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PLANT DISEASES

Swiss Needle Cast

The past few weeks have brought the Plant Clinic several cases of this fungal disease of Douglas fir. We don't see it often at the clinic, but it is fairly common in the Midwest. The disease causes yellowing and leaf drop, symptoms also caused by many site and environmental stress factors. Read on to learn how to identify this disease so that you can provide better long-term management.

This disease is caused by the fungus *Phaeocryptopus gaeumannii*. Douglas fir is the only known host. Look for yellowing of foliage now. Affected trees hold only the 1- or 2-year-old needles. Older needles drop. Healthy Douglas firs hold 4 or 5 years of needles. Affected trees grow slowly in both height and girth because of the defoliation.

In the lab, we look for characteristic fungal fruiting bodies on the needles to make a positive identification of Swiss needle cast. These fruiting bodies are black, pinhead-sized, and appear in rows on the underside of needles. They look much like Rhizosphaera needle cast on spruce (see issue no. 2 of this newsletter). Place affected needles in a plastic bag with some moist (not dripping-wet) paper toweling overnight. If the disease is present, the fruiting bodies will be evident the next day.

Management suggestions include spacing trees for good air circulation, controlling weeds around the base of the tree, and avoiding susceptible seed sources. If nurseries cannot provide varietal resistance information, stick with a variety developed in your planting zone. In cases where the disease has been identified as a problem, fungicides are used to protect new growth. Applications are made at bud break and repeated according to label directions until the new growth is fully elongated. For homeowners, chlorothalonil products such as Dragon Daconil and Ortho Garden are effective, as is mancozeb. Commercial applicators can also use some systemic products, including Heritage (azoxystrobin), Manhandle (mancozeb + myclobutanil), Spectro (chlorothalonil + thiophanate-methyl), or TwoSome (chlorothalonil + fenarimol). Registered products are listed in the *Home, Yard, and Garden Pest Guide* and the *2005 Commercial Landscape and Turfgrass Pest Management Handbook*. Always read and follow the label of the selected product.

A good Web site discussing Swiss needle cast can be found at Oregon State University, http://www.cof.orst.edu/coops/sncc/hansen.htm. *(Nancy Pataky)*

Leaf Spot Diseases of Shade Trees

By now, most of us are convinced that we made it through another winter. Leaves have emerged from the buds and are about half grown. Soon, we may begin to see some brown or black leaf spots and possibly some leaf drop. How do we know what is significant?

First, think about the leaf spots and the fungi that cause many of these spots. There are millions of fungal spores floating around in the air right now, but only a small percentage will cause a problem. Three basic factors are needed to produce disease: a virulent pathogen, a susceptible host, and favorable environmental conditions for infection. Most leaf-spotting diseases of trees are caused by fungal pathogens. The spores are present now, but most of them are harmless. For instance, a scab spore might fall on your pine tree, but it can't harm the pine. That scab spore must fall on a crabapple to be a potential problem. In addition, the host must be susceptible. Some crabapples are resistant to the scab fungus, while others are susceptible cultivars. Finally, environmental conditions have to be right for infection. Spring weather usually provides ideal conditions for leaf-spotting fungi. This year has been no exception. Have you ever wondered why you see these leaf spots in the spring but not so much later in the season? As new leaves emerge, the tender growth has not developed a thick cuticle (waxy coating), and tissue is more susceptible to infection. As the leaves "toughen up," infection successes are reduced.

Some of the common leaf-spotting diseases we see in the spring in Illinois include anthracnose of ash, birch, maple, oak, sweetgum, sycamore, and walnut. It is also common to find other leaf spot fungi on species such as ash, catalpa, linden, dogwood, elm, hackberry, honeylocust, magnolia, maple, oak, poplar, redbud, sweetgum, sycamore, and walnut. Some of the fungal species involved might include *Phyllosticta, Cercospo-*

ra, Alternaria, Marssonina, Septoria, Gloeosporium, Rhytisma, Atinopelte, Tubakia, and *Taphrina*.

As long as the spotting occurs only in the spring and new growth emerging in the summer is healthy, these leaf-spotting fungi probably cause no significant health threat to the tree. Still, repeated infection over many years can cause a tree stress and predispose it to other problems. In such a case, it is advised to get help from a plant lab or otherwise make a positive identification of the causal pathogen. Trees affected by leaf diseases might also need a little extra tender loving care. Water those trees in periods of drought to help with additional leaf production. Also consider fertilizing the tree in the dormant season. Although fungicides are registered for use on various shade trees to prevent leaf-spotting fungi, they are not usually recommended unless the problem is a chronic or the tree is very young and in a focal point in the landscape.

For more information on anthracnose and shade tree leaf spots, refer to issues of *Report on Plant Disease,* listed alphabetically on the University of Illinois VISTA Web site, http://www.ag.uiuc.edu/%7Evista/horticul.htm. *(Nancy Pataky)*

INSECTS

Scouting Watch

Bridal wreath spirea or Vanhoutte spirea *(Spiraea x vanhouttei)* is blooming in southern and central Illinois. This is a major phenology plant in Don Orton's book *Coincide,* available from the publisher, Labor of Love Conservatory, 468 S. President, Suite 103, Carol Stream, IL 80188-2894; (630)668-8597. When a phenological event predicts that a pest is susceptible to control, one needs to scout to verify that the pest is indeed present and in a susceptible stage before using a control measure. Following are the most common pests that are in susceptible treatment stages during Vanhoutte spirea bloom. *(Phil Nixon)*

Full bloom
Birch leafminer young larvae
Elm leaf beetle young larvae
European pine sawfly feeding larvae
Gypsy moth feeding larvae
Pine needle scale crawlers (first generation)

Full to late bloom
Lilac (ash) borer newly hatched larvae
Oystershell scale crawlers (brown race)

Finishing bloom
Bronze birch borer newly hatched larvae

Most blossoms brown, still a few white
Flat-headed appletree borer larval hatch
Peach tree borer newly hatched larvae
Viburnum borer newly hatched larvae

Bloom finished
Oystershell scale crawlers (gray race)

Elm Flea Weevil

Elm flea weevil is numerous in northeastern Illinois, feeding on a variety of elm species. Identification is uncertain, but appears likely to be *Rhynchaenus alni,* known in Europe as the elm leaf-mining weevil. Damage appears as numerous pinhead-sized holes in leaves. Close observation reveals tiny beetles about 1/16 inch long, primarily on the lower sides of the leaves. They are reddish insects with black heads and black spots on the wing covers. Like grasshoppers, they also have thickened hind legs that they use to jump, and then they fly when disturbed.

Many of them will be mating pairs. These insects lay eggs into the leaf midvein. The hatching larva create a blotch mine at the leaf tip. Refer to the German Web site http://www.bladmineerders.nl/minersf/coleopteramin/rhynchaenus/minrhynalni_f/minrhynalni.htm for a photo of the likely damage.

Control the flea weevil adults with a spray of acephate (Orthene), imidacloprid (Merit), bifenthrin (Talstar), or carbaryl (Sevin). The Orthene and Merit should also prevent the larval mines from appearing later. *(Phil Nixon and Morton Arboretum)*

Scouting Report

Gypsy moth larvae are feeding in northeastern Illinois. As of April 30, the larvae were up to 3/8 inch long and had already caused considerable feeding damage on emerging oak leaves. On trees with high populations, where egg masses were numerous and easily seen on the tree trunks and scaffold limbs, gypsy moths were feeding on leaves on the lower, as well as upper, leaves on the tree. Egg masses were still hatching on the east and north sides of trees and in bark crevices where reduced sunlight resulted in cooler conditions. The newly hatched larvae were still sitting on the egg masses in those areas. Leaves are rapidly expanding, so sufficient leaf area will soon be present to make spray applications effective.

Eastern tent caterpillar continues to be numerous in the southern half of Illinois. In the Springfield area, tents are easily seen, with caterpillars being about half grown. Application of *Bacillus thuringiensis 'kurstaki'* (Dipel, Thuricide) or other labeled insecticides should still provide effective control. In many areas of southern Illinois, the caterpillars will be too large for insecticide applications to save much leaf damage. Because eastern tent caterpillar eggs hatch over a couple of weeks, there may be individual trees

where the caterpillars are still only about 1 to 1-1/4 inch long. In these situations, control will still prevent a considerable amount of defoliation from occurring.

Boxwood psyllids are also hatching, particularly in the northern half of the state. Early damage will show as the leaves being cupped at the ends of the branches. Later, these leaves will turn yellow and then brown as feeding continues. Application of acephate (Orthene) at this time should be effective.

Euonymus caterpillar is a whitish caterpillar covered with black spots that is appearing in silk webs on spindle tree, *Euonymus europa*. They can be controlled with a forceful spray into the silk webbing of *Bacillus thuringiensis 'kurstaki'* (Dipel, Thuricide) or other labeled insecticide.

Succulent **oak gall** is numerous on pin oaks in central Illinois. These look similar to gooseberries or green marbles that turn reddish on the twigs. The gall wasps cause the tree to use leaf tissue to form these galls and commonly part of the leaf or leaf tip extends from the gall. There is no control of these insects at this time. The galls will soon shrivel, turn black, and be covered by subsequent leaf emergence. *(Phil Nixon and Morton Arboretum)*

Pine Needle Scale

Despite the cool weather we have experienced recently, in most portions of Illinois it is time to treat for pine needle scale, *Chionaspis pinifoliae* while Vanhoutte spirea, *Spiraea x vanhouttei,* is blooming. During this time, eggs that have hatched into young crawlers are moving around on plants, looking for a place to insert their mouthparts and begin the process of feeding. The crawler stage is the most susceptible to insecticide applications and sprays of a hard stream of water (Remember, water is not a registered pesticide. . . yet!!!). Mugo, Austrian, Scotch, and red pines are the most susceptible to attack from pine needle scale.

Mature pine needle scales are elongated white scales 2 to 3 mm in length on the needles of evergreens. Pine needle scale overwinters as eggs underneath the mated female scale cover. A females can lay up to 100 eggs during her lifespan. The eggs hatch into small crawlers from about late April through June, depending on the environmental conditions—particularly temperature. Crawlers move around on the needles before finding a place to settle and feed. The crawlers withdraw plant fluids from the mesophyll layer of the needles, causing the needles to turn yellow, then brown. Under heavy populations, entire branches may be killed. In fact, entire trees may be killed, particularly pine trees that are stressed. Young crawlers may be blown onto other plants by wind—starting a new infestation. In general, there are two generations per year in Illinois.

Management of pine needle scale involves sustaining plant health and using insecticides accordingly. Properly implementing cultural practices—including irrigation, fertility, mulching, and pruning. Minimize stress and allow plants to tolerate "low" to "moderate" populations of pine needle scale without experiencing injury. Insecticides recommended for controlling pine needle scale include acephate (Orthene), bifenthrin (Talstar), cyfluthrin (Tempo), insecticidal soap, and summer (= horticultural) oil. These insecticides should be applied when Vanhoutte spirea is blooming. Second-generation crawlers may be treated when Queen Anne's lace is in bloom. Repeat spray applications 7 to 10 days later may be needed because second-generation pine needle scale eggs hatch over an extended period. *(Raymond A. Cloyd)*

Leafminers

Leafminers are a large group of insects that have species in almost all the major insect orders, including Coleoptera (beetles), Diptera (flies), Hymenoptera (wasps and sawflies), and Lepidoptera (caterpillars). Below are the leafminers that may be encountered in Illinois:

Coleoptera: Locust leafminer, *Odontota dorsalis*
Diptera: Holly leafminer, *Phytomyza ilicis*
Hymenoptera: Birch leafminer, *Fenusa pusilla;* hawthorn leafminer, *Profenusa canadensis;* alder leafminer, *Fenusa dohrnii*
Lepidoptera: Arborvitae leafminer, *Argyresthia thuiella;* spruce needleminer, *Endothenia albolineana*

Damage is primarily aesthetic or visual, rarely killing plants. Leafminers cause plant damage primarily when in the larva stage. An adult female may also cause damage by puncturing leaves as she inserts her ovipositor (egg-laying device). This creates white specks on the surface of leaves. Leaf miners are generally host specific, which helps in identificaiton.

It is difficult to generalize the life cycle of leafminers, due to the wide diversity of species. So for the sake of brevity and page length, this article will present the life cycle of fly leafminers. The Diptera leafminer adults are 2- to 3.5-mm-long, shiny, black flies with yellow markings on the abdomen. Several species resemble fruit flies. Adult females lay individual translucent, white, oval eggs into leaf punctures created by the ovipositor during probing. Both the female and male feed on the sap that exudes from these wounds. Each female can lay an average of 60 eggs during the 2-to-3-week lifespan. The number of eggs may depend on the food source and temperature. Eggs hatch into bright yellow to white larvae, or maggots, that feed within the mesophyll layer of cells, creating mines in the leaf. The larvae puncture cell

walls and withdraw the fluid contents into their mouth. Heavily infested trees may appear scorched, particularly for leafminers in the order Hymenoptera, such as birch and hawthorn leaf miners. Leafminer larvae can range in size from 1.0 to 7.0 mm in length, depending on the species.

Mines enlarge as the larva grows or molts to the next instar. The mine pattern, location, and plants attacked vary, based on the species. There are generally three to four larval instars that take about 5 to 8 days to develop before pupation. The last larval instar cuts a semicircular slit in the leaf and typically drops to the soil to pupate. Adults emerge from the pupa stage in about 10 days. The number of generations depends on leafminer species and type. For example, birch and hawthorn leafminer may have three or four generations, whereas arborvitae leafminer and holly leafminer have one generation per year in Illinois. Leafminers may overwinter as larvae in mines, becoming active in the spring.

Planting "resistant" or tolerant plant varieties may reduce problems with leafminers. For example, river birch *(Betula nigra)* and Dahurian birch *(Betula davurica)* are less susceptible to attack by birch leafminer. There are a number of hawthorn *(Crataegus* spp.) species that are tolerant of hawthorn leafminer.

Insecticides recommended for control of leafminers include abamectin (Avid), acephate (Orthene), imidacloprid (Merit), and spinosad (Conserve). These insecticides need to be applied when leaf mines first appear. These insecticides are effective against leafminers because they have translaminar properties, which means they penetrate the leaf surface. The active ingredient resides within the leaf tissues where the larvae feed. As a result, insecticides with translaminar properties last longer than typical contact insecticides, and their efficacy is not influenced by rainfall.

For more descriptive information on specific leafminers consult previous issues of the *Home, Yard, and Garden Pest Newsletter* or the publications listed below:

Cranshaw, W. *2004. Garden Insects of North America*. Princeton University Press, New Jersey.

Johnson, W. T., and H. H. Lyon. 1988. *Insects that Feed on Trees and Shrubs*. Comstock Publishing Associates, Cornell University Press, Ithaca, NY.

(Raymond A. Cloyd)

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