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PLANT DISEASES

Pine Wilt vs. White Pine Decline

Maybe you have noticed a dead mature pine standing among other, healthy-looking pines. This might appear along a highway, in a formal landscape setting, or even in a screen of trees. There are many possible causes for tree death, but what would cause only one tree to die in a group of similar pines? Even without knowing anything about plant diseases, you should be able to think of many logical explanations. Something has inhibited water movement from roots to the top of the tree, or something has occurred to the top of the tree directly. Consider what may be different about the affected tree. Look for injury to the lower trunk or roots. Consider factors that might kill roots, such as compaction, flooding, drought, chemical absorption, underground utilities, recent construction, deep planting, girdling roots, or other problems that could affect one tree and not the others. Aboveground problems that could affect this tree and not others might include a lightning strike, borers (insects), canker fungi, mechanical injury, or something specific to the site. There are two disease problems in Illinois that may cause sudden death of one of more mature pines in a setting. These often-confused diseases are pine wilt and white pine decline.

Pine wilt is a disease that kills an infected pine in one season. The tree progresses from off-green to brown rather quickly. The pathogen is a nematode that lives in the aboveground plant parts and moves from tree to tree in a beetle vector. We call the disease pine wilt, but the pathogen is the pinewood nematode. The Sawyer beetle is the vector. It may feed and transmit the nematode to one or more trees before it moves on to another area of town. Because the nematode does not move to other trees by physical contact, or in water, or through root grafts, the disease often affects only one tree in a group. For details about pine wilt, refer to *Report on Plant Disease*, no. 1104, "Pine Wilt Disease," available on the Web at <http://www.ag.uiuc.edu/%7Evista/horticul.htm> or in Illinois Extension offices.

White pine decline looks like a white pine tree with pine wilt. The catch is that we have never found pine wilt on a live white pine tree. Sometimes we find the pinewood nematode in white pines that are already dead, but the nematode has not been shown to kill white pines. Pine wilt occurs on all other pines grown outdoors in Illinois. White pine decline is a complex situation mainly involving roots. Affected trees have very sparse root systems with few fine, white roots. It is likely that several soil fungi help stress these roots, but a single pathogen has not been implicated. Affected trees have ranged in size from 2 feet to more than 20 feet, indicating that any size tree could be affected.

White pines are understory trees that thrive in the cool, moist, well-drained soils of Wisconsin, although they grow with intermittent success in Illinois. Many of the problem trees we have seen, at least in Illinois, have been situated on clay sites or exposed to the elements (planted in new housing developments or used as windbreaks). It is also likely that site stress has contributed to the decline of these trees.

Look for more white pine problems this year. Watering helps, as does the use of natural mulch (such as shredded bark) over the root system; but without adequate root mass, plants are not able to use the available water quickly enough to replace that used by the foliage. Another factor that may be involved in Illinois is the pH of the soil. Our landscape soils have a fairly high pH level, whereas pines prefer more acidic soils. It may be helpful to fertilize with an acidic fertilizer specifically packaged for pines or acid-loving plants. Follow the directions so as not to burn the roots by applying too much fertilizer. Fertilization is usually recommended in early spring or late fall.

Because white pine decline is not the result of an infectious disease, immediate removal of the tree is not necessary. Instead, try to keep the tree watered and see how it responds. Pine wilt is definitely infectious, and the only way to manage the disease is to remove an infected tree as soon as the disease is confirmed.

(Nancy Pataky)

Hosta Viruses

The Plant Clinic receives calls about hosta viruses on a fairly regular basis. We have not seen many positive cases of hosta viruses, so possibly the calls are more a function of the media concern than a widespread problem. On the other hand, department of agriculture inspectors in some states reported finding record numbers of hosta virus X (HVX) in inspected sales lots last year, so it is likely that the problem is more widespread than we know. It is good to recognize symptoms to watch for when purchasing hostas.

Several hosta viruses have been reported in scientific literature. These include HVX, tomato ringspot, impatiens necrotic spot, and arabis mosaic virus. Hosta virus symptoms may be subtle or obvious. The most common symptom is mottling of the leaves; but stunting, twisting, ring spots, and puckering may appear. There are many hosta cultivars on the market, and some have odd coloring, odd leaf form, and even some leaf puckering. Be familiar with the cultivar you are purchasing so that you can recognize abnormal symptoms. Plants do not have immune systems, so a virus stays with a plant for life. There are no chemicals that can be applied to rid the plant of the virus. If the hosta is very susceptible, it dies from the viral infection. More resistant plants may be mildly stunted or show symptoms without a growth response.

The University of Illinois Plant Clinic can identify virus-infected suspects. We cannot positively identify hosta viruses. Virus particles cannot grow on lab media. They cannot be seen with a compound microscope, but they can be detected with specialized enzyme-linked immunosorbant assays called ELISA tests. If symptoms suggest viruses, a private lab offering serological tests is suggested. One lab that can help is AGDIA, Inc., in Elkhart, Indiana. For information on services and costs, go to www.agdia.com. There are separate images of hosta infected with arabis mosaic virus, HVX, and tomato ringspot virus on their Web site under "slide show."

The method of virus particle transmission varies with the virus, so identification is helpful for disease management. For example, HVX is mechanically transmitted through plant sap. You could move it in the garden by pruning an infected plant before a healthy one. Be sure to disinfect cutting tools frequently when trimming or dividing hostas.

Carefully inspect any hostas planted into your gardens. Do not plant those with disease symptoms or those that appear abnormal. Another option is to plant suspicious plants in an isolated location until they prove healthy. (*Nancy Pataky*)

Powdery Mildew

Powdery mildew is usually rather easy to diagnose. The disease causes a powdery, white layer on foliage. Most tree and shrub species can be infected, as can most annuals and perennials. There are literally hundreds of species of fungi that may cause powdery mildew on various hosts. Fortunately, most species have resistance, or they can host the disease without permanent damage. A few forms can be quite pesky or unattractive, such as powdery mildew on rose, zinnia, phlox, and lilac. The disease is probably more of a concern on fruit and vegetable crops that can lose yield as a result of infection.

Unlike most fungal diseases, powdery mildew is not as destructive when rains are frequent. The six common genera of powdery mildew fungi in the Midwest all prefer warm, humid days. The spores germinate on foliage when the relative humidity is 23 to 99% but do not germinate in free moisture (rain). Recent saunalike conditions should promote this disease. There are many different types of powdery mildew fungi; and most are very host specific. For that reason, we will probably never see an epidemic of this disease in Illinois. Still, on one plant, the disease may spread very quickly, especially in humid weather. Despite the fact that this disease does not kill plants, if your zinnias, roses, or other plants are infected, that may be a major aesthetic concern to you. It can do a number on dogwood trees as well. Although most other powdery mildews in our landscape cause symptoms in mid-July, the powdery mildew fungi on dogwood are active all summer. We see symptoms starting much earlier on this species.

Symptoms of powdery mildew include a white mildew type of growth on the leaves, shoots, buds, flowers, or stems. This mildew is composed of threadlike mycelium and asexual spores of the fungus, which are easily blown to other plant parts and cause further infection. New growth is particularly sensitive. The disease is usually very obvious and often unsightly. Occasionally, infected foliage exhibits a purple cast and rolling of leaves rather than a white color. This is true of infected apple, crabapple, or strawberry.

To avoid problems with powdery mildew, provide conditions for adequate air flow in the planting. This may mean that plants need to be thinned or pruned to allow better air movement. Use recommended mature plant spacings when establishing new plants. Because the pathogen thrives in humid conditions, water the plants early in the day to promote rapid drying. Avoid syringing foliage, and try to water the soil rather than the foliage.

Resistant varieties are the easiest means of disease control, but such plants are not always available. Fungicides are available to control the mildews, and if sprays are begun at the first sign of mildew, control can be attained. Scout for the appearance of the disease and then treat the plants according to label directions. If damage is minor, no action may be required. Consult the *Commercial Landscape & Turfgrass Pest Management Handbook* or the *Home, Yard, & Garden Pest Guide* for a list of registered fungicides by host and by disease. These manuals are available in your local Extension offices. *Report on Plant Disease*, no. 617, "Powdery Mildews of Ornamentals," is available on the Extension Web site <http://www.ag.uiuc.edu/%7Evista/horticul.htm> or in Extension offices and provides detailed information about powdery mildew. (Nancy Pataky)

INSECTS

Emerald Ash Borer: Now What?

The emerald ash borer has been detected in Illinois, both in Lily Lake in Kane County and in Wilmette in northern Cook County. This was to be expected because the geographic distribution of this insect has increased substantially throughout Michigan, Indiana, Ohio, and Canada. The emerald ash borer is an invasive species, and Illinois has been the recipient of other invasive insect species, including the gypsy moth, Asian longhorned beetle, Japanese beetle, pine shoot beetle, and banded elm bark beetle. One of the major concerns is the future of planting ash trees in landscapes. First of all, ash trees have been the staple of the nursery industry for decades because they are able to survive in a wide variety of soil types and site conditions. Second, ash trees are easy to propagate and are an inexpensive landscape tree. As such, ash trees have been extensively planted within municipalities and urban environments. However, this had led to the practice of over-planting with one particular tree species. Historically (and we should learn from the past), problems have been encountered through the wide-scale use of one plant type (= monocultures), which has led to the demise of some of our most beautiful trees. For example, monoculture plantings of American elm resulted in these trees succumbing to attack from the Dutch elm disease. Recently, honeylocust trees, which have been extensively planted throughout the United States, are experiencing problems associated with diseases.

The bottom line is that it is important to plant a diverse assortment of plant material to increase

genetic diversity, as opposed to switching from one monoculture to another. A mixture of plant species is much more restrictive to the natural spread of insect and disease pests because tree species vary in their susceptibility to different pest complexes.

It is important to realize that this insect is likely to travel on its own about one-half mile per year, although it is capable of flying about 5 miles. At that rate, it would take a very long time for this insect to move throughout the state even if regulatory control measures are not very effective. This insect is much more likely to move large distance with the aid of people. The movement of firewood appears to be the most likely avenue of long-distance movement by emerald ash borer.

An item to consider is the preventive treatment of ash trees. Application of imidacloprid (Merit) into the soil within 2 feet of the trunk has been found to provide protection to ashes for about a year after application. In fact, protection is heightened by two successive years of treatment. Higher levels of control have been obtained with the IMA-jet formulation of imidacloprid by Arborjet. It is likely that an infestation will be present in an ash tree for a couple of years before dieback, emergence holes, and other symptoms become apparent. As a result, we are in agreement with other states in recommending preventive treatments only on ash trees in the same county or within 10 to 12 miles of an infestation. Ohio State University has an excellent synopsis of emerald ash borer treatment options at <http://ashalert.osu.edu/latestnews.asp?id+497>. (Raymond A. Cloyd and Phil Nixon)

White Grubs

With the high number of Japanese beetles flying this summer, it is important to be aware of the likelihood of turf damage from the resulting white grubs. The numbers of masked chafers that produce annual white grubs was low. Both Japanese beetle and masked chafer adults are attracted to moist soils in which to lay their eggs. Damp soil is easier for the beetles to burrow into; egg and larval survival is low in dry soils.

In late June, nonirrigated turf was dry, browning, and dormant in much of the state. These conditions result in Japanese beetles and masked chafer adults concentrating their egg-laying in irrigated turf. Widespread rainfall in the first half of July has brought the turf out of dormancy and made even unwatered turf attractive to egg-laying. In these conditions, eggs are laid over widespread areas, resulting in few areas of high grub activity. However, egg-laying will still be concentrated in irrigated turf in west central Illinois, where drought continues.

What this means for grub numbers is that we should see high grub numbers in August in irrigated turf in west central Illinois. In the rest of the state, we are likely to still have damaging grub numbers in irrigated turf, with low numbers in unwatered turf. Irrigated turf anywhere in the state should be treated during July with imidacloprid (Merit) or halofenozide (Mach 2) and watered in with one-half inch of water. Mach 2 does not need to be watered in if significant rainfall occurs within 3 days after application. Turf areas that have received intermittent irrigation should be scouted during the first half of August and treated with trichlorfon (Dylox) if there are 10 to 12 or more grubs per foot square. *(Phil Nixon)*

Research Update: Does Pruning Trees Attract Insects?

You probably have heard or read the recommendation to avoid pruning trees and shrubs during particular times of the year to minimize attack from wood-boring insects. For example, we recommend to not prune white birch trees between May and August because the volatiles emitted from pruning wounds attract female bronze birch borers, which are active during this period. As such, this reduces the attractiveness of birch trees to egg-laying females. It has been reported that the incidence of Dutch elm disease is higher in areas where trees are pruned when the smaller European bark beetle (*Scolytus multistriatus*) is most active.

Research has shown this to be the case with elm trees and smaller European elm bark beetles. It was determined that pruning wounds of English and Sibe-rian elms enhance the release of volatile attractants, thus increasing the response of smaller European elm bark beetles and assisting the beetles in locating breeding sites. As a result, the pruning of elm trees should be performed during late fall and winter when the beetles are less active. *(Raymond A. Cloyd)*

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. Major authors are Phil Nixon, (217)333-6650, Fredric Miller, (708)352-0109, and Raymond Cloyd, (217)244-7218, entomologists; Nancy Pataky, (217)333-0519, plant pathologist; Bruce Paulsrud, (217)244-9646, pesticide applicator training; and Tom Voigt and David Williams, (217)333-0350, and Michelle Weisbrook, (217)244-4397, horticulturists. Phil Nixon is the executive editor of the *Home, Yard, and Garden Pest Newsletter*. This newsletter is written by faculty in the Department of Natural Resources and Environmental Sciences and the Department of Crop Sciences. It is edited by Mary Overmier, Information Technology and Communication Services.

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