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PLANT DISEASES

Sudden Oak Death

Many Illinois readers have been concerned about the health of mature oaks on their property. The most serious diseases of oaks in Illinois include oak wilt and bacterial leaf scorch, both of which were discussed in previous issues. Oaks are also susceptible to decline following compaction of the root system, construction injury, Armillaria root rot, and many other factors. Many of you have probably heard of another threat to oak—sudden oak death. We have not seen it in Illinois but address it here because of the U of I Plant Clinic receives frequent questions.

This awesome-sounding disease is caused by *Phytophthora ramorum*. Although we find many species of *Phytophthoras* in Illinois on rhododendron, many greenhouse plants, and even soybeans, the sudden oak death species does not occur in Illinois. In fact, it has not been found outside California and Oregon.

Sudden oak death (SOD) is a fungal disease that causes a rapid decline and death of oaks. The name is a bit misleading because it also occurs on other tree and shrub species, 17 in all. Symptoms vary from leaf spots to twig blight to trunk cankers. Roots show no symptoms. Oaks affected are tan oak, coast live oak, and California black oak, none of which grows in Illinois. Research has shown that red and pin oaks are susceptible when artificially inoculated. In addition, some other plants grown in Illinois can serve as hosts, including rhododendron, azalea, and Douglas-fir. Obviously, there is great concern that the disease might move on these plants to other areas of the country.

SOD causes rapid decline and death of oaks, usually resulting in death in 1 to 3 years. On oak, the disease causes a bleeding canker on the stems or trunk. You might also see bleeding cankers on Illinois oaks; but the SOD cankers ooze a black or reddish fluid, and the wood under them has black zone lines evident when bark is removed. Once crown dieback begins, the leaves turn brown in a few weeks.

Because of the concern of movement of this disease within and out of California and Oregon, USDA began regulating the shipment of all host plants in February 2002. The Animal and Plant Health Inspection Service (APHIS) performed surveys for some southeastern states (Georgia, South Carolina, North Carolina, Tennessee, and Virginia) where the disease is most likely to take hold. These surveys were slated for spring 2003. If the disease moves outside Washington and Oregon, this information will be shared. Oklahoma plant pathologists have initiated nursery surveys and have not yet found the disease.

There is a tremendous amount of information available on this disease on the Internet. A good source to start with is USDA's "Sudden Oak Death Pest Alert," NA-PR-02-02, at **www.na. fs.fed.us/spfo/pubs/pest_al/sodeast/sodeast.htm.** *(Nancy Pataky)*

Hosta Problems

Hostas have become popular landscape plants, so questions about disease problems have increased in recent years. Here is rundown of possible infectious problems.

Anthracnose is a fungal leaf disease of hosta that has been prevalent for the last several years. The pathogen is a *Colletotrichum* species that thrives in warm, wet weather. Symptoms include large, irregular spots with darker borders. The centers of spots often fall out, and leaves become tattered and torn. I have not seen this disease kill plants, but it certainly has contributed to their aesthetic decline. Not much information is available about disease management, but a fungicide effective against leaf spots and having a general ornamental label should protect new growth. Fungicides would be recommended on sites where this has been a problem (although I do not treat my plants that have anthracnose). The thiophanate methyl fungicides would be a good starting point if you are looking for fungicide help. Read the label to be certain it is registered for your crop and has no toxicity warnings.

Sclerotium blight has become a serious disease of hostas. Initially, the lower leaves wilt and brown. In a short time, the upper leaves also wilt; and close inspection shows a soft, brown rot of the base of petioles. The fungus, *Sclerotium rolfsii*, appears as a fluffy, white mass of mycelium on the petioles and surrounding soil. Tiny, tan, mustard seed–sized sclerotia (fungal structures) can be seen in this mycelium and on the soil.

This disease historically has been a problem in the southern states but not in Illinois. It has invaded our state, probably on transplants and with the open exchange and popularity of hostas. It was thought that the fungus would not overwinter in our cold climate, but that is false. The fungus overwinters when protected under mulch and snow in mild winters. Research at Iowa State University is investigating the possibility of resistant cultivars, finding differences in susceptibility but nothing yet with high resistance.

Carefully inspect any hostas that are planted into your gardens. Do not plant those with disease symptoms. This applies to other perennials as well because this organism can also infect ajuga, anemone, daylily, impatiens, peony, vinca, and other species. Because the fungus can overwinter under mulch on the plant stems, pull the mulch back from the crown a few inches and leave a mulch-free area near the crown.

Foliar nematodes on hosta are also relatively new to our area. At this time, we are not seeing a big problem in Illinois, but the possibility is real. Nematodes are microscopic roundworms that cause disease. They are pathogens much like fungi or bacteria; but they require moisture to infect, and they live within the plant. The foliar nematodes are in the genus *Aphelenchoides*. On hosta, the nematode feeds in the leaf, producing brown areas between veins. It is thought to overwinter in the crown. You cannot see the nematode with the naked eye, so watch for brown areas between veins, giving the plant a striped appearance. Foliar nematodes may occur on other perennial hosts, including anemone, creeping phlox, ground ivy, windflower, and heuchera. The brown areas in the foliage may take on various shapes, usually limited by veins.

Disease management is not easy. Inspect new plants for symptoms, avoid close plantings, avoid excessively wet foliage, and discard contaminated stock. These nematodes can survive even the cold temperatures of Minnesota, so Illinois winters are not a threat.

A few "newer" problems have been found in the last few years in Illinois. **Fusarium root and crown rot** is a problem we have seen a few times. This disease causes leaf yellowing, stunting, rotting of roots, and death of crown tissues. In addition, several hosta **viruses** have been reported in scientific literature. These include hosta virus X, tomato ringspot, impatiens necrotic spot, and an unnamed virus in the tobravirus group. The U of I Plant Clinic can positively identify all of the problems discussed except viruses. If symptoms suggest viruses, a private lab offering serological tests is suggested. *(Nancy Pataky)*

INSECTS

Emerald Ash Borer

Continue to watch for emerald ash borer. Recently, new infestations were reported in the Lansing, Michigan, area and in Ohio across the state line from Fort Wayne, Indiana. These infestations are considerably closer us than those previously reported in the Detroit, Michigan, and Toledo, Ohio, areas.

Movement of this pest from infested areas is most likely on firewood and nursery stock. This pest was detected and identified in North America in July 2002, but estimates are that it has been in southeastern Michigan for 8 to 10 years. Ashes moved out as nursery stock during that time could easily have been infested. This beetle is common in younger as well as older trees. If you obtained nursery stock from that area during the last 10 years, scout areas where it was planted for signs of this beetle.

Infestations have been found in Michigan in green, white, and black ash. It would likely attack blue ash as well, but that plant is not common in southeastern Michigan. In Asia, it attacks *Ulmus davidiana* var. *Japonica*, used in some crosses for American elm replacement varieties. Look for 1/8-inch, D-shaped holes in the bark—similar to exit holes of bronze birch borer. Infested ash trees first show dieback of upper branches, progressing to death of major branches, water sprouts on the trunk, and finally, water sprouts at the base of the otherwise dead tree. If suspects are found, contact the Illinois Department of Agriculture, your local U of I Extension office, or me. *(Phil Nixon)*

Fall Webworm

Fall webworm, *Hyphantria cunea*, is appearing throughout many parts of Illinois as small to large nests or webs on trees and shrubs. Fall webworm has two generations per year in the southern and central parts of Illinois, with the second-generation occurring now. There is normally only one generation per year in the northern half of the state. Fall webworms are quite noticeable in August and September, with silk webbing up to 3 feet long enclosing the ends of branches. The caterpillars, leaving bare branches with dirty webbing attached, consume leaves inside the silken web.

Though aesthetically unappealing, this feeding is not harmful to tree health as leaves will drop soon anyway. During this time of year, the most effective control entails pruning out the webs enclosing the caterpillars. If an insecticide spray is needed, use enough pressure to penetrate the water-resistant web.

Fall webworm feeds on more than 120 different species of deciduous trees, including ash, birch, black walnut, crabapple, elm, hickory, maple, oak, pecan,

and sweet gum. Fall webworm generally doesn't feed on conifers. In June, adult females fly, and each lays 200 to 500 white eggs on leaf undersides. Adults are white moths with 2-inch wing spans, with brown spots on the forewings and tiny spots of red or orange at the base of their front legs.

Eggs hatch into caterpillars that feed for about 4 to 6 weeks. Young caterpillars tend to skeletonize leaves, which means they remove all leaf tissue except the veins, whereas older ones consume the entire leaf. Caterpillars are pale green to yellow, some with black spots, and are covered with long, white hairs. Older caterpillars are 1 to 1-1/2 inches long. They build large, protective nests or webs, typically on branch ends; and they hide in these nests in large groups to avoid natural predators such as birds. The nests increase in size as caterpillars continue to feed, and heavily infested trees can be completely covered. Severe early season feeding not only causes aesthetic injury but also weakens trees, thus increasing susceptibility to wood-boring beetles. Fall webworm overwinters as pupae in loosely webbed cocoons.

Managing fall webworm consists of physical removal and/or the use of insecticides. Infestations on small trees can simply be pruned out and the nest destroyed. (Be sure to prune plants in a manner that maintains their aesthetic appeal.) Scout trees regularly so that fall webworm populations can be detected early; removing small nests has minimal impact on a tree's aesthetic quality. Treat first-generation fall webworm caterpillars with recommended insecticides, such as acephate (Orthene), *Bacillus thuringiensis kurstaki* (Dipel or Thuricide), carbaryl (Sevin), or spinosad (Conserve). **Do not treat crabapple trees with Orthene**. The bacterium, *Bacillus thuringienis kurstaki,* must be applied early when caterpillars are small and before they construct large nests. The caterpillars must ingest this material for it to kill them. Use high-pressure water sprays to break up the nest to get the insecticide inside where the caterpillars reside and onto the leaves where they feed. Second-generation caterpillars may not warrant spray applications. Not spraying will help preserve natural enemies such as parasitoids and predators. *(Raymond A. Cloyd)*

Syrphid Flies

Large numbers of syrphid, or flower, flies are being seen in central Illinois and are being reported in other areas of the state as well. They are small flies, usually 1/4 inch or shorter, with yellow and black or brown bands on the abdomen. They hover around your arms when you have been perspiring and land to lap up the sweat. This hovering also gives them the name of hover flies. They are called flower flies because they are commonly found on flowers, pollinating as they move from flower to flower. They are called syrphid flies because they are in the fly family Syrphidae.

Illinois sweat bees are 1/4-inch-long, metallic green, brown, or black bees that are also be attracted to perspiration. The only yellow and black stinging insects commonly attracted to perspiration are yellowjackets. These wasps are about 1/2 inch long and easily recognized by most people. Although commonly referred to as sweat bees, syrphid flies cannot sting. While they are feeding on perspiration, their mouthparts can usually be felt; and on sensitive areas, a person may feel a slight pinch. These insects have one pair of wings instead of the two pairs characteristic of bees and wasps. Like many people in the Midwest, I grew up being told that these insects were sweat bees. Only when I went to college did I learn the difference.

Syrphid flies are a diverse group, with the larvae being primarily feeders on dead organic matter and predators of aphids. The white to gray, legless larvae may have become abundant, feeding on the increased amount of decaying organic matter generated by the above normal rainfall experienced in many areas of the state in the last couple of months. Alternatively, these species may be ones whose larvae have been feeding on aphids and other small, soft-bodied, slow-moving insects. A possibility is that the larvae have been feeding on the soybean aphids that are very common in Illinois this year. However, field sampling for soybean aphid has not revealed many syrphid larvae.

In any case, the adult insects are common around flowers and in shady areas. There have been reports of them covering entry doors and automobiles. Control efforts are not recommended because these flies are, at the least, pollinators or nonpests and, at the most beneficial, useful in controlling aphids. Insecticide application is problematic because hovering flies easily avoid sprays aimed at them; large-surface spraying of insecticides is not recommended, and the effects are very short-lived. Put up with the flies. They will probably decline naturally within a week or two. *(Phil Nixon)*

Japanese Beetles: Impact of Winter

During the year, we often get asked questions regarding the impact of winter on pests such as Japanese beetle. Just as a weatherperson has difficulty predicting the weather, it is not always possible to determine the extent of winterkill. However, it is important to note that winter conditions affect natural enemies (parasitoids, predators, and pathogens) as well as pests. Additionally, just because we experience extremely cold air temperatures doesn't mean that the insects are affected. The effect of cold depends on whether there is a snow cover.

Snow acts as insulation (just like insulation in a house) to buffer the soil from extremes in air temperatures. In fact, the soil may be as much as 20 to 30 degrees warmer than the ambient air temperature, depending on depth of snow cover. Snow cover reduces insect mortality and allows more insects to survive the winter. For example, even air temperature of –35°F may have minimal effect on insect survival if snow cover is deep. In contrast, barren soil (with no snow cover) will be colder deeper down within the soil profile. This has the greatest impact on insects in the soil and leads to higher mortality.

This year, portions of Illinois, such as the Chicago area, experienced winter conditions with little or no snow cover; and cold temperatures occurred over an extended period. This allowed soil temperatures to get cold enough to increase the likelihood of killing insects in the soil. Winterkill may be substantial, especially when unusually cold weather occurs without an insulating layer of snow. Soil temperatures below 15°F likely result in near 100% mortality.

Japanese beetles overwinter in the soil as immature grubs (larvae). At first frost, grubs move deeper in the soil. Most of them typically overwinter at 2 to 8 inches, although they can migrate down 11 to 12 inches below the soil surface. The depth at which grubs are located may depend on soil structure. Other grub species, probably true white grubs, have been found 6 feet deep in the soil during extended subzero conditions in northern Illinois with little to no snow cover. Although grubs migrate down to avoid freezing temperatures, some mortality may still occur over the winter if rapidly changing conditions prevent the grubs from moving far enough to escape lethal environmental conditions. For example, sudden cold spells with little snow cover often cause high mortality.

A heavy snow and thick sod cover usually result in grubs' being closer to the surface and surviving with only low mortality. They tend to move deeper in relatively barren soil. Lack of substantial snow cover on barren soil typically results in extremely high grub mortality. Japanese beetle grubs are killed at soil temperatures near 15°F and die when soil temperatures are consistently around 32°F for 2 months.

In Illinois last winter, consistently cold temperatures with little or no snow cover resulted in the soil's being frozen longer and deeper than has been common in recent years. Reports of the soil's being frozen 15 inches deep in central Illinois and 30 inches deep in northern Illinois for about 2 months were common. Emergence of Japanese beetle adults has been slow and late this year, probably due to the prolonged cool spring. Much lower numbers are being reported in many areas of central and northern Illinois, although there are reports of spots with very high populations. It is possible that prolonged cold soils caused increased wintering grub mortality. Areas with high beetle numbers may be those where deeper snow insulated the soil. *(Raymond A. Cloyd and Phil Nixon)*

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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.

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).

U of I Extension
Newsletter Service
University of Illinois
at Urbana-Champaign
528 Bevier Hall, MC-184
905 S. Goodwin Avenue
Urbana, IL 61801

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