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PLANT DISEASES

Pine Wilt Obvious Now

Pines killed by pinewood nematode are obvious in many locations now, at least in Illinois. The disease is called pine wilt, and the pathogen is the pinewood nematode. The pathogen may infect most of the pine species we grow in Illinois, with the exception of white pines. White pines that suddenly discolor and die may have white pine decline or other root-related problems. They do not have pine wilt. The non-pine conifers are also exempt, so don't worry about this on spruce, true fir, or Douglas-fir. The most common hosts in Illinois are Scotch, Austrian, and mugo pines.

Many readers will be familiar with nematodes as soil- or root-related pathogens; but in the case of pinewood nematodes, the nematode lives in the wood of the pine tree. The pinewood nematode is microscopic and causes blockage of the water-conducting tissues, resulting in a wilt symptom much like the fungal wilt diseases on deciduous trees.

Symptoms of pine wilt include the appearance of dull green needles on entire branches or over the entire tree. These soon turn brown, so you may miss the dull green stage. The process may take anywhere from a month to a year. Often, one or two dead trees appear in a line of healthy trees because the vector, the Sawyer beetle, feeds on a few trees and moves on to other sites. The nematode is spread in the feeding process. It is not spread by roots. In fact, it is not even present in the roots. It is not spread by contact between trees.

Once a tree is infected with pinewood nematodes, it dies. Pine wilt does not allow any recovery periods. No chemicals are available that will kill the nematode and not the tree. The only management of the disease is to remove the infected tree from the site, and burn or bury it. Do this as soon as possible. Remove any dead pines, even if you are not certain of the presence of pinewood nematode. There is no point in giving a pine tree time to recover once it is brown.

If you want to know whether pinewood nematodes are present in your tree, you can send a sample to the Plant Clinic. Consult this Web page for details on fees, shipping, etc.: http://plantclinic.cropsci.uiuc.edu/. Find a branch that is about 2 inches in diameter and has brown needles still attached. Cut a section of the branch about 10 to 12 inches long and mail it to the Plant Clinic for testing. We cut thin cross sections and soak them in water. If present, the nematode pathogen swims out of the wood and into the water, where it can be identified with a microscope. For more on this disease, consult *Report on Plant Disease (RPD),* no.1104, available in Illinois Extension offices. The *RPD* is also available on the Web at http://www.ag.uiuc.edu/~vista/abstracts/a1104.html. *(Nancy Pataky)*

DED Confirmed

Unfortunately, Dutch elm disease (DED) is still found on elms in Illinois. Some of the infected trees are escapes from the beetles that spread the fungus starting in the mid-1950s. Some of the newer trees may have avoided infection for other reasons. Each year at the Plant Clinic we confirm a number of cases of Dutch elm disease. In fact, we have isolated 71 cases of the Dutch elm disease fungus in the past 5 years. The first case for 2008 appeared last week.

Symptoms of Dutch elm disease (DED) generally begin in early summer. Watch for yellowing of the elm leaves, followed by wilting and browning. A single branch usually shows symptoms first (called flagging), with rather rapid spread to adjacent branches and the entire tree. Look for vascular discoloration to help with diagnosis of this disease. DED causes streaking of the sapwood. You can see this streaking by peeling the bark of a symptomatic branch to reveal the brown streaks in the otherwise tan outer sapwood. Verticillium wilt and Dothiorella wilt can also cause this streaking in elm. Sometimes staining from nearby cankers can be confusing as well. A similar disease caused by a phytoplasma is discussed in *Report on Plant Disease (RPD),* no. 660, "Elm Yellows or Phloem Necrosis and Its Control." This is available online at http://www.ag.uiuc.edu/~vista/abstracts/a660.html.

DED is caused by a fungus, *Ophiostoma ulmi* (*Ceratocystis ulmi*), which plugs up the vascular system and causes wilt and death of the tree. The Plant Clinic can test for the presence of this fungus and provides results after 7 days in the lab.

American elms are very susceptible to the DED fungus. Although Chinese elm and Siberian elm are known to be more resistant, infection of these species may occur.

Breeding programs have produced the more resistant Sapporo Autumn Gold, American Liberty, and Urban elms. Ask about DED resistance when purchasing elms.

If you wish to use fungicides to protect nearby elms, consult the *Commercial Landscape & Turfgrass Pest Management Handbook* for details on chemical controls. Propiconazole and thiabendazole are active ingredients registered for preventive and therapeutic treatment of trees. For more information on DED, including management suggestions, consult *Report on Plant Disease (RPD),* no. 647, available online at http://www.ag.uiuc.edu/~vista/abstracts/a647.html. *(Nancy Pataky)*

Cherry Black Knot

Both edible and ornamental cherry trees are susceptible to this fungal disease. If caught early, black knot is easy to control. This is a fungal disease with symptoms of elongated, rough, black swellings on twigs, branches, and sometimes even the trunk. The knots are a velvety olive green in the spring. They gradually become hard, brittle, and coal black. Black knot looks much like crown gall (a bacterial disease), but swellings from black knot are located on branches rather than on roots and at the crown. Additionally, crown gall never turns black. Injury from black knot may be fairly severe. If stems become girdled, dieback is evident. The trees gradually weaken and may die unless effective control measures are taken. The causal fungus, *Dibotryon morbosum*, can infect at least two dozen species of cherries, plums, and other members of the *Prunus* genus, including some ornamental species.

Purchase only disease-free nursery stock. Never buy trees with visible knots or abnormal swellings on the twigs and branches. Look for this disease in its early stages, appearing as light brown swellings that later rupture the bark and turn darker. Prune and burn (or bury) all infected wood in late winter or early spring before growth starts and as soon as new knots appear. Make cuts 4 to 8 inches behind any obvious, black-knot swellings. Knots on the trunk or on large limbs should be carefully cut out with a knife and chisel, removing about an inch of healthy bark and woody tissue beyond any visible gall tissue. If possible, destroy (burn) all available wild, neglected, or worthless plum and cherry trees.

Most infections occur between budbreak and 2 weeks after bloom, when wet conditions are accompanied by temperatures of 55° to 77°F. If fungicides are used, sprays should be applied as buds open and must be continued every 2 weeks until about 3 weeks after petals fall for effective protection against this fungus. These early-season fungicide sprays do much to prevent new infections but will not stop infections that are already present on the tree. The fungicides are protectants, used in situations where black knot is found in your area. Chemical recommendations for ornamental trees are listed in the *Illinois Commercial Landscape & Turf Pest Management Handbook*. The only product that we can recommend for homeowners is copper, which comes in many formulations; so read the label carefully to be certain that the formulation you choose is registered on the host tree that you have. It must be labeled for use against the black knot fungus. Besides the chemical use, all visible knots must be pruned from the trees to remove old infections.

For more information concerning this disease, consult *Report on Plant Disease (RPD),* no. 809, "Black Knot of Plums and Cherries," available at http://www.ag.uiuc.edu/~vista/abstracts/a809.html. *(Nancy Pataky)*

INSECTS

Emerald Ash Borer

Emerald ash borer has been found for the first time in Chicago. It was found on the near south side at 29th and State Street across from the Illinois Institute of Technology campus. Expect additional finds in many parts of northeastern Illinois over the next few weeks. There are enough infested trees in widely spaced locations that we expect additional finds between and near these locations.

The Chicago trees were large, with dbh's of about 18 inches. Foliage crowns were thinly foliated, and there were many water sprouts on the bases of the lower branches. However, there were almost no emergence holes on the lower 10 feet of the tree trunks. Based on the amount of damage and emergence holes, the infestation had probably been there for about 4 years.

On June 19, some of the first adult emerald ash borer beetles were emerging at this Chicago location. This means that beetles have emerged anywhere in Illinois where infested ash trees are located. So far, no infestations have been found outside the quarantined area of the state, which extends to the north from just a few miles south of Interstate 80 and east of a line a few miles west of Peru and Rockford. *(Phil Nixon)*

Japanese Beetle

Japanese beetle adults will probably emerge this week in southern Illinois. Typically, they emerge there around June 18, but emergence appears to be delayed this year. As of June 18, they had not emerged in Kentucky, and they should emerge in southern Kentucky a week or so before southern Illinois. Perhaps the cool spring has slowed down their emergence. Japanese beetle adults were emerging in North Carolina on June 11, so they will eventually show up.

When they do start to emerge in southern Illinois, we expect them about a week to 10 days later in central Illinois, and a week to 10 days after that in northern Illinois. An entomologist at Eastern Illinois University in Charleston needs to collect recently emerged adults.

Please contact me, Phil Nixon, at (217)333-6650 or at pnixon@uiuc.edu when Japanese beetle adults are first seen in southern and south central Illinois so that I can let him know when to start looking for them.

We had high numbers of Japanese beetle adults in southern and northern Illinois last year, and nothing has occurred since then to decrease their numbers. Central Illinois had lower numbers than predicted last year, and we have still not figured out why.

Reduced numbers of Japanese beetles in this area of the country are typically affected by two climatic conditions. Once the larvae hatch from eggs in late July to early August, they need 11 inches of water through the fall before descending deeper into the soil for the winter. They tunnel downwards when the turfgrass root zone temperature drops to 60°F. Thus, a summer into fall drought can cause a reduction in beetle emergence the next year. Of course, irrigation helps the grubs to survive, so the drop in numbers may not be so severe in housing developments where a high percentage of the lawns are irrigated frequently.

Deeply frozen soil during the winter is the other climatic condition that reduces the number of Japanese beetles. Most Japanese beetle grubs migrate only about elev11en inches deep into the soil for the winter. They can tolerate freezing temperatures during the winter for 2 to 3 weeks before dying. Several years ago, the soil in central and northern Illinois froze 18 inches to 3 feet deep and stayed that way for about 6 weeks. The following summer, only about 1/4 to 1/3 the number of Japanese beetle adults emerged, compared to the previous summer.

We had adequate rainfall last summer and fall for the Japanese beetle grubs to survive. Temperatures did not get cold enough last winter without protective snow cover to freeze the soil very deeply. Based on that, we are expecting a normal to high emergence of beetles this year.

Male Japanese beetles emerge before the females. They are able to detect females tunneling near the surface of the turf before they emerge, resulting in their being numerous in these areas. As soon as a female emerges, many males will try to mate with her, creating a ball of beetles a couple of inches in diameter. This is referred to as "balling." These become obvious on the closely mowed turf of golf greens and tees.

Japanese beetle adults feed on the foliage of many trees and shrubs, preferring linden, crabapple, willow, birch, and rose. They feed first on the upper, sunniest leaves, eating through the upper surface, the epidermis, of the leaves. Frequently, they eat holes through the leaves but also may eat just the upper epidermis and internal mesophyll cells, leaving the lower epidermis intact. Leaves damaged in this way will initially appear whitish but turn brown as the lower epidermal cells dry and die. Thus, damaged trees have missing and/or brownish foliage at the top of the canopy that gradually descends as the beetles feed on lower leaves. This damage is primarily aesthetic, with little obvious effect on plant health.

Because the damage is primarily aesthetic, not treating attacked trees or shrubs is a viable option. By treating only those plants most obvious in the landscape, such as those near entryways and in front yards, you reduce the amount of insecticide applied into the environment and keep the cost to the client lower.

These insects typically feed on one host for about 3 days, and then fly 3/4 to 1-1/2 miles away to another host. They repeat this every 3 days for about 6 weeks. They are much more attracted to previously damaged foliage, particularly that fed upon by other Japanese beetles. Thus, reducing leaf damage during the first couple of weeks after emergence frequently results in markedly less damage through the balance of the season even with no further control efforts.

Carbaryl (Sevin), cyfluthrin (Tempo), permethrin (Astro), and other pyrethroid insecticide foliar sprays provide protection from damage for 10 days to 2 weeks. These would need to be repeated twice at 2-week intervals to provide season-long protection. However, if clientele are willing to pay for only one treatment, applying soon after beetle emergence is likely to provide the best results. Azadirachtin, sold as Azatin, Ornazin, and Neem, has been shown to be an effective repellent in some situations and less so in others. It is most effective when applied just before the beetles emerge.

Clientele can hand-pick the beetles, and this is most effective during the first 2 weeks after emergence. Use a wide-mouthed jar, and partially fill it with rubbing alcohol (isopropyl alcohol) or soapy water. Holding the jar opening under the beetle, poke at the beetle. It will fold its legs and fall into the jar, where it will be killed. This is most effective in the late afternoon to evening or in the early morning. During the middle of the day, disturbed beetles tend to fly off into your face rather than drop into the jar. By harvesting the beetles every day or two, one can greatly reduce the amount of damage to the plants.

Japanese beetle traps contain a pheromone to lure males and a floral lure to attract female beetles. They have a bright yellow color in the lure area that also attracts both sexes. Research has shown that these traps increase the amount of damage to landscape plants. Apparently, the traps attract beetles to the area; but once in the area, many beetles attack nearby plants rather than fly all of the way to the trap. If traps are used, be sure that clientele understand the risks of increased damage and place the traps 50 feet or more from plants that you want to protect. *(Phil Nixon)*

Invasive Species Spotlight: Gypsy Moth *(Lymantria dispar)*

Gypsy moths were brought into New Bedford, Massachusetts, from Asia and Europe in 1868. They were originally intended to be used for increasing disease resistance in hybridized silk-spinning caterpillars. Eventually the gypsy moth escaped the industry and became established in natural areas. From there, it has slowly spread throughout the northeastern states south to Virginia and west to the Great Lakes Region; it is beginning to establish itself **in Illinois**. (http://pest.ceris.purdue.edu/searchmap.php?selectName=ITAXAIA).

Like many other insects, the gypsy moth has four life stages. **Egg** masses are laid in mid- to late summer; they are beige and about 3/4 of an inch in diameter. **Larvae** emerge from the mass in the following spring (hatching generally occurs when most hardwood trees are starting to bud). Each larva can be from 1 to 2 inches long, with hairs running down its entire body. They are grayish, with five pairs of blue spots and six pairs of red spots on their body and yellow markings on their heads. They transform into the **pupa** stage in midsummer from which they emerge into the **adults** in midsummer. Male moths are light tan to dark brown, with wavy bands, and have a wingspan of about an inch. Females are almost all white, with faint darker wavy bands on the forewings, and have a wingspan up to 2 inches. Female gypsy moths do not fly and typically lay their eggs near areas where they were feeding (including picnic tables, firewood, grills, and even cars). When these items are moved, these "hitchhikers" move with them!

Gypsy moth larvae are known as severe tree defoliators and can be a tremendous problem for forest land owners and managers. Oaks (*Quercus spp*.) are their preferred meal, but they will feed on over 500 shrubs and trees. If populations are relative small, 1 egg mass per hectare (~2.47 acres), a few trees can become infested, but damage can be limited. When large populations build up, 1,000 egg masses per hectare, the damage can become quite extensive. This could lead to entire forests being stripped of their foliage. Healthy trees can usually withstand the loss of one flush of leaves but if it happens continuously throughout the year in consecutive years it will almost mean certain failure; especially when coupled with other insect, disease, and environmental conditions.

Illinois participates in the **Slow the Spread** (http://www.gmsts.org/operations/) program. STS is one of the largest monitoring and action programs in the nation targeting the gypsy moth. Largely funded and managed by the USDA, this program monitors populations by employing pheromone traps for detecting the spread of the insects, to notify interested parties and establish action plans. Scientists have begun to capitalize upon natural enemies of the gypsy moth as a way to help keep their populations under control. Several of these natural enemies include the bacteria *Bacillus thuringiensis* (Bt), viruses Gypchek, and predatory insects such as parasitic wasps.

For more information, stop by the Illinois CAPS blog (http://www.illinoiscapsprogram.blogspot.com) for all the latest news on invasive pests in Illinois. *(Mike Garrett and Kelly Estes)*

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