

Number 15 - September 9, 2013

Whiteflies

Whiteflies are being found commonly in the landscape, feeding on the leaves of flowers and other herbaceous plants as well as hydrangea, other 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 of 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 whitefly 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. Silverleaf whitefly used to be known as sweet potato whitefly and appears to be the most common species this fall. 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.

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. I have not noticed nymphs on landscape plants yet this year. 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.

The infestations seem to be heavier and earlier this year than most years. Weather forecasters are predicting an early, cool fall. However, if we have warm weather extending into the fall, large numbers of whiteflies could cause the plants to initiate new foliage. This foliage will be too immature to harden off and avoid winterkill. Keep an eye on the weather and the bugs. Warm temperatures with numerous nymphs on leaves are likely to make control necessary.

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*)

Potato Leafhopper

Potato leafhopper damage has become obvious during recent weeks. These leafhoppers attack oak, maple, red mulberry, red bud, cottonwood, birch, apple, dogwood, hawthorn, wafer ash, euonymus, black locust, and cherry.

Red maple is most severely damaged. The expanding leaves at branch tips are curled and stunted, and they are mottled with light green, red, and brown. Leaf edges and entire leaves may turn brown or black. Stem growth is greatly reduced. Overall, the damage looks similar to 2,4-D injury. Damage this fall is heaviest at the top of the tree rather than on side branches. On other host species, leaves may be misshapen, have brown areas, show early fall color, or have stippling (light dots).

Potato leafhopper adults are wedge-shaped, green, and about 1/8 inch long. They fly readily from foliage when approached and are very migratory, making it difficult to find the insects on damaged foliage. They are strongly attracted to lights at night and are small enough to go through the mesh of window screening. You'll probably recognize these pests as the little green bugs that fly around the newspaper or book you are trying to read during summer evenings indoors.

As nymphs, potato leafhoppers are similar in appearance to adults but are

smaller and cannot fly. Even so, nymphs are quite active and will walk sideways to the other side of the leaf when it is inspected, making them difficult to see. Frequently, the only insect parts that can be found are the transparent, cast skins left behind by the molted nymphs.

Treatment at this time of year is probably not warranted. These insects start feeding in May in Illinois, and treatment at that time to prevent leaf damage and reduced growth through the growing season in nurseries is usually necessary. At this time of year, damage to landscape trees needs to be recognized for what it is rather than be misdiagnosed as herbicide or other injury. (Phil Nixon)

Late Blight (*Phytophthora infestans*) found on Tomato in Illinois.

Several weeks ago, Purdue University reported tomato infection by *Phytophthora infestans*, which causes the disease known as Late Blight. More recently, the U of I Plant Clinic received a tomato sample from Northern Illinois also found to be infected with this pathogen. *Phytophthora infestans* was first reported in Europe in 1845 and is more famously associated with the Irish potato famine. In most cases, potato crops are more at risk to be infected by this disease, because infested tubers provide the main source of initial inoculum. In recent years, this disease has been a problem in Florida and sporadically in Northeastern United States. In the Northeastern U.S., tomato and potato are commonly grown together and form a “green bridge” contributing the spread of the late blight pathogen. Historically, this disease has not been a problem in Illinois.

Through chance mutation or recombination during sexual reproduction, *Phytophthora infestans* can produce multiple genotypes that may vary in aggressiveness on tomato and potato. For example, they have found that one genotype may only affect potato, while other genotypes may be more aggressive on tomato. Fortunately, this variation allows for easier control of this disease. Government funding has led to the recent investigation of late blight. Through this project, several existing and new genotypes of *Phytophthora infestans* have been documented in the Northeastern US.

This pathogen can be devastating in cool, rainy weather, as it thrives in a wet, humid environment. However, this disease has continuously developed several weeks later than normal (in May) in Florida, which suggests that there may be a genotype that is able to tolerate warmer temperatures. Typically, this disease can appear from August through October in the Northeastern US.

Phytophthora infestans is an obligate parasite, and currently only known to survive in the US on living host plant tissue or tubers. The type of pathogen reproduction varies based on mating types present. If only one pathogen mating type is present, asexual reproduction occurs. This results in the development of fuzzy fungal growth on affected tissue that yield wind dispersed spores (sporangia containing zoospores). If both mating types are present, sexual reproduction takes place and oospores are produced. Oospores can survive in the absence of host tissue and in the presence of adverse conditions in the soil. If both mating types of this pathogen

become established in the north, late blight could become a very common disease and have a profound impact on tomato and potato production (especially organic).

This pathogen can infect both young and old foliage. The first symptom to appear will be rapidly enlarging water soaked areas that will form into irregularly shaped greenish black blotches with a “frosted” appearance. The undersides of leaves can have a downy white growth when wet. Foliage can be quickly killed, especially above points where stems have been infected. Fruits can also be infected, developing irregular shaped brown blotches before deteriorating rapidly. Depending on favorable conditions and genotype virulence, the infection can quickly progress within 4 to 7 days. This rapid disease progression can cause crop loss and disease epidemics.

If a preventative disease management approach is not taken, this disease will be extremely difficult to control. Luckily, a large, five year, national project with government funding was started to investigate late blight, monitor pathogen genotypes, and improve management by developing resistant varieties and a monitoring program. The project web site is <http://usablight.org>. Successful management of late blight includes the following: Scouting, early detection by a Plant Clinic, destruction of infected plant material (tomatoes, potatoes, and susceptible weeds), monitoring of favorable conditions, and weekly protective fungicide application. Research is ongoing to control late blight in organic tomato and potato production. Unfortunately, the late

blight pathogen has demonstrated that it has developed resistance to fungicides and resistant plant varieties.

(Stephanie Porter)

This article was based on Late Blight: Recent Occurrences, Challenges, and Future Outlook (2013) by Margaret Tuttle McGrath, Cornell University, which can be found at the following link: http://www.longislandhort.cornell.edu/vegpath/late_blight_recent_future.pdf

Testing for Bacterial Leaf Scorch (BLS) at the U of I Plant Clinic - Take 2

The U of I Plant Clinic recently completed their first round of serological tests on tree samples suspected of being infected with Bacterial Leaf Scorch (*Xylella fastidiosa*). For additional information on this disease, you can refer to the recent Home, Yard, and Garden article found at the following link: <http://hyg.ipm.illinois.edu/article.php?id=513>

Due to recent inquiries from throughout the Midwest, we feel there is a significant need to run another round of tests. The fee is \$25 per sample. It is suggested that you call ahead to be certain you have prepared the correct sample and to avoid resampling at your expense. **Petiole tissue from symptomatic leaves is preferred for this test, so leaves showing symptoms with green petioles are the usual request.** Please send your samples in the next several weeks. We will collect samples, store them, and then run a serological tests on all the submitted samples at the end of September, 2013.

(Stephanie Porter)

Bur Oak Blight

Last summer, the U of I Plant Clinic confirmed its first sample of Bur Oak Blight (BOB). The infected tree was located in Lake County, IL. Dr. Tom Harrington of Iowa State University and his research lab have been keeping track of counties and states with trees confirmed to have BOB. As of January 2013, seven counties in Illinois have had confirmed BOB cases. The majority of these counties are located in the northern portion of the state along the Wisconsin state line. A map with the current disease distribution can be found at the following link: <http://www.public.iastate.edu/~tcharri n/BOB.html>.

Bur Oak Blight is a fungal disease caused by a newly described pathogen, *Tubakia iowensis*. Several species of *Tubakia* are known to infect oak (*Quercus spp.*) and cause minor leaf spots. *Tubakia iowensis* is the only species known to cause severe leaf blight, and will only infect Bur oak (*Quercus macrocarpa*). Fortunately, susceptibility to this disease varies within Bur oak populations. Highly resistant Bur oak trees have been observed growing in close proximity to trees severely infected with BOB. The variety *Quercus macrocarpa* var. *oliviformis* has been reported to be especially susceptible to the disease.

Symptoms

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. 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 a scorched appearance. Many, but not all, leaves killed by BOB 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 diseased leaf petioles that remain attached to the tree. 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 twolined chestnut borer. Trees infected with BOB appear to have increased susceptibility to these secondary invaders.

Management Strategies

- 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 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>). A \$15 fee will cover diagnostic services for the sample. For Bur Oak Blight sampling, collect branches and twigs with symptomatic and healthy leaves. Be sure to include branches with petioles from the previous growing season still attached.
- Raking diseased leaves may 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 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)