

THE PURDUE LANDSCAPE REPORT

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Declining Pines of the White Variety

(John Bonkowski, jbonkows@purdue.edu)

I think white pines are beautiful trees, especially at maturity, and they have the added advantage that they are one of the few conifers that don't try to kill you with their needles. Besides working with the foliage, have you ever had to "rescue" a child who climbed too high in a spike-infested deathtrap of an evergreen? Did you develop the rashes to prove it? Not with a white pine!

My kids haven't had the chance to climb a mature white pine. Many seem to decline at about 15-20ft. We have been describing this issue as white pine decline, but it isn't entirely easy to explain. There are a number of factors that influence overall plant health and that can contribute to plant decline, but let's focus on white pines here. White pine decline is typically attributed to root stress that can be caused by or exacerbated by high soil pH (chemically unavailable nutrients), heavy soil texture (clays), compaction, and excessive soil moisture.

Anything that affects the roots can affect the

overall health of the tree, so if the roots are compromised and they cannot uptake water or nutrients, the tree will decline due to lack of nutrients or even lack of water. Needles on an affected tree will turn yellow and eventually brown and fall off prematurely (Figure 1). A symptom of white pine decline includes stems that have shriveled or desiccated bark because roots are not functioning properly cannot pull in enough water (Figure 2).

Depending on the severity of the root conditions, trees may take several years to decline and die, but with significant root stress, trees will decline faster. I have been seeing a lot of white pine yellowing around West Lafayette and in Indianapolis over the last year and a half and I think the odd environmental extremes have not been helping. Cycling between prolonged drought and torrential downpours lead to stress that can have lasting effects that could take years to recover from, or might be the final nail in the coffin.

There is nothing that can be done to recover from or stop decline once symptoms are observed in white pine. However, taking an approach to actively mitigate stress can help extend the life of white pine trees that are currently healthy. In many cases, one white pine will decline while other trees in the vicinity appear healthy (Fig 3, 4). Removal of symptomatic trees is important because stressed trees often attract bark beetles which can spread

to the remaining healthy trees.

Another point: not every tree is going to respond the same way at the same location. Stress factors, such as a poor root system when planted, planting too deeply, or even Phytophthora root rot may have predisposed one tree to decline more than others. Just because one tree goes down doesn't mean they all will, so keep an eye on the others and try to improve the site conditions where practical.

For more information on white pine decline, please see the following link:

<https://www.extension.purdue.edu/extmedia/BP/BP-34-W.pdf>

For information on wood and bark boring beetles of pines and other conifers, please see the following link:

<https://www.purduelandscapereport.org/article/bark-borers-attacking-pines-and-other-cone-bearing-trees/>

<https://www.youtube.com/watch?v=OoQtAYrNwAo&list=PLgavttJPLt2QF5ZEUzGfA5hg2qSOdiT2c&index=5>



Figure 1: Image: 23-00643 White Pine_001 Text: Two white pines planted in the landscape; one is developing a general chlorotic appearance.



Figure 2: Image: 17-00382 White Pine_02bark Text: White pine showing symptoms of decline on

branches where the bark is shriveled and sunken.



Figure 3: Image: 15-00086 White Pine_08 Text: A singular white pine amidst a windbreak showing symptoms of white pine decline.



Figure 4: Image: 15-00086 White Pine_11 Text: View same tree from the other side of the windbreak.

Webinar on Vascular Streak Dieback

(John Bonkowski, jbonkows@purdue.edu)

Vascular streak dieback is an emerging issue on woody ornamentals in the nursery industry. We have provided information on this topic as the situation has been unfolding (<https://www.purduelandscapereport.org/article/vascular-streak-dieback-of-redbud-what-plant-pathologists-know-so-far/>; <https://indianagreenexpo.com/sessions/vascular-streak-dieback-an-emerging-issue-in-nursery-stock/>). Researchers and Collaborators working on vascular streak dieback will be presenting up-to-date information during the tHRive webinar hosted by Horticultural Research Institute on Thursday, April 11, 10am-12pm Eastern. If you think you have plants with vascular streak

dieback or have been dealing with this issue already, I would recommend attending. To register, please follow the link below.

https://us02web.zoom.us/webinar/register/WN_SHvqM3mJTiiKBskOL1aPIA#/registration



Blight, Leafminers, and Moths: The Plight of Boxwoods

(Alicia Kelley, ajkelley@purdue.edu)

Blight, Leafminers, and Moths: The Plight of Boxwoods

Boxwoods (*Buxus* spp.) were introduced into the United States during colonial times, and still today they are one of the most popular evergreen shrubs used in landscapes. They are frequently selected for hedges and topiaries because they are easily trimmed into geometric shapes. They were also easy to maintain and had very few, if any, insect or herbivore problems at that time.

This changed in the 1970s when “boxwood decline” began sweeping across landscapes. This catch-all term did not have a singular cause, but was a combination of factors. Conditions such as improper drainage, over-pruning, over-mulching,

fungal pathogens, nematodes, and winter injury are all associated with decline. The issue led to the breeding of several new cultivars which were resistant to the disease complex, but unfortunately, they were extremely susceptible to boxwood leafminer, (*Monarthropalpus flavus*).

Boxwood leafminer (Fig. 1) is a small yellow fly native to Europe. It was likely introduced with imported boxwood plants, and is now distributed across the United States. The adults lay their eggs on boxwood leaves in late spring (April-May). Eggs hatch in 2-3 weeks, and the larvae feed inside the leaf, causing the leaf to form a blister (Fig. 2). Larvae develop throughout the summer, and then overwinter as pupae inside their mines. Adults emerge in spring to begin the cycle again.



Fig. 1: Boxwood leafminer adults. Image credit: Jim Baker, North Carolina State University



“Fig. 2: Boxwood leafminer blisters. Image credit: Jim Baker, North Carolina State University”

Boxwood leafminer quickly became the most severe pest of boxwoods, and this led to more cultivar development in the search for resistance. d'Eustachio and Raupp (2001) identified cultivars resistant to leafminer, but still today boxwood leafminer is the most damaging insect pest of boxwoods.

Leafminer wouldn't be the last problem to plague boxwoods. In 2011, boxwood blight was introduced to the United States in North Carolina and Connecticut. Boxwood blight is a fungal disease caused by *Calonectria pseudonaviculata*. This disease causes leaf spots and stem cankers (Fig. 3), which spread throughout the entire aboveground portions of the plant, ultimately resulting in plant death if left unmanaged. It has been detected in at least 30 states (Castroagudin et al. 2020).



Fig. 3: Boxwood blight symptoms. Image credit: David L. Clement, University of Maryland

In 2022, Yoder et al. evaluated 146 cultivars against leafminer, and 75 cultivars against boxwood blight. They identified five cultivars with resistance to both pests: 'Peergold', 'Cole's Dwarf', 'SB 108', 'SB 300', and 'Wee Willie'. These options provide a solution to two of the most severe boxwood pests, which is great news for nursery suppliers and landscapers who sell boxwoods. Unfortunately, there is a new invasive insect in the US which is the worst pest of boxwoods yet.

Box tree moth (*Cydalima perspectalis*) is the next major threat to boxwoods. Between August 2020 and April 2021, infested boxwoods were shipped from a Canadian nursery to distributors in Connecticut, Massachusetts, Michigan, New York, Ohio, Tennessee, and South Carolina. It was confirmed in New York and Michigan in 2021, and in Massachusetts and Ohio in 2023. Several counties in Ohio and New York are now under quarantine to prevent the movement of this pest.

Box tree moth adults have two color variations: brown or white with a brown border (Fig. 4), although the white form is much more common. Both forms have a distinct white comma-shaped marking in the center of the forewing. However, it's rare to find an adult because they typically fly at night. The caterpillars, which cause the damage to the plant, are easier to spot. They are lime green with black stripes, and they have a black head with a white "Y" in the middle (Fig. 5). The most tell-tale sign of a box tree moth infestation is the chewing damage to the foliage due to larval feeding (Fig. 6). In severe cases, this insect can completely defoliate a boxwood.



Fig. 4. Box tree moth adults. Image credit: Szabolcs Sáfián, University of West Hungary



Fig. 5: Box tree moth larva. Image credit: Ferenc Lakatos, University of Sopron



Fig. 6: Box tree moth damage. Image credit: Ferenc Lakatos, University of Sopron

In addition to the severe issues outlined above, there are numerous minor pests and diseases of boxwoods. Volutella blight is a fungal disease caused by *Pseudonectria foliicola* and *P. buxi*. They are weak pathogens that attack stressed plants, and can cause limb loss which decreases the plant quality (Fig. 7). Boxwood psyllids (*Cacopsylla busi*) feed on terminal leaves, resulting in leaf cupping which reduces aesthetic appeal (Fig. 8). Boxwood mites (*Eurytetranychus buxi*) are spider mites whose feeding causes yellow pin-prick spots on the leaves (Fig. 9).



Fig. 7: Volutella blight symptoms. Image credit: Penn State Department of Plant Pathology & Environmental Microbiology Archives



Fig. 8: Boxwood psyllid leaf cupping damage. Image credit: Penn State Department of Plant Pathology & Environmental Microbiology Archives

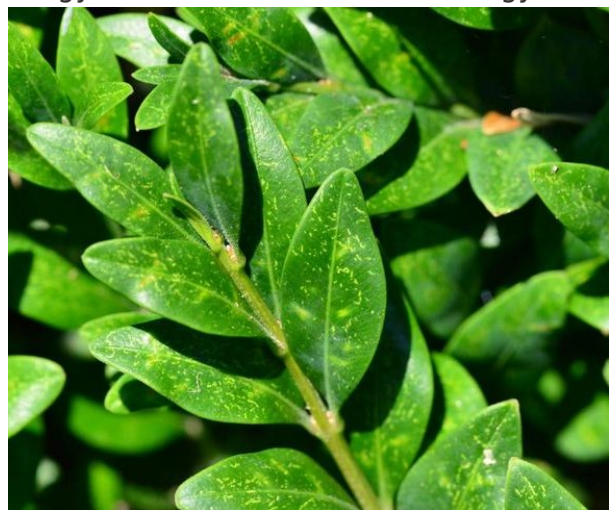


Fig. 9: Boxwood mite leaf stippling damage. Image credit: David L. Clement, University of Maryland

Should you still use boxwoods in the landscape? They have numerous good qualities, including

deer resistance, environmental hardiness, and evergreen foliage. With new resistant varieties available for blight and leafminer, and several chemical control options for box tree moth, the pest and disease problems are manageable. In addition, resistance research for box tree moth is in progress. The decision ultimately rests with both the landscape professional and homeowner, yet they should consider the potential expenses associated with managing pest and disease issues in making their choice. Below is a list of alternatives to boxwoods that are native to the USA that may serve as a better option depending on the needs of the landscape.

Boxwood alternatives:

Evergreens:

Inkberry Holly (*Ilex glabra*)

Eastern arborvitae (*Thuja occidentalis*)

American yew (*Taxus canadensis*)

Eastern red cedar (*Juniperus virginiana*)

Deciduous woody plants:

Winterberry (*Ilex verticillata*)

Red twig dogwood (*Cornus sericea*)

Lowbush blueberry (*Vaccinium angustifolium*)

Blackhaw Viburnum (*Viburnum prunifolium*)

Citations:

1. Castroagudin et al. (2020) Boxwood Blight Disease: A Diagnostic Guide. Plant Health Progress. 21: 291-300.
2. d'Eustachio and Raupp (2001) Resistance of Boxwood Varieties to the Boxwood Leafminer, *Monarthropalpus flavus* (Schrank). Journal of Environmental Horticulture. 19(3): 153-157.
3. Yoder et al. (2022) Field Performance of Buxus Cultivars and Selections Against

Boxwood Leafminer and Boxwood Blight.
Journal of Environmental Horticulture.
40(4): 129-142.

As the sayings go... (Climate & Weather)

(Beth Hall, hall556@purdue.edu)

An old saying predicts that March will go out “like a lamb”. Another saying predicts April’s wetness with “April showers bring May flowers”. A lot seems to have happened across Indiana since April began, but March finished the month with below-normal rainfall (except for the northern counties) and above-normal temperatures. Does this describe conditions that are “like a lamb”? I’ll let ‘ewe’ decide!

And then came April. We are less than a week in and already some parts of Indiana have received more than 750% of what is normal for early April. That is not a typo! Actual amounts have ranged from just below an inch of water in southwest and far southeast Indiana along the Ohio River to over three inches around the eastern counties of Adams and Jay (Figure 1). Typical rainfall for the entire month of April (averaged from 1991-2020) ranges from just 0.2” to less than 0.75”. Can we really call what we’ve seen in just the first few days April “showers”? Streams are flooding across the state, soil moisture percentages have increase significantly, and many are hoping for just a few dry days for things calm down a bit. The U.S. Drought Monitor has eliminated abnormally dry conditions across most of the state except for southwestern counties. The far southwestern counties are considered in Moderate Drought (Figure 2). And then there are the temperatures. True, April is part of the transitional season where one day the temperature can be in the 70s and the next is a chilly 30s with light snow falling. Much of Indiana

was already seeing some snow flurry activity on April 3rd after the heavy rainfall events passed through. Will that be the last of our snow events for the season, or can we expect a few more? The Midwestern Regional Climate Center has a Snowfall Climatology Toolbox (<https://mrcc.purdue.edu/resources/climateTools/snowfallclimatology>) where users can look up the last date of measurable snowfall for a nearby station. According to this product, since 1991, the average last date of snowfall measuring at least 0.1 inches has occurred sometime in March (with a few stations far north indicating April 1st or April 3rd). However, the latest dates have occurred in late April to mid-May. Will 2024 set a new 'last date of measurable snowfall' record since 1991?

According to the national Climate Prediction Center, climate outlooks over the next two weeks are favoring above-normal temperatures with the next 6-10 days favoring above-normal precipitation while the 8-14-day outlook is favoring near-normal precipitation (Figure 2). Hopefully, this means very little chance of measurable snowfall over the next few weeks. The monthly climate outlook for April continues to support those trends with the highest probability of above-normal precipitation occurring across central Indiana. Please keep in mind, though, that short-term freeze events can still move through fast enough that climate models are unlikely to predict them. Similar to the MRCC's Snowfall Climatology Toolbox, the MRCC has another tool, the Freeze Date Tool (<https://mrcc.purdue.edu/freeze/freezedatetool>), where users can select a temperature threshold

and statistical value (e.g., earliest, average, latest) for the date when the last spring freeze occurred since 1950. For example, across much of Indiana (except for southwestern counties), the latest date of a 28-degree freeze occurred on May 9th (the "Mother's Day Freeze Event of 2020").

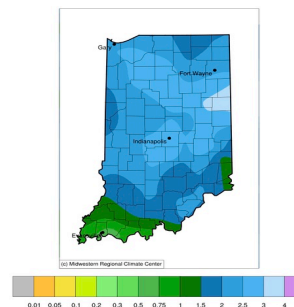


Figure 1. Total precipitation from April 1-4, 2024.

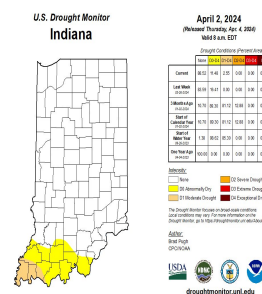


Figure 2. U.S. Drought Monitor reflecting conditions through April 2, 2024.

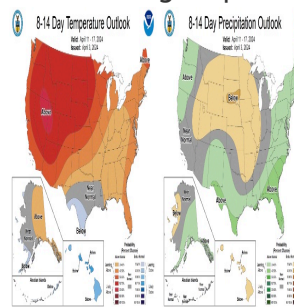


Figure 3. The 8-14 climate outlooks for April 11-17 for temperature (left) and precipitation (right). Note that shading indicates the probability of above-, near-, or below-normal conditions occurring and not necessary the magnitude of that departure from normal.

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