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## Whiteflies

Whiteflies are being found commonly in the landscape, feeding on the leaves of flowers and other herbaceous plants as well as shrubs and trees. Generally, late season whiteflies can be ignored, as they are too late to cause serious damage to plant health or even cause obvious aesthetic damage. They are 1/16-inch-long insects with white, powdery wings. They sit on leaf undersides and fly off infested foliage when disturbed, frequently being numerous enough at this time of year to be obvious. They are sucking insects, whose removal of sap can cause leaf distortion.

Three species of whitefly are common in Illinois. One is the bandedwinged whitefly. The adult has two dark bands on each front wing. It is hardy in Illinois, feeding primarily on velvetleaf, also known as buttonweed. This weed is common in agricultural and weedy land areas. From late summer into fall, huge numbers of adults migrate to other plants, even flying in large numbers into greenhouses. Bandedwinged whiteflies feed as adults on many plant species but does not reproduce heavily on them. Thus, bandedwinged whiteflies usually do not warrant control. An exception is attack on flowering maple, *Abutilon*, which is in the same genus as velvetleaf.

The other two common species are greenhouse whitefly and silverleaf

whitefly. Neither species have dark bands on their front wings, being totally white. They are common pests in greenhouses and are apparently moved outdoors each spring on bedding plants. These whiteflies can build up in numbers through multiple generations through the growing season to be common on plants in late summer and fall. They reproduce on many plants and can increase enough to cause damage.

Damage appears as wrinkled, curled, cupped, or otherwise distorted leaves. Large amounts of honeydew, excreted from the nymphs and adults, make leaves glossy and sticky. Infestations may be first noticed by sidewalks and objects below infested plants becoming sticky from the honeydew. Black sooty mold grows on the honeydew and is another clue that an infestation is present. Sooty mold can reduce the amount of light reaching the leaf surface, resulting in reduced photosynthesis. Large numbers of yellowjackets associated with a tree and shrub at this time of year is usually due to their feeding on honeydew produced by whiteflies, mealybugs, or scales.

Another determination that greenhouse or silverleaf whiteflies are present is to look for nymphs and pupae. Insects with incomplete development go through egg, nymph, and adult life stages; and complete development insects have egg, larva, pupa, and adult life stages.

Whiteflies, along with a few other insects, are thought to be somewhat transitional between incomplete and complete development. They are considered to have incomplete life cycles, but the last nymphal stage is called a pupa.

Whitefly nymphs and pupae appear as oval, clear to light yellow insects on the leaf undersides. Legs are not apparent. The pupae and older nymphs are about 1/16 of an inch long, 1 to 2 millimeters. They are most common on the older, lower leaves of the plant. Their small size and transparent qualities make them difficult to see. Adults and their eggs are most common on the younger, upper leaves of the plant.

Control of whiteflies is usually not necessary unless nymphs are present. Even with nymphs being present, there may not be enough to cause damage but keep an eye on them. Commonly, when these whiteflies become numerous, the leaves are already too hardened off to show damage. In those cases, the whiteflies may cause early leaf fall, but it is too late to stimulate new leaf production.

If treatment is warranted, thorough coverage with sprays of insecticidal soap, summer spray oil, or pyrethroids should be effective. Apply weekly, two or three times. Imidacloprid (Merit) applied to the soil as a single application is also effective systemically on whiteflies. (*Phil Nixon*)

### **Stinging Caterpillars**

Almost all caterpillars are harmless when handled, their impact to us is primarily from their feeding on plants. A few caterpillars possess stinging hairs

and barbs that cause various reactions from itchy rashes to painful stings. They are easily recognized by their physical appearance, being colorful with obvious hairs and spines. These include the Io, imperial, and saddleback caterpillars.

Io moth, *Automeris io*, caterpillars are gregarious (feed in groups) and grow to 3 inches; they are light green, with a white stripe bordered in dark red. Tufts of irritating spines on their back are connected to poison glands. Small, young caterpillars are orange, with gray bristles. People who contact the spines often react as if stung; itching may be mild or severe. The caterpillar feeds on trees and shrubs, including ash, beech, birch, elm, linden, maple, oak, poplar, rose, sycamore, and willow. They eventually spin a thin, papery cocoon that falls to the ground. Hindwings of adults have conspicuous eyespots. Adult female moths are attracted to outdoor lighting and lay eggs in clusters on leaf undersides. There is generally one generation per year in Illinois.

Imperial moth, *Eacles imperialis*, caterpillars become large, up to 4 inches. They are covered with long, irritating hairs; people are more likely to react with an itching rash rather than a stinging sensation. They are green, with four large and four small hornlike yellow to orange tubercles behind the head and a couple of median, yellow to orange, short, cone-shaped tubercles towards the back end. These caterpillars feed on many trees, including oak, maple, linden, birch, elm, walnut, cedar, and pine. They form naked pupae (without a silk cocoon) in the soil or leaf litter. Adult moths are bright yellow, with brownish markings and wingspans from 3-1/2 to 5-1/2 inches.

Saddleback caterpillar, *Sibine stimulea*, is greenish, with a brown, oval saddle-back marking on the back. Also, it has distinctive stinging spines or hairs that, when touched, can severely irritate the skin. The caterpillars grow to about 1 inch and primarily feed on rose, cherry, and pawpaw. An adult moth is dark brown, with two small white spots on each forewing.

Saddleback caterpillar is in the family of slug caterpillars, having no obvious legs as larvae. Several others in the same family also have stinging spines and are colorful with orange and red being common. They feed primarily on the leaves of forest trees and are very rare in landscapes, even when the same tree species are present. It is useful for foresters to acquaint themselves with these other species.

Although these caterpillars, particularly the large ones, eat large quantities of leaves, the female moths typically scatter their eggs. This pattern results in only local defoliation. In some years, however, caterpillars can be locally numerous, with very noticeable defoliation. Moths lay egg clusters, resulting in gregarious caterpillars that are more likely to cause damage. Even so, this late-season, occasional defoliation does not seriously harm the tree's health. *(Phil Nixon)*

### **Tar Spots of Maple**

Tar spots have been evident on many species of maple this year. Several different fungi in the genus *Rhytisma* cause this disease. Tar spots result in raised, black spots on upper leaf surfaces. The symptoms are distinct, allowing for

and easy diagnosis. Affected leaves appear as if they splattered with tar, hence the name Tar Spot.

The first symptoms appear in mid-June as small, pale yellow spots. By mid-July the yellow spots expand and a thick, raised, black stromata forms within the spot. By September, spots truly look like tar and often have a wavy or rippled surface. If severe, the disease may cause some minor defoliation, but will not significantly influence tree growth and development.

The fungi that cause tar spots overwinter on infected leaves. In the spring, overwintering fruiting bodies ripen and eject spores. Wind carries the spores to nearby developing leaves of susceptible hosts. First symptoms appear 1-2 months following the initial infection.

Outbreaks of this disease are relatively infrequent. Moist, sheltered locations allow the pathogen to easily survive the winter. Trees grown in these locations may be repeatedly infected. The most effective management practice for a home landscape is to rake and destroy leaves in the fall. This practice will help reduce inoculum capable of causing infections the following spring. Fungicides can be used to protect newly developing leaves, but are not warranted. *(Travis Cleveland)*

### **Bur Oak Blight Moves South in Illinois**

Bur Oak Blight (BOB) is a potentially serious fungal disease that only affects bur oak trees. After first being reported in Illinois in 2012, the Plant Clinic has received symptomatic samples almost every year. The pathogen was first iden-

tified in Iowa and appears to be present in almost every county in Iowa and Minnesota. For the first several years, the only confirmations in Illinois were in northern counties and one far western county (Hancock). Over the past few years we have received samples from central Illinois which were either confirmed or highly suspected of infection with the bur oak blight pathogen.

There are a couple of possible reasons for this apparent shift south: 1. The pathogen is becoming more prevalent in central Illinois and beginning to infect bur oak trees here, either due to pathogen movement or due to changing environmental conditions resulting in more favorable conditions for infection in the center of the state; 2. The public is more aware of what symptoms to look for when scouting bur oak trees, resulting in greater numbers of samples and confirmations at the Plant Clinic; 3. Some work has suggested that the variety *oliviformis* is more susceptible to this disease and it's possible that the pathogen will move within this variety's geographic range. Because identifying varieties can be difficult, the exact range of this variety is not known though it appears to be more common in northern Illinois.

This map indicates the counties in Illinois where bur oak blight has been identified. The counties in red were confirmed by Dr. Harrington, a professor at Iowa State University who first identified the causal agent of bur oak blight. The counties in green are counties where the pathogen has been confirmed by the University of Illinois Plant Clinic, while the counties in orange are ones from which we've received samples that we highly suspect are infected with bur

oak blight, but we were unable to confirm the disease due to insufficient samples. McLean County was confirmed in 2016 while Menard and Peoria Counties were confirmed in 2017, and suspect samples from Champaign and Tazewell were also received this year.

### *Bur Oak Blight*

Bur Oak Blight is a fungal leaf disease caused by the pathogen *Tubakia iowensis*. 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.

### *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 necrotic 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 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 over-winters 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 branches. 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 in-

fectured 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 mls 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 re-occurs.

#### *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](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 & Diane Plewa)*