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INSECTS

Birch and Hawthorn Leafminers

Be on the lookout now for two leaf-mining insects, the birch leafminer (*Fenusa pusilla)* and the hawthorn leafminer (*Profenusa canadensis)*. They don't necessarily cause severe plant damage, but they can ruin the aesthetic quality of landscape plants.

Hosts of the birch leafminer include gray, European white, and paper birch. Hawthorn leafminer primarily attacks *Crataegus crusgalli*. Both leafminers are generally attracted to healthy, vigorously growing trees that can tolerate damage.

These leafminer adults are small (3-mm-long), black sawflies. Adults are generally present when leaves begin to unfold. Females lay eggs singly in the upper epidermal tissue near the base of a leaf. Eggs are normally laid in the young leaves, almost never in older leaves. The eggs hatch into larvae that feed between the top and bottom leaf layers within the parenchyma cells. The larvae are yellowish orange and grow to 6 to 7 mm long. They generally feed toward the leaf tip and stay close to the leaf margin, creating brown, irregularly shaped, blotched mines. Heavily infested trees appear scorched, appearing as if hit with a blowtorch. There may be three to four generations a year in Illinois. Throughout most of the state, the damage caused by leafminers is not significant enough to warrant control–except in extreme northern Illinois, where they can be a severe problem.

Pest management of leafminers includes planting resistant or tolerant varieties of plants. For example, river birch (*Betula nigra*) and Dahurian birch (*Betula davurica*) are less susceptible to attack by the birch leafminer. Several species of *Crataegus* are tolerant of hawthorn leafminer.

Recommended pest-control materials for managing both leafminers include abamectin (Avid), acephate (Orthene), chlorpyrifos (Dursban), spinosad (Conserve), dimethoate (Cygon), and imidacloprid (Merit, Imicide, and Pointer). *(Raymond Cloyd)*

Black Vine Weevil

Current year's leaf damage by black vine weevil has been found east of Effingham. Now is the right time of year to be seeing this in southern Illinois, particularly with our unusually warm spring.

Black vine weevil larvae are thick-bodied, white, legless grubs up to about 3/8 inch long that feed on the roots of yew (*Taxus*), strawberry, and other plants. They prune off small roots and also damage larger roots. This rootfeeding can be devastating in a nursery because it results in reduced growth or even dieback of the aboveground part of the plant. Anything that lengthens the time a plant takes to reach marketable size is a concern for the nurseryman. It is common to find damage from black vine weevil larvae on the roots of dying yews in the landscape, but these plants typically have obvious additional stresses, such as having poor soil drainage from being near a downspout or soil compaction from being next to a footpath. Nearby yews that show no dieback and do not have these additional stresses commonly show root damage from black vine weevil as well.

The larvae pupate, and adults emerge later in the spring. Adults are about 3/8 inch long; blackish, with indistinct small, yellowish spots; and very hard-shelled. The head tapers into a narrowed muzzle. These insects are all flightless females that must feed 2 to 3 weeks before their ovaries develop enough to lay eggs. These adults hide in debris below the plant during the day and come up onto it during the night to feed. Their small mouthparts nibble 1/8-inch-long, crescent-shaped notches in the leaf margins. This feeding damage is very characteristic and is common on the leaves of yew, strawberry, euonymus, clematis, wisteria, and many other plants. The adults also can migrate indoors, where they feed heavily on house plants. Eighty other feeding hosts are known for the adults of this insect.

For the nursery, control has been achieved against the larvae with soil drenches of bendiocarb (Dycarb or Turcam), carbofuran (Furadan), and acephate (Orthene or Pinpoint). The insecticidal nematodes *Heterorhabditis bacteriophora* and *Steinernema feltiae* are also effective. Larval control is much more

certain in potted plants than in field-grown plants. Thus larval control in the landscape is uncertain.

Controlling the adults, particularly in the first 2 to 3 weeks after emergence, not only reduces adult damage but also indirectly reduces the larval population by killing the adults before they lay eggs. Spray attacked foliage with acephate (Orthene), cyfluthrin (Tempo), or bendiocarb (Dycarb or Turcam); and allow a liberal amount to run from the foliage onto the soil to kill hiding adults. Bendiocarb is being phased out of the marketplace and may be difficult to find.

Finally, it is often not necessary to treat for the damage by black vine weevil in landscapes. Larval feeding is likely not to be a problem to established plants. Adult feeding is not obvious on yew, so frequently the client is unconcerned about that damage. Adult feeding is more obvious on euonymus and some other plants. Avoid siting these near yews to reduce adult damage and avoid insecticide application. *(Phil Nixon)*

PLANT DISEASES

Oak Wilt Confirmation

The Plant Clinic had its first case of oak wilt for the season this past week. The disease was confirmed by isolations of the causal fungus from an infected tree in Peoria County. We do not usually see the disease symptoms this early in the season, but disease problems are a couple of weeks ahead of the average this year. This fact should be a reminder to the rest of us not to prune oaks until at least the middle of summer, especially in areas known to have oak wilt. Pruning actively growing trees results in sap flow, attracting the beetles that may carry the fungal pathogen.

Oak wilt is caused by a fungus (*Ceratocystis fagacearum*) that enters the water-conducting vessels of the sapwood and causes them to become plugged. Symptoms vary depending on the oak species involved. Generally, oaks in the red–black group develop discolored and wilted leaves at the top of the tree or at the tips of the lateral branches in late spring and early summer (now). The leaves curl slightly and turn a dull pale green, bronze, or tan, starting at the margins. Usually by late summer, an infected tree drops all its leaves. In some years, we have seen red oaks progress from scorched foliage to total defoliation in as little as 3 weeks. This year's confirmed case was on an oak in the red–black oak group.

The white and bur oak group generally shows symptoms on scattered branches of the crown. The disease is often confused with general dieback and decline. Leaves on infected white oaks become light brown or straw-colored from the leaf tip toward the base. The leaves curl and remain attached to the branches. An affected tree in this group may die in one season but is much more likely to survive for many years with a stagheaded appearance. Recent appearances of anthracnose on white oak have caused concern among many tree specialists who fear oak wilt. Anthracnose causes brown spotting scattered over the leaves and may cause slight leaf cupping.

Other problems can mimic oak wilt, including construction damage, soil compaction, changes in the soil grade or water table, lightning damage, nutritional disorders, insect and animal injuries, chemical damage, cankers, and root decay. None, however, has the distinct vascular discoloration found with oak wilt.

To detect the discoloration, peel the bark back with a knife. The sapwood of a healthy tree is white or tan. An oak wilt suspect shows brown and white streaking of the wood. Samples without streaking do not yield the oak wilt fungus even if the fungus is present elsewhere in the tree. Therefore, the disease can go undetected if not properly sampled. There is a slight brown streak to healthy wood as the air comes into contact with the sapwood. The distinct discoloration from oak wilt is visible as soon as the bark is peeled back and does not intensify as the wood dries. Sometimes the discoloration is visible just under the bark, and other times it is deeper in the wood and visible only when viewed from the end of a cut branch.

If you think your tree is infected with oak wilt, the Plant Clinic can prepare cultures from the wood and detect the fungus when it is present. Samples should be 6 to 8 inches long, about thumb thickness, alive but showing symptoms, and must contain vascular discoloration. It takes about 7 days for the fungus to develop in the lab to the point that a positive confirmation can be made. Oak samples submitted for oak wilt testing should be sent on disposable ice packs to prevent killing the fungus with high temperatures before it can be isolated in the lab.

Oak wilt is particularly threatening because there is no complete control or cure once the fungus infects. The fungus infects through fresh wounds and a beetle vector, and it can spread by root grafts between trees. You cannot save the infected tree, but you may be able to save surrounding trees; so a positive diagnosis is important in many cases. Pruning of oaks should be done only in the dormant season if at all possible. Refer to *Report on Plant Disease (RPD)* no. 618 for more on oak wilt. You can obtain this report on the Web **(http://www.ag.uiuc.edu/~vista/horticul.htm)** or from your local Extension office. *(Nancy Pataky)*

Ash Tree Problems

Questions about ash trees have been common the last few weeks. If your ash tree looks healthy, don't be too concerned, but be aware of these symptoms. Many homeowners have seen decline and dieback of even 20- to 25-year-old trees. A number of disease problems might be involved in decline of ash trees.

One possible cause of decline is **ash yellows**. This disease primarily infects white and green ash in the north-central and northeastern parts of the United States. It is a problem in Illinois, but one that is difficult to quantify because its presence is difficult to confirm. Ash yellows is caused by a phytoplasma (formerly called mycoplasma-like organism). These pathogens are somewhat like virus particles, cannot be cultured in a lab, and are spread by phloem-feeding insects. They are definitely limited to the phloem tissue of the tree. This disease is characterized by a loss of vigor over 2 to 10 years before the trees die. Symptoms include short internodes and tufting of foliage at branch ends. Leaves become pale green to chlorotic (yellowed) and might develop fall colors prematurely. The tree might defoliate, and the canopy generally appears sparse. Cankers form on branches and the trunk; and twigs and branches die back. Witches'-broom sprouts of growth might appear on some branches but are more common on the trunk near the ground. Cracks in the trunk may appear in this area as well. It is rare for an ash tree to recover from ash yellows. Many ash trees in our landscapes are green ash, which do not show ash yellows symptoms as clearly as white ash. It is very likely that this yellows disease is more common than we realize because the typical witches' brooms and yellowing are not always seen with green ash, even when the disease is present. Instead, we see only the cankers and stem dieback.

Ash decline is a term that is often used loosely to refer to more than one condition. Ash decline might involve the ash yellows disease or even Verticillium wilt, but it is often used to indicate any decline of ash for which a single pathogenic cause has not been identified. Ash decline usually includes branch tip death, defoliation of enough leaves to give the tree a sparse look, and a slow decline of the tree over a number of years. Trees with ash decline may appear to be recovering each year in the spring and then decline in July and August.

To complicate matters, **Verticillium wilt** on ash also results in cankers and dieback and does not cause the typical vascular discoloration of most Verticillium infections. Refer to *RPD* no. 1010 for more information on Verticillium wilt. It is difficult and time-consuming to distinguish between ash yellows, Verticillium wilt, and ash decline in Illinois. Diagnosis depends almost entirely on symptoms that could be caused by a variety of problems.

Ash yellows is caused by a phytoplasma, a phloem-inhabiting pathogen. It cannot be cultured in the laboratory on artificial media. Some testing services offering specific PCR (polymerase-chain-reaction) tests can detect phytoplasmas in plant tissues. This service is not offered at the U of I Plant Clinic. I spoke with AGDIA, Inc, a company in Indiana that has such a service. You can read about AGDIA on the Web at **http://www.agdia.com/.** There are likely other labs that can help. Let me know, and I will include these in future newsletters. The cost for phytoplasma testing varies with the number of samples being tested. The procedure is very time-consuming and involves expensive equipment, so unit costs are lower when multiple samples are run. The cost ranges from $134 to $315. Turnaround time also affects the cost; so if you need results quickly, it costs more. For this test, AGDIA needs live, thick bark from the base of the tree. The sample must include phloem tissues and be deep enough to prevent that layer from drying out. It is advised to call the testing service before sending a sample. It is obvious why this disease has not been confirmed frequently in Illinois.

Verticillium wilt can be detected by traditional laboratory isolations of live leaf petioles at the Plant Clinic. The fungus grows to the point of positive identification in about 7 days. Samples should include live, symptomatic branch terminals with leaves attached.

Ash decline cannot be confirmed with laboratory isolations because many factors are involved. Sometimes Verticillium is involved, sometimes ash yellows, and always some sort of site or environmental stress.

There are no cures for any of these maladies of ash. Suggested management to slow disease progression includes removing trees with severe dieback, watering the trees during extended drought, and fertilizing in the fall with a general tree fertilizer. Removal of dead limbs may help as well. I have heard some very good testimonials involving the value of fertilization and watering to ash tree recovery. *(Nancy Pataky)*

Leaf Scorch/Tatters

I think most people have seen leaf scorch. The edge of the leaf is brown or black, and often this discoloration continues between veins. The veins themselves are usually the last to be affected. Now is the time of year

we usually see scorch because new growth is succulent and has not yet developed a thickened cuticle to protect it from drying factors. Scorch is a noninfectious, environmental condition that occurs each year when water cannot be translocated to the foliage as rapidly as it is lost. The causes vary and might include root injury, root rot, poor soil conditions, strong winds, transplant shock, flooding, and drought. Often injury is worse on the south and west sides of the plants where foliage is more exposed to wind and sun. Badly affected leaves drop from the tree, but most scorched leaves hang on and become tattered and torn as the wind whips the scorched areas. The possibilities are explained more completely in *RPD* no. 620, "Leaf Scorch of Woody Plants."

Scorch does not kill a tree. To assess the tree's ability to refoliate, look for live buds on the twigs. A bud is alive if it is green and fresh inside. Pick off a few buds and look at their bases to make this observation. Also try scraping the newest twig growth with your thumbnail. If the wood is green and fresh, then it has a good chance of producing more leaves. If there are no live buds and internal wood tissue is dead, then a more serious problem has affected your tree. Trees scorched due to weather stress just need a little extra TLC. Water them in periods of low rainfall, and consider a fall application of a balanced fertilizer.

Leaf tatters is a condition that occurs when the scorched tissue is whipped about in the wind. It looks much worse than scorch, but the actual effect on the plant is the same. Another condition is dubbed **spring leaf tatters**. It too is harmless. Sometimes you see holes and splits in the otherwise normal foliage. The missing leaf tissue seems to have a similar pattern on both sides of the main vein. This is not insect feeding (unless you actually see them feeding), and it is not scorch. This condition results from cold injury when the buds were first developing. Even a slight injury at this critical stage in the leaf development would be greatly magnified as the leaf expands. Such injury usually is fairly symmetrical on both sides of the leaf. Insect injury never shows this symmetry. Treat spring leaf tatters as you would scorch. *(Nancy Pataky)*

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