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Tree Borers

Numerous trees are dying across Illinois. It is easy to find dead and dying maples, oaks, walnuts, ash, and other trees. Many of the dying ash are due to emerald ash borer. Many of the dying pin and red oaks in southern Illinois are due to horned oak gall. But many of the dying ash, oak, and other trees are due to the season-long drought of 2012, the July-September drought of 2013, and the severe winter of 2013-2014.

After a very severe drought such as that in 2012, it is common for trees to succumb to its effects for about six years. The more years that pass after a drought, the less likely clients are to accept that analysis, making life harder for arborists and landscapers. During extended dry conditions and severe winters, trees lose root mass, resulting in a reduction of sap flow and dieback of branches. The reduced sap flow provides opportunities for disease and borer attack that would not be present otherwise.

Insect borer adults are tuned into aromatic chemicals released by trees with dieback. Generally, this comes from the portion of the tree with storm injury, other limb breakage, frost cracking, or pruning wounds. Trees dying from old age or severe weather produce similar compounds. These chemicals indicate reduced sap flow.

Eggs laid into niches made by adult beetle borers or other small wounds on healthy trees are likely to be washed out of the wound by strong sap flow. Eggs managing to stay in the niche or wound will hatch into larvae that will likely to be drowned in sap or be crushed by internal sap pressure in healthy trees. While these natural defense mechanisms by the tree are effective in eliminating borers, it is also in the borers' best interests to not expend resources and energy by laying eggs into unsuitable hosts. Selecting trees or parts of trees that are dying are a better option for mother borers.

Bark beetle infestations increase with drought along with other beetle borers. Flatheaded appletree borer attacks rose family trees including crabapple, hawthorn, serviceberry, mountain ash, and ornamental pears, plums, and cherries. It also attacks maple, ash, and a variety of other trees. Two-lined chestnut borer, another flatheaded borer, attacks beech family trees including chestnuts, oaks, and beeches. Redheaded ash borer is a roundheaded borer that attacks many tree species in addition to ash. Other, more specific roundheaded borers include linden borer in linden, cottonwood borer in poplars and cottonwood, and ash and privet borer in ash and privet. Ash/lilac borer is a moth that attacks declining trees. Dogwood borer and carpenterworm are moths that attack a

wide range of hosts. All of these borers attack declining trees.

Insecticide treatment is most effective against borers that attack healthy trees such as emerald ash borer and Asian longhorned beetle. These exotic borers are able to attack healthy ash, maple, and other trees because native North American trees did not co-evolve with these insects and develop protective chemical and other mechanisms. Even if we plant trees native to the exotic pests' native country, in these cases China, the different soils and weather in this country cause those trees to be less healthy and more susceptible to these borers than they would be in their native lands.

Newly planted trees become weakened and susceptible to even native borers as they recover from transplant shock and adapt to their new environment. They profit greatly from insecticide applications to prevent and control borer attack.

Established trees that are declining due to drought, cold weather, girdling roots, soil regrading, soil compaction, and other factors are typically attacked by borers when their health has declined beyond recovery. These, and trees dying of old age, are unlikely to be saved by borer insecticide treatments. The borers are merely hastening death, not causing it. Insecticide treatments are unlikely to prolong the life, or as I like to say prolong the death, more than two to three years. As such, insecticide borer treatments are generally an unnecessary cost to the environment and client. If insecticide treatments prolong the tree's life enough for a new tree to replace the loss of shade and aesthetic appearance, they may be justified. (*Phil Nixon*)

Bur Oak Blight

Bur Oak Blight (BOB) is a fungal leaf disease caused by the pathogen *Tubakia iownesis*. The U of I Plant Clinic has received several BOB samples over that past month. This is a relatively newly described pathogen, identified by Dr. Tom Harrington of Iowa State University. Several species of *Tubakia* are known to infect oak and cause minor leaf spots. *Tubakia iowensis* is the only species known to attack leaf petioles. Additionally, the pathogen will only infect bur oak, particularly *Quercus macrocarpa* var. *oliviformis*. Results from his research suggest that the pathogen is native to the region and has only recently become problematic due to a significant environmental change. Moist springs, with significantly more precipitation, have likely created an environment favorable for disease development. His research lab has also been keeping track of counties and states with trees confirmed to have BOB. As of May 2015, nine counties in Illinois have had confirmed BOB cases: Jo Daviess, Carroll, Stephenson, Ogle, DeKalb, Lake, Cook, and Hancock. A map with the current disease distribution can be found at the following link: http://www.public.iastate.edu/~tcharrin/BOB.html.

Symptoms

Bur oak blight is a late season leaf blight. The earliest symptoms of Bur Oak Blight first appear in June as purple-brown spots on the underside leaf veins. In July, the spots expand, and purplish necrotic veins become noticeable on the upper leaf surface. The most notable symptoms appear in August and September as leaf veins are killed as the infection progresses and a characteristic wedge shaped ne-

crotic area develops on the leaf blade. Coalescing lesions and expanding vein necrosis may cause the leaf to die. Severely affected trees may have significant leaf mortality and/or leaves with a scorched appearance. Extensive premature defoliation is common, but many diseased leaves remain attached to the tree into the winter, well after healthy bur oaks have dropped their leaves.

The retention of diseased leaves favors the pathogen and its spread. This pathogen overwinters as pustules on the still attached diseased leaf petioles. In late April and May, fungal spores are produced and released from the pustules about the same time as new leaves are developing and expanding. Heavy rainfall promotes spore production and disseminates this primary inoculum by splashing the spores to newly expanding leaves. Infection occurs before the leaves are fully developed. However, there is a latent period between infection and when the first symptoms appear in June.

Initially, infections may be limited to the lower braches. Symptoms intensify from year to year and progress from the lower branches to the entire crown.

Diseased leaf retention is currently one of the best ways to identify this disease in the field. Look for leaves and petioles attached from the previous growing season. Infected petioles will have black pustules or scars from previously attached pustules. The other species of *Tubakia* that infect bur oak are not known to produce these overwintering pustules.

Several successive years of severe infection and defoliation have been reported to kill trees. Death has also been attributed to secondary invaders such as the two-lined chestnut borer. Trees infected with BOB appear to have increased susceptibility to these secondary invaders.

Management Strategies

- Fortunately, not all bur oaks will be affected by this disease. Many bur oak trees have a resistance to this pathogen. It's not uncommon to observe a healthy unaffected bur oak growing in close proximity to a severely infected tree.
- If you suspect a BOB infection, have the disease diagnosis confirmed by a laboratory. The leaf blight and scorching symptoms of BOB can be confused with other common disease such as: oak wilt, oak anthracnose, and environmental stresses. Disease confirmation is important for providing accurate disease control strategies and recommendations. Suspect BOB samples can be submitted to the University of Illinois Plant Clinic. Information on general sample submission can be found on the plant clinic website (http://web.extension.illinois.edu/plantclinic). For Bur Oak Blight sampling, collect branches and twigs with symptomatic and healthy leaves. Be sure to include branches with petioles from previous growing season still attached.
- Raking diseased leaves will have little effect on controlling the disease. The primary infection occurs from the abundant spores produced from diseased petioles that remain attached to the tree.
- Boosting tree vigor may help the tree to limit and prevent secondary invaders. Pruning and removing

branch dieback has been suggested to help reduce borer populations

- For high value trees, Iowa State University found trunk injections of propiconazole to be effective at controlling the disease. Applications require specialized equipment and will need to be made by a certified professional.
  - Injections should be made in late May or early June just after the leaves have fully expanded
  - The recommended application rate is 8-10 ml per 1"DBH. Higher applications rates reportedly resulted in phytotoxicity to leaves. The rate will also need to be adjusted if the tree has significant branch dieback in the canopy.
  - One application should last several years. Iowa State currently recommends repeat application only after a severe outbreak recurs.

References and Further Reading

US Forest Service Pest Alert: Bur Oak Blight (http://na.fs.fed.us/pubs/palerts/bur_oak_blight/bob_print.pdf)
Published Research Article-- Harrington T, McNew D, Hye Young Y. Bur oak blight, a new disease on Quercus macrocarpa caused by Tubakia iowensis sp. nov. Mycologia January 2012;104(1):79-92.

(*Travis Cleveland*)

Turf Aeration

Aeration, core-cultivation, or soil aerification are interchangeable terms to describe the process of pulling plugs from the lawn, one of the best practices any homeowner or professional should do to turfgrass. It's not just for golf courses.

There is a direct relationship between root growth and top growth. The more the roots can grow, including deeper, the thicker the stand of grass. The lawn is also more drought-tolerant as the root system tends to be stronger. Aeration creates a looser soil, one with larger pores and less compaction. The result is better root growth.

Aerating in the fall, coupled with fertilizing and overseeding, can really thicken up the turf. Aeration also helps reduce thatch by placing a thin layer of soil on top of the existing thatch, helping break it down.

Most aerating machines pull a plug from the soil, usually about 2 to 3 inches deep, and spaced about the same. All the plugs makes it look like a gaggle of geese descended on the yard. But that's only temporary.

Aerators only work on moist soil. If the soil is too dry, the machine won't be able to slice into the soil and pull the plug. If the soil is soggy, the machine just sits and spins, ripping up the lawn. Rain or a thorough irrigation 2 or 3 days before aeration should make the soil ideal.

Make sure the lawn is mowed before aerating. Set the machine to the appropriate depth and spacing. The following day or two after aeration, run the mower over the lawn to pulverize the plugs, which hopefully have dried. Some of the soil will filter down in the hole, but most won't. The holes will collapse inward, loosening the soil around it.

Fertilizing the turfgrass is recommended following aeration to encourage new root and shoot growth, and to hide the aesthetic injury aeration does to the

lawn. Of course, watering is also necessary. Aeration is crucial on heavy clay soil, especially for sodded turf. In other words, the common suburban yard.

Spring aeration, coupled with fall aeration, is recommended for heavily compacted soils but remember there is more weed competition in the spring, especially with an opened turf. Be prepared to apply weed control.

Most lawns recover within three weeks after aeration and fertilizing. While it's best to aerate in early September, satisfactory results can occur even in mid-October. (*David Robson*)

Invasive Species Alert: Jumping Worm Confirmed in Two Counties in Illinois

The Illinois Department of Agriculture has announced that a new invasive species, the jumping worm (*Amynthas* spp.) was identified in Illinois for the first time. Until now, the closest identification was in Wisconsin in 2013. Samples from two counties in Illinois have been confirmed. Worms from DuPage and Cook counties were examined at the University of Illinois Plant Clinic and identified.

The earthworm is native to East Asia but has been sold in the United States as bait under the names crazy worm, Alabama jumper, and snake worms. The worm has characteristic coloration and behavior. When disturbed, jumping worms become very active, wriggling and thrashing vigorously. Adult worms are approximately the same size as the naturalized earthworms, but are much darker. Most of the tissue is dark grey/brown, with a milky white bad of tissue (the clitellum) circling the body. The clitellum is also smooth, compared to other species which are raised.

Jumping worms are voracious consumers of organic material, affecting soil quality. They breed quickly and eggs can survive our winters. Adults reach maturity in approximately 60 days, allowing populations to double during the growing season. These worms are also capable of reproducing without mating. Concerns include the effect these worms will have on native areas, ornamental plantings, and agronomic fields. Recommendations to prevent the spread of jumping worms and their eggs include cleaning equipment before moving it to another site, reducing the transportation of mulch and soil, and carefully inspecting nursery plants before installing them in a new landscape.

If you suspect you have jumping worms, please contact the University of Illinois Plant Clinic at 217-333-0519 before sending samples as there are special handling instructions. We have found that the worms are very sensitive to heat and cold and so far, no live samples have survived being sent via mail. Samples preserved in ethanol allow us to observe physical characteristics, but discoloration of the tissue may occur. Pictures of suspect worms can be sent to plantclinic@illinois.edu for preliminary identification. (*Diane Plewa*)

Save the Date for 2016 Illinois First Detector Workshops

We are pleased to announce the dates for the First Detector Workshops. Topics in 2016 will cover insect invaders of forests, boxwood blight, and jumping

worms. Learn more about your role as a first detector, what's new with the Illinois Exotic Weed Act. Back by popular demand is the Q & A lunch session where speakers update participants on previous topics and open the floor to your questions. Plan on joining us in one of these locations – more information on how to register will be available in the coming months.

WORKSHOP SCHEDULE

January 28 – Waterloo
February 2 – Joliet
February 3 – Champaign
February 9 – Effingham
February 17 – Grayslake
February 18 – Freeport
February 23 – Quincy
February 24 – Springfield

The Illinois First Detector workshops are supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, Crop Protection and Pest Management Extension Implementation Program grant. (*Kelly Estes*)