, so determining which fungus, if not both, are
present requires microscopic examination (Figure 5).

Both fungi are regarded as weak pathogens and are suspected to infect trees that are already predisposed by other forms of stress, such as improper/aggressive pruning, cold/freezing injury, water stress (drought), physical injury, and transplant shock. Chemical management is not normally needed to manage these diseases. Disease severity typically increases as plant stress increases, so

when this disease becomes apparent, it is important to also address any other problems the tree is facing to improve overall plant health and vigor. In addition, pruning out infected material will prevent further stem dieback as well as reduce inoculum for future seasons. Avoid handling/pruning the tree during wet weather as this could potentially spread fungal spores to new spots in the plant canopy. When installing arborvitae, be sure to provide adequate plant spacing to prevent crowding and excess competition for water and root space as the tree grows. Also ensure you are picking locations that provide adequate sunlight and drainage.

Both Phyllosticta and Pestalotiopsis can infect other conifers, including junipers (Juniperus) (Figure 6), fir (Abies), spruce (Picea), and false cypress (Chamaecyparis),so if you do find these diseases you may want to monitor other nearby conifer species for symptoms of dieback. Fungicides are not recommended for management since these problems are stress related.

Figure 1 Branches of an arborvitae showing tip dieback symptoms in a nursery. Photo Credit: Angela Rust, Indiana Department of Natural Resources

Figure 2 Arborvitae branches showing tip dieback caused by Pestalotiopsis and Phyllosticta. Photo Credit: PPDL

Figure 3 Arborvitae tip dieback caused by the fungus Phyllosticta. Photo Credit: PPDL

Figure 4 Symptoms of Pestalotiopsis needle blight on arborvitae. Photo Credit: Purdue Tree Doctor App, used with permission.

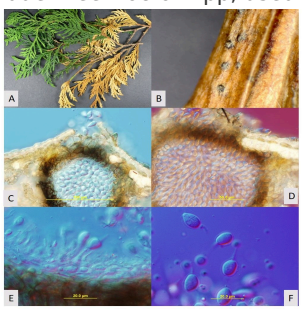


Figure 5 Symptoms and signs of arborvitae needle blight caused by Phyllosticta thujae. A: Branch symptoms; B: Pycnidia produced by the fungus; C-F: Microscopic view of a leaf section including the pycnidium and asexual spores. Photo Credit: Bruce Watt, University of Maine, Bugwood.org

Figure 6 Branch dieback of Juniper caused by Pestalotiopsis. Small gray/black tendrils of spores are being exuded out of the fungal structures growing within affected branches. Photo Credit: Purdue Tree Doctor App, used with permission.

Purdue Landscape and Arboriculture Diagnostic Tour

(Kyle Daniel, daniel38@purdue.edu)

Join Purdue Extension Specialists and Diagnosticians on August 18, 2021 in downtown Indianapolis for a walking tour of diagnosing plant problems. In addition to the Purdue Plant and Pest Diagnostic Lab diagnosticians, the entomology, urban forestry, and nursery and landscape specialists will guide attendees through the diagnostic process and provide solutions to problems encountered on the tour.

There will be a morning and afternoon tour to allow for smaller groups.

Register before August 6th to receive the early bird discount.

Credits will be requested from the Office of the Indiana State

Chemist and International Society of Arboriculture.

Register online: https://www.eventbrite.com/e/landscape-and-arboriculture-diagnostic-tour-tickets-160553211979

Register by mail or money order: https://tinyurl.com/42vr5xwx

Figure 1. Join us for the Purdue Landscape and Arboriculture Diagnostic Tour on August 18th.

PURDUE UNIVERSITY | Horticulture and Landscape Architecture

Purdue Green Industry Landscape and Arboriculture Diagnostic Tour

Downtown Indianapolis
August 18th
10:00-12:00 and 1:30-3:30

INLA or IAA member early bird: $40/person

INLA or IAA member on-site: $60/person

Non-member early bird: $60/person

Non-member on-site: $80/person

Name:_____

Address:_____

City:_____

State:_____ Zip:_____

Telephone:_____

Email:_____

Indicate your time preference: 10:00-12:00 ___ or 1:30-3:30__

Early registration ends August 6, 2021.
Send registration form with credit card information below or check payable to Indiana Nursery and Landscape Association at 7915 S. Emerson Ave., Ste 247, Indianapolis, IN 46237.

To pay with a credit card:
Name on card: _____
Card Number:_____
Expiration Date:_____ CVV code (on back of card)_____

Details and other communication will be sent via email prior to the tour.

Questions about payments, contact INLA at 317-889-2382.

If you need a reasonable accommodation to participate in this program, prior to the meeting:
Contact: Kyle Daniel, email: daniel38@purdue.edu, phone: 765.494.7621

Figure 2. Register by August 18th for the early bird discount.

If you have questions, email Kyle Daniel at daniel38@purdue.edu.

Purdue Virtual Tomorrow!

(Kyle Daniel, daniel38@purdue.edu)

Join us tomorrow at noon (Eastern) for a conversation on roots and wire baskets. Kyle Daniel will be joining you to discuss the current research on transplanting plants in pots and wire baskets.

To join via Zoom: https://purdue-edu.zoom.us/j/9207718963?pwd=MGtCUDJ1Y0hCTStXcGZoSEJhdVZMQT09

To join via Facebook Live: https://www.facebook.com/PurdueLandscapeReport/

Purdue Landscape Report © Purdue University - www.purduelandscapereport.org
Editor: Kyle Daniel | Department of Horticulture and Landscape Architecture, 625 Agriculture Mall Dr., West Lafayette, IN 47907