UNIVERSITY OF ILLINOIS EXTENSION
HOME, YARD & GARDEN PEST NEWSLETTER
College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign
Illinois Natural History Survey, Champaign

No. 10 • June 23, 2004

PLANT DISEASES

Correction of URL in Issue no. 9

The address for issues of *Report on Plant Disease* is http://www.ag.uiuc.edu/%7Evista/horticul.htm. It was incorrect in the print version, correct online. I'm sorry for the inconvenience.–*Mary Overmier*

Daylily Leaf Streak vs. Rust

Daylily leaf streak is a common fungal disease caused by *Aureobasidium microstictum*. Symptoms begin as chlorosis along leaf midveins, often starting from the tip and moving down the leaf. Necrotic tissue follows. Small, reddish brown flecks or spots develop in this tissue. The effect is yellow and brown streaks and specks on the leaves. Daylily cultivars vary in susceptibility to streak, but generally the most severe result is streaking and death of infected leaves. Fruiting bodies of the fungus are difficult to see even with a hand lens but appear as small white spots on either leaf surface. The fungus develops most quickly when temperatures are warm but not hot. Look for daylily leaf streak in susceptible daylily beds now. It spreads by splashing spores or spores spread on animals (including us). To avoid spread of this disease, try to irrigate the soil rather than the foliage, and avoid working with wet plants. Also try to keep plants thinned to improve air movement. No fungicides are listed specifically for this purpose, but general use fungicides could work as preventives where this problem is chronic.

Daylily rust became a problem in the United States in 2000. It is a fungal disease caused by *Puccinia hemerocallidis*. Daylily cultivars reported as susceptible to rust include Attribution, Pardon Me, Gertrude Condon, Crystal Tide, Colonel Scarborough, Starstruck, Joan Senior, Imperial Guard, Double Buttercup, and Stella D'Oro.

Daylily rust causes yellow to brown streaks on the leaves, much as with daylily leaf streak. Rust causes raised pustules on either surface of the leaf, but especially the underside. The yellow–orange to reddish brown pustules produce abundant spores that rub off when touched. Resistant varieties may produce only yellow flecks. There are a few very good Web sites that discuss daylily rust and show pictures of the disease and pathogen. A site to start with is the daylily rust information page, which has links to many other sites and includes photos of both rust and leaf streak. You can enter "daylily rust information page" in your search engine to find this starting point.

The big concern over daylily rust is that it spreads very rapidly (new infections arise in 2 to 3 days on the more susceptible cultivars), and daylilies have become one of the most popular and widespread perennials in the Midwest. We do not believe daylily rust kills entire plants, but it may kill infected foliage on susceptible plants. If found, infected foliage should be removed and fungicides considered to protect new foliage.

Although daylily leaf streak and daylily rust look similar, there are no pustules or rusty spores with leaf streak. Aphid feeding can cause similar symptoms. Try rubbing the streaks with your finger or a piece of white paper. Rust leaves an orange streak. Use a hand lens or send a sample to the Plant Clinic for identification. A positive ID is done by examining leaf tissue with microscopes to find the fungal fruiting bodies and spores. Although live tissue is best, even dead foliage is fine in this case because the fungus remains on dead or dry foliage. The Plant Clinic has not yet received a positive daylily rust sample in 2004. *(Nancy Pataky)*

Juniper Blight

Junipers in Illinois are plagued by rusts, Kabatina blight, and Phomopsis blight. The rusts were discussed in issue no. 2. This article focuses on the difference between the two fungal needle and stem blights.

Phomopsis blight is the most common disease of juniper. It causes the tips of new growth to turn brown and die. This disease is common in warm, wet weather, as we have experienced in much of Illinois the last few weeks. It can be controlled with fungicides and resistant varieties. **Kabatina blight** is a secondary invader on wounded plants. It usually follows winter injury and appears in early spring, before the new growth. Fungicides are not useful against Kabatina blight.

Juniper tip blight is also known as Phomopsis blight. The newest plant growth is susceptible to infection and becomes resistant with age, usually once needles become a normal, dark green. Infected shoot tips turn light green before becoming brown. One diagnos-

tic clue is the presence of a grayish band at the base of the dead shoot. In this band are pinhead-sized, black fruiting bodies (pycnidia) of the fungus. The pycnidia are visible with the naked eye or with the aid of a hand lens. If the tissue is very dry, place it in a plastic bag with wet paper toweling overnight. The fruiting bodies are easy to see the next day.

Management of Phomopsis blight includes pruning and removing infected foliage when the plant is dry, using resistant varieties, or using preventive fungicides. Prune only dry foliage to avoid spreading spores and to lessen the risk of infection by other fungi. Fungicide recommendations are provided in the *2003 Illinois Commercial Landscape and Turfgrass Pest Management Handbook,* as well as the *Home, Yard, and Garden Pest Guide*. *Report on Plant Disease,* no. 622, "Phomopsis Twig Blight of Juniper," is available in Extension offices or on the Web at http://www.ag.uiuc.edu/%7Evista/horticul.htm.

Kabatina blight is the other common Illinois juniper blight. It is caused by a fungus that appears very similar to *Phomopsis*. The significant difference in these diseases is the time of symptom development. Phomopsis blight occurs on new growth, with infection occurring in the spring. Kabatina blight occurs on last year's needles. You might see it on your junipers in March or April on what you believe is new growth. That is actually last year's growth. This year's growth is much lighter in color and emerges in May and June. Kabatina continues to affect old growth or injured growth during the growing season.

The other significant difference in these diseases is management. Kabatina blight is not clearly understood, and fungicide timing has not been effective in disease control. It is important to remove and destroy infected twigs in dry weather. Also try to assess and relieve any site stress. Reports indicate that disease-resistant varieties are in development, so ask for these at your nursery. Some information about Kabatina blight can be found in Sinclair, Lyon, and Johnson's book, *Diseases of Trees and Shrubs*. *(Nancy Pataky)*

What Is a Fruiting Body?

Often when we discuss plant diseases, we talk about fruiting bodies. Sometimes this causes quizzical looks from the audience or blank stares. Every once in a while I am asked, "What is a fruiting body?"

Plant diseases may be noninfectious or infectious. The infectious diseases are those caused by a pathogen, also known as a disease-causing agent. The major pathogen groups that cause plant disease include fungi, bacteria, viruses, phytoplasmas, and nematodes.

Of these pathogens, **only fungi form fruiting bodies** and spores that are used in diagnosis of plant disease. When we talk about fruiting bodies, we are referring only to fungal pathogens. Keep in mind that the vegetative body of a fungus is made up of threadlike hyphae. Hyphae are recognizable as the threadlike filaments in a mold or the white threads of mycelium seen on rotting wood. Usually, we cannot identify a specific fungus by the hyphae alone. Spores are the reproductive unit of fungi, analogous to plant seeds. Spores are often the dusty, colored part of a fungus that is easily moved in the wind or in water. **Fruiting bodies** are fungal structures that contain spores. They come in many sizes, shapes, and colors, all of which aid in identification of the specific fungus.

Here is some information that is helpful but not necessary to fruiting body identification. Fungal pathogens often have an **imperfect stage** (also called an anomorph) and sometimes a **perfect stage** (teleomorph) as well. This really confuses things because a disease might be named for either stage. For instance, oak wilt is caused by *Ceratocystis* (perfect stage); but we identify its imperfect stage, *Chalara*, in the lab. The point is not to confuse but to alert you to the fact that more than one fungal name may be associated with a single disease. For example, powdery mildew forms white, powdery spores called *Oidium* (imperfect stage). It also forms a resting stage that is a perfect stage of the fungus, such as *Erisyphe*. You can see this as the black, pinhead-sized structures on a leaf with white, powdery growth of powdery mildew.

How do we identify fruiting bodies? It is not necessary to know the fungal names or even whether the stage is imperfect or perfect. The first step to disease and fruiting body identification is to use reference books that describe the disease on your host plant. When the fruiting body is listed (as an example) as a pycnidium or an acervulus, pathologists know what to look for on the plant.

The most significant structures in fungal ID are spores, fruiting bodies, and sometimes mycelium. Often these structures can be seen on a dry plant sample. More often, however, the sample must be placed in a moisture chamber overnight to encourage formation of these structures. Laboratory samples for fungal identification are often incubated in moisture chambers for 24 to 36 hours. After that, they become a moldy mess and of little value in diagnosis. In the lab, we use a dissecting microscope to identify fruiting bodies, but you can use a hand lens. Spores need to be observed with a dissecting microscope. *(Nancy Pataky)*

INSECTS

Potato Leafhopper

Potato leafhopper, *Empoasca fabae*, damage has been noticed in central Illinois, with populations numerous

in southern and central Illinois. Potato leafhoppers attack many ornamental landscape trees, including crabapple *(Malus* spp.), birch *(Betula* spp.), ash *(Fraxinus* spp.), and maple *(Acer* spp.). Red maples are extremely susceptible, whereas silver, sugar, and Norway maples are tolerant.

Potato leafhoppers have piercing–sucking mouthparts, which they use to feed within the vascular tissues (primarily the xylem) of plants. During feeding, they inject a toxic substance into plant tissues. Feeding, especially on maples, results in stunted tree shoots and leaves that curl downward, with brown edges. This damage looks as if the infested trees have been sprayed with a phenoxy-based herbicide (that is, 2,4-D). On plants such as ash, feeding creates small, white or yellow spots on leaves. This results in a stippled appearance that resembles twospotted spider mite injury; potato leafhoppers, as do twospotted spider mites, remove chlorophyll (green pigment) from leaves. Potato leafhoppers don't overwinter in Illinois because their eggs are sensitive to the cold. From the Gulf of Mexico (nice place to overwinter), adults are blown north into Illinois by prevailing winds from early May to early June.

Potato leafhopper adults settle into alfalfa fields during the spring migration; and after the first cutting of alfalfa, they migrate onto ornamental trees. Adults are about 1/16 inch long, wedge-shaped, and pale green, with white eyes. Females lay eggs in the veins on the leaf underside. Eggs hatch in 6 to 9 days into light green nymphs that are found on the underside of leaves and tend to move sideways when disturbed. Nymphs may undergo five instars before molting into adults. Adults and nymphs look similar except that the adults are larger, have wings, and can fly. The wings are held rooflike over the body. Empty, white, cast skins on the underside of leaves provide evidence of potato leafhopper activity. There may be as many as three to five generations per year in Illinois.

Insecticides must be applied before potato leafhoppers cause severe plant damage. Applications of pyrethroid-based insecticides such as bifenthrin (Talstar), cyfluthrin (Tempo), lambda-cyhalothrin (Scimitar), and permethrin (Astro) generally provide adequate control. If plant damage has already occurred, insecticide applications prevent further damage, and new growth appears normal beyond the damaged leaves. Regular scouting helps minimize the potential for potato leafhoppers to cause severe foliar damage. *(Raymond A. Cloyd)*

Gypsy Moth Traps

Gypsy moth traps are set out to determine where gypsy moth is located in the state. In most of the state, these are triangular green or reddish orange cardboard traps about 10 inches long and about 4 inches per side. In areas where gypsy moths are more numerous, such as Lake, DuPage, Cook, McHenry, and Will counties in northeastern Illinois, the milk carton trap may be used. This trap is the general size and shape of a half-gallon milk carton and typically green. Its larger size allows the trapping of more moths. Both traps have a synthetic pheromone similar to the pheromone, or scent, that the female gypsy moth releases to attract the male for mating. Males can detect either pheromone from a considerable distance and follow the pheromone upwind.

These traps are set a mile apart on a grid system in most areas of the state where the Illinois Department of Agriculture in cooperation with the USDA APHIS is trying to detect this insect. In areas where the gypsy moth is known to occur, traps are commonly placed closer together to determine the size and shape of the infested area, as well as obtain an idea of the size of the infestation. This information is useful in determining the type and extent of control operations for next year.

The traps are government property and should not be tampered with. If one must be moved due to painting, tree removal, or other activities, contact information is on the trap. Agencies putting out these traps have right of trespass under federal and state laws. The traps will be removed in July or August. *(Phil Nixon)*

Black Cutworm

Black cutworms are numerous this year in many Illinois locations. Although present in several turfgrass situations, these insects typically result in treatable damage only on golf courses.

Black cutworm overwinters in the extreme southern United States. The moths fly northward in the spring, typically arriving in Illinois during late March or April. At that time, turf is quite attractive to them for egg-laying because it and winter annual weeds are about the only green plants present. Eggs are laid near the tip of the grass blades, and research shows that mowing and collecting clippings removes a high percent of eggs. Most eggs survive the mowing process and hatch where the clippings are dumped. Dumping the clippings basket near the green results in a large number of larvae that attack the green. Clippings should be dumped at least 100 feet from the green.

Black cutworm larvae are able to feed on a wide range of plant species, but only a small percent survive to adulthood when feeding on Kentucky bluegrass. The survival rate on bentgrass, ryegrass, and fescue, even cultivars that contain endophytes, is high. Studies show that black cutworm damage is frequently heaviest near the edge of the green because the cutworms live in the taller Kentucky bluegrass around the green and com-

mute nightly onto the bentgrass green to feed. They commonly crawl 30 feet from their daytime hiding place and may crawl 90 feet or more.

Black cutworm larvae are dark-colored, heavy-bodied caterpillars with only a few indistinct markings. They grow to be 2 inches long before pupating. Feeding on turf typically consists of the posterior end of the caterpillar being stationary while the caterpillar eats the grass blades down to crown as far as can be reached. Commonly, the posterior end of the caterpillar is inserted into a hole in the soil. The result is a tightly clipped circular area 1-1/2 to 3 inches across, depending on the size of the cutworm. These areas are yellowish and look like ball marks to golfers.

Although larval damage is noticeable, feeding on larvae by birds causes much more damage. Starlings, cowbirds, robins, cuckoos, red-winged blackbirds, and other insectivorous birds can detect individual cutworms beneath the surface of the green during the day. In the process of pecking at and eating the larvae, they create small divots. Hundreds of these per green cause openings in the turf surface, as well as causing putts to go awry. On sand-dressed greens, the sand in these divots rapidly dulls and pits mower blades.

Birds on the greens does not necessarily mean that cutworms are present although the birds are cause for closer scouting. Disclosing solutions irritate the cutworms and cause them rapidly to come to the surface for a couple of minutes, where they can be seen. A teaspoon of 5% pyrethrum or a tablespoon of dishwashing detergent per gallon of water spread over a square foot of turf causes any caterpillars present to come to the surface within a minute or two, before tunneling back into the thatch or soil.

Several insecticides are effective against cutworms, but it is important to select one that kills the cutworms rapidly. Some cause the cutworm to thrash about, which elicits a feeding frenzy on the part of insectivorous birds, resulting in increased green damage. Bifenthrin (Talstar), carbaryl (Sevin), deltamethrin (DeltaGard), halofenozide (Mach 2), spinosad (Conserve), and trichlorfon (Dylox) are all effective against cutworms. The insecticidal nematode *Steinernema carpocapsae* is also effective.

Black cutworms have several generations per growing season that overlap due to the continual arrival of moths in the spring from the south. As a result, continual scouting is needed well into the fall. In taller turf on golf courses and lawns, cutworms rarely cause enough damage to be noticeable, so treatment is rarely needed. *(Phil Nixon)*

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.

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