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PLANT DISEASES

More on Oak and Hackberry Tatters

Last week (issue no. 4, 2007), I discussed a condition we have observed on oaks in the white oak group and on hackberry. We call this condition "tatters" and describe it as a condition in which most of the leaf tissue is gone, leaving only leaf veins and a bit of leaf tissue around the veins. I mentioned some work done by researchers Jayesh Samtani, Dr. John Masiunas, and Dr. Jim Appleby. A link was provided to a journal article reporting their first-year findings.

I learned that this original work was repeated. These researchers have done two other studies on white and red oak that are complete. Their study on hackberry is ongoing. The following links will take you to a few abstracts published after that original paper. There have been no additional full-length publications to date.

Samtani, J.B, J.E. Appleby, and J.B. Masiunas. 2006. "Simulated Drift Injury to Oaks and Hackberry." *North Central Weed Science Society Proceedings* 61:129. http://www.weeds.iastate.edu/ncwss2006/horticulture.html

Samtani, J.B., J.B. Masiunas, and J.E. Appleby. 2006. "Herbicide Drift Study on White Oak Seedlings." *HortScience* 41:1005. http:/ashs.org/resources/horttalks/detail.lasso?id=59

Another abstract was presented at the HortScience conference. The citation for it follows:

Samtani, J.B., J.B. Masiunas, and J.E. Appleby. 2006. "Leaf Abnormality on White and Red Oak Linked to Drift of Chloroacetanilide Herbicides." *HortScience* 41:1038

Some of our readers may want to pursue this additional information. I cannot state with certainty that the injury on oaks and hackberry is from the same cause, but symptoms are similar. *(Nancy Pataky)*

Virus Testing at Plant Clinic

Viruses can cause diseases in herbaceous plants, vegetables, and even in woody plants. They rarely cause damage to plant health in the last group but can be of great concern to those who propagate plants. Roses and ash are the most common woody hosts of concern. Herbaceous plants in greenhouse can have many virus problems, as can annuals, perenniels, and vegetables grown in polyhouses or moved to outdoor production.

The symptoms of viruses include some general problems such as poor plant vitality, stunted growth, and reduced leaf size, as well as more specific symptoms such as a mottled or mosaic pattern in the foliage, ringspots, distorted growth, or odd color patterns. Sometimes these symptoms are not visible at first (latent) but become obvious with temperature changes or time.

Viral pathogens do not have fruiting bodies or spores to help with identification. They cannot be cultured from infected plant material onto artificial media. They do not cause oozing of material from the infected site. Serological methods are necessary to confirm the presence of a virus in infected plant material. The generally accepted serological methods usually involve ELISA (enzyme-linked immunosorbant serological assays). Molecular diagnostics can also be used, but costs become much higher with molecular testing.

The U of I Plant Clinic can test for some viruses but not all possible plant viruses. We have tests for viruses that we see most often in our lab and for which there are detection kits available. At present, we can test for cucumber mosaic virus, impatiens necrotic spot virus, cymbidium mosaic virus, Odontoglossom ringspot virus, potato virus Y, squash mosaic virus, tobacco mosaic virus, and tomato spotted wilt virus. We can make referrals to specialty labs for other virus tests. Additionally, we can order reagents for other virus tests if we know a large sample request for a virus is coming to us. Refer to our Web site, http://plantclinic.cropsci.uiuc.edu/, for information about fees and sample preparation. In most cases, plant material submitted for virus testing must arrive fresh so that sap can be extruded for testing. Fees are required with the testing request. *(Nancy Pataky)*

Verticillium Wilt Sampling

Verticillium wilt is caused by a fungus. In Illinois the species may be either *Verticillium dahliae* or *Verticillium albo-atium.* Symptoms include wilt, branch death, and quick decline of plants. Hundreds of plant species, including trees, shrubs, groundcovers, vines, vegetables, fruits, herbaceous ornamentals, and flowers, may become

infected. We see symptoms throughout the growing season. For information about Verticillium wilt, refer to the *Report on Plant Disease,* no. 1010, "Verticillium Wilt Disease." It is available for downloading from the Internet at http://www.ag.uiuc.edu/%7Evista/horticul.htm. This is a University of Illinois publication.

Verticillium wilt is most often fatal to the plant infected. This disease is caused by a fungus that enters the vascular system, initiating plugging of the xylem, resulting in wilting and death of the plant. The fungus lives in the soil for many years, even without a host plant. It is important to confirm a case of Verticillium wilt if you plan to replace the plant in the same area. If *Verticillium* is present, the replacement plant must be resistant to *Verticillum,* or you will see the same problem all over again. The list of resistant species is rather short.

Often, any plant with a rather quick decline is suspect. The key is to look for vascular discoloration. When sampling a plant to test for Verticillium wilt, look for live tissue showing vascular streaking. Dead plant tissue do not yield the fungus, or at least not reliably. Live stems show green color when scraped with the finger nail, does not snap when bent, and have live leaves or buds attached. Labs testing for this fungus ask for stems that are about finger diameter, 6 to 8 inches in length, and showing vascular streaking. You can see this staining as a ring of discoloration in a cross-section of an infected branch or possibly as streaks of discoloration visible on the wood when bark is peeled. Samples can be placed in plastic bags, boxed, and sent to the Plant Clinic for testing, with the clinic data form and clinic fee enclosed. The $12.50 clinic fee includes costs for culturing. The clinic data form can be accessed at http://plantclinic.cropsci.uiuc.edu/forms.html. Expect 10 days of lab time for a confirmation of *Verticillium* infection. This fungus is slow growing in the lab on agar. *(Nancy Pataky)*

Pagoda Dogwood Decline

The pagoda dogwood *(Cornus alternifolia)* is a beautiful tree with nice horizontal branching and small tree stature. It does not seem to have as many disease problems as we see with flowering dogwood *(Cornus florida)* and seems to have better resistance to the potentially lethal *Discula* anthracnose. Unfortunately, I have been watching my 25-year-old pagoda dogwood decline over the last 5 years. It has trunk cankers, stem cankers, and wilts easily when conditions are dry.

Pagoda dogwoods are very susceptible to a canker disease called *Cryptodiaporthe*. Some of my southern colleagues have reported that Pagoda dogwoods die after about 20 years of growth because of infection by Cryptodiaporthe canker. Most of us know that canker fungi often infect a plant following stress. That is most likely the case with this disease as well. In the case of my tree, the only stress I can detect is deep planting. There may well be girdling roots belowground. The tree is in a protected location and is watered during drought.

Pagoda dogwoods grow best in cool, shady areas and prefer moist, acidic, well-drained soil. They are known to be very drought sensitive and decline when grown in hot, dry sites. If you have a pagoda dogwood growing in a protected, shady spot, be sure to water it in periods of drought. If the tree is left to fend for itself, Cryptodiaporthe canker will likely infect and kill it.

Cryptodiaporthe canker is also known as golden canker, from the color of affected branches. Look for stem dieback with cankers at the base of affected branches. Prune to remove cankered wood, cutting 4 to 6 inches below affected areas. Water the tree in periods of drought and try mulching over the root system to provide a more even temperature for the root system and to keep weed trimmers away. Mulch also helps retain moisture. For more information about this disease specifically, refer to the Web site http://www.uwex.edu/ces/wihort/gardenfacts/X1125.pdf. Cankers in general are discussed in *Report on Plant Disease,* no. 636, "Canker and Dieback Diseases of Woody Plants," available on the University of Illinois site at http://www.ag.uiuc.edu/~vista/horticul.htm. *(Nancy Pataky)*

INSECTS

Scouting Watch

Pine needle scale crawlers are present in northern Illinois. Scout for the brick red crawlers on the needles and stems. Application should still be effective in southern and central Illinois, as well as northern Illinois. Spray with acephate (Orthene), bifenthrin (Onyx, Talstar), cyfluthrin (Tempo), insecticidal soap, or summer oil.

Euonymus scale crawlers are lemon yellow and should be present in southern and central Illinois. Spray with the same insecticides as recommended above for pine needle scale crawlers.

Maple petiole borer has been found in northern Illinois. This sawfly tunnels as a larva in the petioles of maple leaves, severing the petiole, and causing leaf drop. Dropped leaves have just a short portion of the petiole still attached to them. This allows one to distinguish from physiological leaf drop due to heat and drought, as those leaves have complete petioles attached. Because maple petiole borer does not seriously harm the tree, no control is recommended. The sawfly larva remains in the portion of the petiole that remains attached to the tree, so raking up and destroying the fallen leaves has no effect on the borer. *(Phil Nixon and Morton Arboretum)*

Clearwing Moth Borers

There is a number of borers in the family Sesiidae, known as the clearwing moths. For many years, they were known as the family Aegeriidae; but it was changed

to Sesiidae decades ago. They are known as clearwing moths because the adult moths have loosely attached scales on their wings that easily rub off, revealing the transparent wing membrane. This characteristic, along with their narrow wings, antennal shape, and elongate abdomen, gives them a wasplike appearance. Behaviorally, they fly during the day and tend to pulsate the abdomen, which enhances their mimicry of paper wasps. Their appearance and behavior cause humans to hesitate in grabbing them, and they probably cause the same reaction in birds that would prey on them.

There are many clearwing borers of trees and shrubs, including the lilac/ash borer, viburnum crown borers, oak borer, silver maple borer, dogwood borer, peachtree borer, and lesser peachtree borer. The squash vine borer is an important pest of squash and pumpkin. Male moths are typically smaller and more slender than females, emerging several days or even a week or more before the females. Females produce pheromones, hormones exuded outside of the body to affect other individuals, that attract the males to them for mating.

Science has been able to isolate many of these pheromones, synthetically produce these chemicals or components of them, and perfect methods of releasing them in a controlled manner over several weeks. These pheromones can be put into traps to attract and catch males. Although many males emerge before the females, the highest catch in the traps coincides with female emergence. By checking traps two or three times per week and recording new male catches, one can tell when their numbers peak. It is assumed that the females mate and lay eggs within a couple of days after emergence, and that the eggs take 10 to 14 days to hatch. Insecticide application to control hatching larvae is recommended about one week after peak male catch to be present when larvae hatch.

The pheromones of many clearwing moths attract the males of other species. This is not a problem for the moths because typically the males of other species whose pheromones cross-attract are not present at the same time. However, pheromone traps are commonly set well before a particular borer emerges and may catch males of other species. For that reason, it is important to use phenology or degree days to know when to expect a particular borer. It is also useful to be able to identify the males of common species. They are described or pictured in some tree and shrub insect pest publications.

Moths mouthparts are drawn out into a long tube suitable for drinking nectar from flowers. As such, they are unable to chew holes into tree bark to lay their eggs. Instead, they lay their eggs into wounds on the tree, including those made by emerging moth borers. Hatching larvae are exposed to insecticide application while they search for a site to tunnel into the tree. Thus, pheromone traps allow one to accurately apply insecticides to control the hatching larvae before they tunnel into the tree or shrub where insecticides can't reach them. Although imidacloprid (Merit) moves systemically through the plant and is effective against beetle borers, it is not very effective against caterpillars, the larval stage of moths. Pyrethroids are effective in controlling caterpillars but are not systemic. *(Phil Nixon)*

Viburnum Crown Borers

Viburnum crown borers are several species of clearwing moth borers that attack at the base of viburnum shrubs. Younger plants and those that have just been transplanted or put under similar stress appear to be more susceptible to attack. *Vibrurnum opulus*, particularly *Vibrunum opulus compacta,* appears to be considerably more susceptible to attack than other species. Commonly, new plantings of *Viburnum opulus compacta* are severely attacked, resulting in severe dieback and even the death of half or more of the planting. Other species of *Viburnum* are attacked but are usually not severely damaged.

Larvae tunnel in the cambium just under the bark, primarily from the soil surface to 6 to 8 inches belowground. Heavily attacked belowground stems are deeply furrowed by larval tunneling, with very little if any bark remaining. The fully grown white, legless larvae are about 1 inch long and 1/4 inch in diameter. They are easily located in the shallow tunnels. Heavily attacked shrubs have dead stems that break off easily from the crown. Moths emerge through round holes about 3/16 inch in diameter on the stems just above the soil line. Several-year-old emergence holes can commonly be found at the base of older, healthy viburnums of several species, indicating that they were attacked early in life but survived.

Control is achieved by applying permethrin (Astro) to the base of the plant when beautybush and mock orange bloom. Beautybush is blooming at this time in central Illinois, so application at this time in southern and central Illinois is warranted. Application in northern Illinois should occur in a couple of weeks. Spray heavily onto the bark at the base of the plant. This provides complete coverage and allows the insecticide to run down onto the belowground portion of the stem.

Because the larvae feed shallowly on the stem below ground and many are exposed to the soil, the insecticidal nematode *Heterorhabditis bacteriophora* is effective in late August against these larvae. Apply the nematodes to moist soil and keep it moist so that the nematodes do not dry out and die. *(Phil Nixon)*

Lilac/Ash Borer

Lilac borer and ash borer are the same species of clearwing moth. Lilac and ash are closely related plants and share this pest. Full-grown larvae are the diameter of a pencil and over 1 inch long. The legless, white larvae tunnel deeply into the trunks of lilac and ash. The larva

keeps the tunnel free of frass by pushing it to the outside, so it is common to see sawdust clinging to the bark below the 1/4-inch-diameter round borer holes.

On lilac, this borer attacks stems that are at least 1 inch in diameter, and typically 2 or more inches in diameter. Attack is usually 1 to 3 feet above ground level. It is most effectively controlled on common lilac by pruning out stems over 1 inch in diameter, leaving suckers off the root system to replace the aboveground plant. Although the resulting shrub is shorter, it is bushier and typically produces more blooms.

On ash, attack is most severe on young, recently transplanted trees. Attack usually occurs at pruning wounds, borer emergence holes, and other wounds. For that reason, it is recommended that pruning be delayed until July to avoid fresh wounds during moth flight. Painted wounds are attacked, as the paint cracks or separates near the edge of the wound, the moths lay eggs in that area, and the larvae tunnel in through these openings. Once the tree is established and exhibits normal annual stem growth, it is unlikely to be severely attacked. This borer also attacks where branches rub together in older tree canopies, but this attack can be viewed as beneficial in that it hastens the tree's self-pruning.

Permethrin (Astro) is an effective insecticidal control on both lilac and ash. If pheromone traps are used, it should be applied 1 week after peak male moth catch. Now is the proper time to treat in southern and central Illinois. In northern Illinois, the Morton Arboretum has been trapping adults in their traps; but they are still probably a week or so away from peak catch. Application in northern Illinois should probably be made around the first of June. *(Phil Nixon and Morton Arboretum)*

For subscription information, phone (217)333-2666 or (800)345-6087, or e-mail acesnews@uiuc.edu. Web subscriptions are available (http://www.ag.uiuc.edu/cespubs/hyg).

Peachtree Borer

Peachtree borer is a clearwing moth that attacks the base of trees in the genus *Prunus*. This includes not only peaches, plums, and cherries but also their landscape relatives, purple leaf plum, and flowering cherry, peach, and plum. The white, legless, full-grown larvae are about 3/8 inch in diameter and over 1 inch long. They attack at and just below ground level, tunneling just under the bark in the cambium. The tree reacts by producing large quantities of sap, called gummosis in the fruit trade, at the base of tree. Eventually, the tree is girdled and dies.

In the landscape, these trees are short-lived. Peachtree borer typically attacks older trees that are in decline from old age. Treatment of these trees is only delaying their death by a couple of years. As such, treatment is usually not in the best interest of the client. This borer can attack young transplanted trees, but these trees usually adapt to site so quickly that treatment may not be needed. Scout young trees for signs of attack before treating, or only treat trees planted in poor situations where establishment is likely to be a struggle.

If insecticide application is desired, apply permethrin (Astro) to the trunk of landscape trees now in southern Illinois. Apply at the end of June in central Illinois; apply in mid-June in northern Illinois. Spray heavily enough to allow the insecticide to run in along the trunk at ground level. Repeat the application 4 weeks later. *(Phil Nixon)*

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