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PLANT DISEASES

Scorched Trees, a Closer Look

It is now August; and until recently, we have had a hot, dry summer in much of Illinois. Although we would like to forget it, we also had a severe drought in 2005. Naturally, leaf scorch is present on many trees, especially those in clay soil, poorly drained sites, or new housing developments. Environmental scorch is a rather common, noninfectious occurrence. This necrosis of leaf margins and between veins is the result of insufficient water movement to the leaf tips. That is the last place to receive water and the first to show drought stress. Environmental scorch is worse on the south or west side of trees in exposed sites (more wind and sun) or on the same side as trunk or root injury. Environmental leaf scorch is addressed in *Report on Plant Disease*, no. 620, "Leaf Scorch of Woody Plants," available in Extension offices or on the Web at <http://www.ag.uiuc.edu/%7Evista/horticult.htm>.

Do you have a large tree that has healthy leaves each spring, develops scorched foliage by midsummer, and seems to be getting worse each year? You may have looked for a source of stress and can't find anything wrong. Even a careful examination of the trunk a few inches belowground did not reveal girdling roots. Another possibility is a disease called bacterial leaf scorch (BLS). This disease has become more apparent in the last few years, probably because we are more aware of symptoms.

Bacterial leaf scorch is an infectious plant disease caused by a bacterium called *Xylella fastidiosa*. The most frequent hosts of this disease in the United States include elm, oak, sycamore, mulberry, sweetgum, sugar maple, and red maple. Oak seems to be our most common host species in Illinois. We have confirmed it on pin, red, shingle, bur, and white oaks. Kentucky reports BLS on pin, red, scarlet, bur, white, willow, and shingle oaks; silver, sugar, and red maples; sweetgum, sycamore, planetree, hackberry, American elm, and red mulberry. Look for scorch symptoms that occur in early summer to midsummer and then intensify in late summer. The scorched leaf edges or tissue between veins may be bordered by a

yellow or reddish brown color, but not in all cases. The symptoms occur first on one branch or section of branches and slowly spread in the tree from year to year. It is one of those situations that you hope will be better next year but only gets worse. This disease will kill the tree in 6 or more years.

The bacterial pathogen is found only in xylem tissue. Xylem-feeding leafhoppers and spittlebugs are thought to spread the bacterium in landscape trees. It can also be transmitted between trees through root grafts. The transmission methods must not be very effective, though, because we do not see rapid spread of the disease from tree to tree.

The bacterial pathogen cannot be isolated in the lab as with most other bacteria. It can be confirmed using serological techniques. The most reliable test results occur in August and September. The University of Illinois Plant Clinic will be testing for this bacterial pathogen in mid- to late August. If you have a sample you want tested for BLS, give us a call at (217)333-0519, and we will arrange to run an ELISA with the next batch of samples. It is not economical to run this test for only one sample. There is a fee associated with all Plant Clinic samples.

What can you do if bacterial scorch is present? There is probably nothing you can do to keep the tree from dying. You can help by pruning out dead wood as it appears. Start thinking of tree-replacement options and plant something that is not known to host this disease. Be sure to pick a species that does well in the site you have in mind. Investigate drainage pattern, soil type, amount of sunlight, and any oddities about the location. There are not any fungicides, insecticides, or bactericides that can be sprayed on a tree to positively, effectively prevent or cure this disease. There is an antibiotic called oxytetracycline present in some commercially available injectable products intended to combat *Xylella*. There is not a great deal of research in this area, but work shows that in some cases oxytetracycline suppresses *Xylella* and may provide temporary symptom suppression when injected into trees. Injections may need to be repeated as frequently as every year, can be costly, and afford no guarantees. (Nancy Pataky)

Verticillium Wilt of Trees

Here's another disease that can kill mature trees. It is also a disease that may be confused with general decline and dieback. This fungal disease infects via the roots and eventually becomes systemic in a tree. Some disagree, but if you can catch infection early, branch removal and pampering may actually save a tree.

Verticillium wilt is caused by a fungus, either *Verticillium dahliae* or *Verticillium albo-atrum*. 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.

The most diagnostic feature on a suspect tree is the presence of vascular staining. 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. Streaking can be caused by cankers, some insects or injuries, and a few other wilt pathogens, so culturing of infected tissue is necessary for a positive ID. Staining from Verticillium continues down the stem toward the trunk, whereas cankers and other localized injuries have limited staining of the wood past the injured area. Staining of the center of the stem (the pith) is not characteristic of Verticillium wilt. That stain usually indicates an injury further down the branch. Usually the fungus can be isolated from these stained tissues. Samples should be alive, showing vascular streaking, thumb thick, and 8 to 10 inches long. Culturing can be done at the University of Illinois Plant Clinic for a fee of \$12.50 per sample. See <http://plantclinic.cropsci.uiuc.edu/> for details about the Plant Clinic.

Research confirms that stressed plants are more susceptible to infection. To complicate matters, symptoms of site and environmental stress can mimic Verticillium wilt symptoms. Stress, however, does not cause vascular streaking as described above.

There is no cure for Verticillium wilt. Still, there are many cultural and preventive strategies to manage the disease and help infected trees live with the fungus. Always start with healthy plants and avoid susceptible species. Supply balanced fertilization and provide adequate irrigation to improve the health of stressed plants. This may help the tree "wall-off" infections and resist attack. Remove dead wood to avoid problems with wood rots and decay. When dead wood is removed, it should be burned, not chipped, and not reused in the landscape. Because the disease is soilborne, use only resistant species to replace *Verticillium*-infected plants. At the Plant Clinic, we usually

see Verticillium wilt in maple, redbud, smoketree, ash, magnolia, and catalpa. Some suggestions for replacement plants can be found in *Report on Plant Disease*, no. 1010, "Verticillium Wilt Disease," available in Extension offices or on the VISTA Web site, <http://www.ag.uiuc.edu/%7Evista/horticul.htm>. It is advantageous to control weeds in the landscape because many can serve as sources of inoculum. Dandelions, pigweed, horse nettle, and velvetleaf are all susceptible to *Verticillium*. Do not move soil from an infected area of the garden. This pathogen may be soilborne and can survive for decades in the soil. Laboratories cannot positively identify this disease on a dead tree but can isolate the causal fungus from live, symptomatic wood. Why should you bother if the tree will be removed anyway? The reason is that *Verticillium* is able to survive in the soil for many years without a host, and it may infect hundreds of landscape plants. It is important to know whether this fungus is present when considering replant options. (*Nancy Pataky*)

Weird Growths on Hawthorn

Have you been seeing odd-looking fruit on your hawthorn tree? The tree may be infected with cedar-quince rust. This disease usually does not cause any leaf symptoms on hawthorn but causes stem cankers and fruit infection. You can learn more about this disease in issue no. 3 of this newsletter. Many folks don't notice the disease until it affects the fruit, so we are mentioning this again now, while fruit infection is evident. You should also see the swollen cankers on the stems. They are rusty orange at the beginning of the season but black by winter.

Thornless cockspur hawthorn (*Crataegus crus-gali* var. *inermis*) and Washington hawthorn are very susceptible to cedar-quince rust. We have not identified a hawthorn resistant to cedar-quince rust. Chemical options are available for disease control. Where problems have occurred in the past and resistance is not available, fungicides may be sprayed annually to prevent infection. The sprays must be applied before or soon after spores arrive on the crabapple or hawthorn. Most recommendations tell us to make the initial spray when crabapples are in pink bud and then to continue sprays through 2 weeks after petal fall. Read product labels for recommended spray intervals. The idea is to protect the plants from spores that are moving from junipers to the susceptible plants when those plants are most vulnerable to infection. If you have some infected junipers with rust galls, you can observe when the spores appear (bright color present). Protective fungicide sprays should be initiated at that time. There are many chemical options available in

the *Illinois Home, Yard, and Garden Pest Guide* and the *Commercial Landscape & Turfgrass Pest Management Handbook*. For longer fungicide activity, a systemic product should be considered. Tables at the end of appropriate chapters provide mobility information on each chemical listed. (Nancy Pataky)

INSECTS

Pest Survey

Emerald ash borer has been verified in Evanston, just north of Chicago. There are now three infestations known in Illinois—Lily Lake in Kane County, Wilmette in Cook County, and Evanston in Cook County. The Illinois Department of Agriculture is surveying the extent of infestation in these areas through visual and destructive sampling. Destructive sampling involves the removal of bark from branches to check for the larval tunnels in the cambium.

Green June beetle adults are numerous in Illinois at this time. These are one-inch-long, metallic green, heavy-bodied scarab beetles with a yellow stripe on the side of each wing cover. They fly during the sunny part of the day with a loud buzzing sound. Their size and sound causes many people to think that they are bumblebees. They commonly fly into people at a considerable speed. These insects feed as larvae on dead grass, being most common in piles of grass clippings. They may also be more numerous in lawns with heavy thatch, with the larvae most common under trees. There is no control for the adult beetles. They can be prevented by not collecting grass clippings or by composting them. Efforts to reduce thatch buildup also help keep larval numbers down, and the larvae can be controlled with carbaryl (Sevin) watered into the turf in the fall or spring.

Alder woolly aphid adults are being seen by many people. In flight, they appear as a small piece of floating fluff. The insects themselves are bluish and about 1/4 inch long, but they are covered with white filaments that stick out from the body. With these white filaments, they are similar in appearance to cottonwood seeds. The aphids feed on silver maple, as well as alder, but are rarely numerous enough to warrant control.

Mimosa webworm is numerous in the southern two-thirds of the state. This caterpillar feeds in groups on the leaves of mimosa or silk tree in southern Illinois and on honey locust throughout the state. Typically, three or four compound leaves are webbed together; the caterpillar feeding causes the leaves to turn brown. In heavily infested trees, much of the foliage is brown, but the damage is noticeable also in lightly

infested trees. This is the second generation, which will leave the foliage later in the summer to overwinter under bark and in other protected locations. *Bacillus thuringiensis kurstaki* (Dipel, Thuricide), spinosad (Conserve), and other labeled insecticides are effective in controlling the larvae. Thorough spraying with high pressure is needed to penetrate the webbing with the insecticide. (Phil Nixon)

Twospotted Spider Mite

The warm weather we have been experiencing throughout the state means it is time to be cognizant of the potential damage caused by twospotted spider mite, *Tetranychus urticae*. Twospotted spider mites are considered warm-weather mites because they are mainly active from late spring through early fall. Summer temperatures allow twospotted spider mites to reproduce faster, so that they overwhelm natural enemy populations, which under moderate temperatures are able to control them.

Twospotted spider mites have a very broad host range, feeding on a wide range of trees and shrubs including ash, azalea, black locust, elm, euonymus, maple, oak, poplar, redbud, and rose. Twospotted spider mites also feed on many herbaceous annuals and perennials, such as marigold, pansy, aquilegia, buddleia, clematis, daylily, delphinium, phlox, rudbeckia, salvia, Shasta daisy, and verbena.

Adults are oval and about 1/16 inch long. They vary in color from green–yellow to red–orange. The adults possess two lateral dark spots that are visible when the spider mite is viewed from above. Both adults and nymphs may be found on all plants parts; however, they are often more numerous on older leaves. Twospotted spider mites produce a fine silk, which may be seen between leaves, and the petiole and stem. The webbing produced by twospotted spider mites protects them from predators. Heavy rainfall disrupts and removes this webbing.

Twospotted spider mites feed on leaf undersides, removing chlorophyll (the green pigment) from individual plant cells, with their styletlike mouthparts. The spider mites feed near the leaf midrib and veins because this is where the highest concentrations of amino acids are located. Leaves are stippled in appearance, with silvery gray to yellow speckles. Heavily infested leaves appear bronzed, turn brown, and eventually fall off.

The warm and dry conditions of summer favor rapid development of twospotted spider mites, in addition to increased feeding and reproduction. The life cycle from egg to adult occurs within 5 days at 75°F. Twospotted spider mite females don't have to mate to

reproduce (= parthenogenesis) laying up to 300 eggs during their 2- to 4-week lifespan. Twospotted spider mites spend the winter in protected places, including weeds, leaf litter, and debris, which mean that applications of dormant oil are not effective against this spider mite species.

Twospotted spider mite management involves sustaining plant health, implementing sanitation practices, and/or using pest control materials (miticides). Avoid exposing plants to any “stress,” through maintaining proper watering, fertility, and mulching—as this will at least reduce any potential problems with twospotted spider mites. For example, inadequate moisture or overfertilizing plants, particularly with nitrogen-based fertilizers, may result in the development of excessive spider mite populations. It is always recommended to monitor for twospotted spider mites by knocking the spider mites off plant parts such as branches, onto a white sheet of paper. This allows you to observe the spider mites more easily. Plant-feeding or phytophagous spider mites typically leave a green streak when crushed, whereas predatory mites leave a red streak. A very effective and rapid method of dealing with twospotted spider mites is to apply a hard water spray, which dislodges eggs and any live spider mites. This also preserves any natural enemies. The removal of plant debris and weeds eliminates overwintering sites. Additionally, many broadleaf and grassy weeds are hosts for twospotted spider mites.

Pest control materials, in this case insecticides/miticides, recommended for controlling twospotted spider mites in outdoor environments include abamectin (Avid), bifenthrin (Talstar), etoxazole (TetraSan), hexythiazox (Hexygon), insecticidal soap, and horticultural (= summer) oil. Avid has translaminar properties, which means that the active ingredient

penetrates the leaf surface and resides in leaf tissues, thus killing spider mites feeding on the leaf underside even after spray residues have dried. TetraSan is a spider mite growth-regulator that inhibits the molting process. TetraSan is active on the egg, larvae, and nymphal stages, with minimal effect on adult spider mites. However, treated adult female spider mites do not produce viable eggs. TetraSan also has translaminar properties similar to Avid. Hexygon is active on the eggs and nymphal stages, with no activity on spider mite adults. Be sure to make applications before twospotted spider mite populations are “high” and causing aesthetic injury. Many pest control materials used to control other insects, such as plant-feeding beetles and caterpillars, may be harmful to the natural enemies of twospotted spider mite, thus leading to an inadvertent increase in twospotted spider mite populations. (*Raymond A. Cloyd*)

Home, Yard, and Garden Pest Newsletter is prepared by Extension specialists from the University of Illinois at Urbana-Champaign and the Illinois Natural History Survey. Information for this newsletter is gathered with the help of staff members, Extension field staff, and others. Karel Jacobs and Donna Danielson of The Morton Arboretum also provide information and articles. Major authors are Phil Nixon, (217)333-6650, Fredric Miller, (708)352-0109, and Raymond Cloyd, (217)244-7218, entomologists; Nancy Pataky, (217)333-0519, plant pathologist; Bruce Paulsrud, (217)244-9646, pesticide applicator training; and Tom Voigt and David Williams, (217)333-0350, and Michelle Weisbrook, (217)244-4397, horticulturists. Phil Nixon is the executive editor of the *Home, Yard, and Garden Pest Newsletter*. This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. It is edited by Mary Overmier, Information Technology and Communication Services.

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>).

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