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PLANT DISEASES

Watch for Oak Wilt

The Plant Clinic had its first confirmed case of oak wilt for the 2002 season this past week. This is consistent with last year's first positive case. This year, the disease was confirmed by isolations of the causal fungus from an infected tree in Lee County. Many callers have questioned us about oak wilt symptoms, how to sample for oak wilt, and where to send samples for testing. Obviously, many oaks in Illinois are showing distress. Know what to look for. Most important, do not prune oaks until at least the middle of summer, especially in areas known to have oak wilt. Pruning when trees are actively growing results in sap flow, attracting the beetles that may carry the fungal pathogen. Both the beetles and the fungus are now active.

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 has dropped 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. This tree group may die in one season but is much more likely to survive for many years with a stagheaded appearance. Anthracnose may produce some look-alike symptoms. Anthracnose causes brown spotting scattered over the leaves and may cause slight leaf cupping as well.

Other problems, 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, can mimic oak wilt. None, however, has the distinct vascular discoloration found with oak wilt. To detect discoloration, peel the bark back with a knife. The sapwood of a healthy tree is white or tan. A suspect tree will show 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 the tree is 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. At other times, the discoloration is deeper in the wood and is 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 8 to 10 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. We cannot hurry that process. Oak samples submitted for oak wilt testing should be sent on disposable ice packs to prevent killing the fungus (in mail trucks 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 by 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. 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 you can get a copy from your Extension office. (Nancy Pataky)

Crown Gall

This plant disease doesn't look like other bacterial diseases. There is no spotting with halos, no bacterial streaming, and certainly no secondary soft rot or tissue dropping out of the foliage. The crown gall bacterium causes the plant to produce woody galls on stems, crowns, or roots.

Crown gall is a bacterial disease infecting hundreds of plant species, both woody and herbaceous. The most common hosts in Illinois include creeping euonymus, grape, raspberry, crabapple, and rose. The causal bacterium, *Agrobacterium tumefaciens*, enters the plant through a wound. The plant forms a gall in response to this infection. Galls appear on the trunk, crown, and roots, and sometimes on the stems of the host plant. Young galls are white or tan, usually round, and are quite soft and spongy. As the gall ages, it develops an irregular, convoluted, rough, corky surface and a dark brown, hard, woody interior. These galls might be mistaken for insect galls. Cut into the gall to investigate the cause. The galls from crown gall disease will appear as a mass of undifferentiated tissues whereas insect galls will have galleries or pockets with or without insects present. There are a few fungi that may cause galls on plant tissue too, so check a good disease reference book to see what else might be affecting your plants.

Plants may survive for years with galls of crown gall. Still, you will not be able to cure the plants of the malady even if you remove the galls. My own creeping euonymus survived many years with crown gall. They were finally killed during one severe winter, weakened by the crown gall infection.

The bad news is that this disease is quite persistent. The *Agrobacterium* bacterium can survive in the soil more than 5 years. It is easily spread in soil water or rain splash but can penetrate plants only through fresh wounds. Such wounds might be made during pruning, cultivating, transplanting, budding or grafting, or feeding by insects or other pests. If you let your dog run through the planting, enough wounding may occur to let the pathogen enter.

Control of this disease is very difficult. If you decide to remove plants and start over, you will need to use plants that will not host this disease. For instance, if you had a bed of creeping euonymus with crown gall, do not put healthy creeping euonymus back in that bed. They will become infected like their predecessors. If you are moving to a new site, inspect new plants for galls before planting. Do not buy plants with galls. Because plants may have the crown

gall disease and remain symptomless, do not try moving seemingly healthy plants from your infected bed to the new site.

Here are some options for you to try in an area infested with crown gall: barberry, hornbeam, true cedars, ginkgo, golden-rain-tree, tuliptree, mahonia, spruce, linden, boxwood, catalpa, beech, holly, larch, magnolia, black gum, pine, Douglas-fir, baldcypress, hemlock, birch, firethorn, redbud, smoke tree, sweetgum, deutzia, serviceberry, yellowwood, yew, and Zelkova. For more information on crown gall, consult *Report on Plant Disease (RPD)*, no. 1006, available in Extension offices or on the Extension Vista Web site. (Nancy Pataky)

Leucostoma (Cytospora) Canker of Spruce

Here is a disease that we see frequently on spruce trees in Illinois, especially in periods of stress. As we move into hot, dry summer weather, we see more of this canker disease. The pathogen in this case is *Leucostoma kunzei*, formerly called *Cytospora kunzei*. To confuse matters more, the perfect stage of the fungus is *Valsa kunzei*. Cytospora canker and Leucostoma canker are one and the same disease. You will see both names in scientific literature. Old texts still have the Cytospora name, and I still prefer to call it Cytospora canker.

Cytospora canker is probably the most common and damaging infectious disease of spruce in Illinois. Colorado blue and Norway spruces are very susceptible, especially 10- to 20-year-old trees. This disease causes death of branches, usually starting at the base of the tree and moving upward. Occasionally, the affected branches are scattered throughout the tree. Needles may drop early from affected branches or hang on for several months, leaving dry, brittle twigs. An important diagnostic feature to note is that *Cytospora* causes entire branches to die. A girdling canker forms at the base of the branch, and symptoms show first as a branch tip death. Sometimes, this disease is confused with *Rhizosphaera* needle cast, but that disease affects older needles first while needles at the tips of branches are symptomless. (Refer to issue no. 3 of this newsletter for details about *Rhizosphaera*.) *Cytospora* may continue to spread until all the branches on the tree are dead. Conspicuous patches of white resin commonly form on the bark in cankered areas at the base of dead branches. The diseased tissue is brown under the thin layer of outer bark. Black pinhead-sized fruiting bodies of the fungus (pycnidia) form in the inner bark,

often embedded in the resin. These fruiting bodies are very difficult to see, so don't despair if you cannot find them.

Don't be fooled when diagnosing *Cytospora* canker. The mere presence of dead branches does not confirm the disease. Look for resin (sappy) areas at the base of the dead branches. Then look more closely for the black pycnidia. We have seen so much damage to spruce from environmental stress over the past several years that it is possible that injury has nothing to do with an infectious agent. On the other hand, stressed spruce trees are more susceptible to *Cytospora* canker, and it is highly likely that the disease will eventually invade the stressed tree as a secondary pathogen.

There are no chemical controls to prevent or eradicate this disease. Remove dead branches as they occur, waiting for dry weather for this pruning. Try to improve tree vitality by watering in drought stress periods. It may help to apply an organic mulch under the full spread of the branches, but not up against the trunk. Mulch helps retain moisture and maintain a more even temperature and moisture environment for the roots. For more information on *Cytospora* or *Leucostoma* canker of spruce, consult *Report on Plant Disease (RPD)*, no.604, available on the Extension VISTA Web site or through your Extension office. (Nancy Pataky)

INSECTS

Gypsy Moth: Part Two

This is the second article of a series in this newsletter on gypsy moth. The first article appeared in issue no. 3, published on May 8. Gypsy moth, *Lymantria dispar*, larvae are full-grown, and they are leaving the trees in northeastern Illinois to pupate. The pupae are dark brown, shell-like cases about 1 inch long, covered with hairs. They are primarily located in sheltered areas, such as tree bark crevices or leaf litter. Adult gypsy moth emergence generally begins the first week in July and continues into August. Males appear 4 to 5 days before the females. Following emergence, adult females locate themselves on tree trunks and release a sex pheromone or odor that attracts males. (In general, a pheromone is a chemical produced by one individual to affect the behavior of another.) Males fly around until they contact the pheromone, odor, which they can detect from a mile away. They then fly upward or upwind in a zigzag pattern to locate females and begin mating. After mating is complete, the females begin to lay eggs.

Both sexes live only for about 7 to 10 days in the adult stages. Females in Illinois are unable to fly because they are heavily laden with eggs.

Eggs are normally laid from July through August. The egg mass is found close to where the mature female pupates, such as on tree trunks, on the undersides of branches, under bark or rocks, on buildings, on vehicles, or in debris. Females have white- to cream-colored wings, a tan body, and a 2-inch wingspan. Males, which are smaller than females, with a 1-1/2-inch wingspan, are dark brown and have feathery antennae. Both the adult female and male can be identified by the inverted V-shape that points to a dot on the wings.

In order to determine the spread of gypsy moth, both federal and state regulatory agencies conduct comprehensive gypsy moth trapping programs. Delta or milk carton traps (6 inches by 3 inches), which vary in color (green, orange, or brown), are placed about 5 to 6 feet off the ground on tree trunks or poles. They are distributed in areas that are known to have gypsy moth and at the leading edge of an infestation to track its spread. The traps are baited with a synthetic lure that attracts the male gypsy moth. Males enter the trap looking for a female producing the pheromone (scent), and they get stuck on its sticky interior. Each September, the number of male moths in traps is counted to determine the extent of the gypsy moth program. This provides a means to determine the potential infestation of an area and to decide if a quarantine should be implemented. The traps do not contain an insecticide. Do not disturb or move gypsy moth traps, and do not put out your own gypsy moth traps unless the area is generally infested. The capture of male gypsy moths in traps does not necessarily mean that gypsy moths have become established. When large numbers of gypsy moths are detected in traps, then an area may be designated as quarantined. Moths other than gypsy moths may inadvertently enter the trap; therefore, not all moths in the traps will be gypsy moths. Traps are generally removed in July or early August.

In some areas of northeastern Illinois, gypsy moth pheromone flakes have recently been applied. These are applied under the supervision of local authorities, Illinois Department of Agriculture, and the USDA. Each flake is elongate and about 1/8 inch long. These flakes are applied at such a low rate that most people do not notice them. The flakes release a synthetic version of the pheromone that the female gypsy moth releases to attract males to her for mating. When pheromone flakes are applied, so much pheromone is detected by the male gypsy moths coming from so

many directions that the male moths become confused. They typically will sit and cower, flutter their wings, and do not fly or mate. As a result, the unmated females lay infertile eggs that do not hatch the following spring. Pheromone flakes are only effective on relatively small populations. If populations are large, females will be numerous enough that males will find and mate with enough of them to keep the infestation high. (*Raymond Cloyd, Phil Nixon, and Donna Danielson, Morton Arboretum*)

Scouting Watch

It is time to spray for bagworms. Enough time has elapsed since they hatched that ballooning to new hosts should have ended. *Bacillus thuringiensis kurstaki* (Dipel, Thuricide), cyfluthrin (Tempo) and other pyrethroids, as well as other insecticides, are effective against these small larvae. As the larvae get older, cyfluthrin and the other pyrethroids will be most effective.

Fall webworms have hatched into the first generation in southern and central Illinois. There is only one generation of this insect in north-central and northern Illinois, occurring in August and September. This insect is not particularly damaging to tree health, but it is an obvious aesthetic pest. Hand removal of the large silk tents, along with their enclosed larvae, on the ends of branches is effective. If insecticide sprays are used, be sure to use enough pressure to break up and penetrate the silk tent.

Earwigs are very numerous at this time in Illinois. These 5/8-inch-long, elongate, brown insects with pincerlike forceps on the rear end hide during the day in protected areas. When found under the bark of a

dying tree, they are commonly blamed for causing the tree to die, but they are just using the site as a place to hide. Those that find their way indoors should be removed by hand; they will eventually die indoors without reproducing. They have varied food habits, feeding on decaying plant material, leaves and flower petals of some plants, and other insects, including fleas. Their damage to the petals and leaves of rose, lily, zinnia, dahlia, aegeratum, and other flowers may justify control. Carbaryl (Sevin), rotenone, and other labeled insecticides applied to the foliage provides control. Do not spray the blooms, to avoid killing bees and other beneficial pollinating insects. (*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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