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PLANT DISEASES

Rhododendron Problems?

Phytophthora root and stem rot of rhododendron is initiated in wet weather. The causal fungus is a water mold and needs water to infect. Recently, we have received several samples of rhododendrons with this disease. Although we had a long stretch of drought in much of Illinois, recent rains brought as much as 8 inches of water in a short time, causing flooding and waterlogged soils. Details about this disease are discussed in issue no. 4 of this newsletter.

Although Phytophthora root rot is most common on rhododendron, the fungus can also cause a top dieback. In warm, wet conditions, the fungus can splash onto foliage, causing brown blotches. Infection may move into the petiole and then to the stem. This dieback may occur without the root rot.

If you are doing garden renovations this fall, try to provide good drainage in beds containing rhododendrons. Add organic matter and adjust the soil pH to between 5.5 and 6.0 for ideal growth in Illinois. Remove old debris that can harbor this fungus over winter. Water the soil around the plant—rather than the foliage—to reduce foliar infection.

Details on growing rhododendrons can be found in *Large Flowering Shrubs for the Midwest*, University of Illinois special publication no. 74. Details about the disease can be found in *Report on Plant Disease*, no. 664, “Phytophthora Root Rot or Wilt of Rhododendron and Azaleas in the Midwest.” (Nancy Pataky)

White Pine Problems Again

We are seeing a resurgence of white pine problems at the Plant Clinic and in the field. This is not a new situation but one aggravated by the long drought this summer. It all goes back to root damage, so we see increases in white pine decline after heavy rains or after a long drought. Because we had both this spring and summer, I suspect we will all see more white pines dying, seemingly all at once. In fact, roots have probably been declining for many months. The trees reach a point of no return (permanent wilting), and symptoms appear to happen overnight.

Symptoms vary but generally include some pattern of needle yellowing or browning, shriveled bark on branches or trunk, sap exudate on branches, and (in some cases) death of the tree. Affected trees range in size from 2 feet to more than 20 feet. The Plant Clinic has assayed samples for the presence of pinewood nematodes; cultured for fungal pathogens of needles, stems, and roots; and inspected for insect infestations or injuries. The only common factor seems to be root decline. Few live, white roots have been found; but fungal pathogens cannot be correlated with poor rooting. It appears that roots are on the decline for other reasons. Some possibilities include heat, drought, flooding, and sudden extremes in temperature and moisture.

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 have been situated on clay sites or exposed to the elements (planted in new housing developments or used as windbreaks). The excessive rains of the past several springs also may have contributed to root injury and decline by saturating the soil and causing a lack of soil oxygen.

What can we do to help these trees? If roots were injured as we are suggesting, they will not be able to absorb enough water if drought-stressed. Watering helps, as does the use of a natural mulch over the root system; but without adequate root mass, plants will not be able to use the available water quickly enough to replace what the foliage uses. The result is sudden browning or off-color needles and death of branches. Because these problems in white pine are not usually the result of an infectious disease, immediate removal of the tree is not necessary. Instead, try to keep it watered and see how it responds. Also, try digging into a bit of the root system for a better picture. If the roots are brown in cross-section and the outer layer easily pulls off or is not present, then root injury has occurred. If the roots are white and healthy, then the problem is above ground and our theory is wrong, at least in your case.

Another factor that may be involved in Illinois is the soil pH. Our 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. It may be helpful to test the soil pH (use a soil-testing lab) to determine the starting level before you apply an acidic fertilizer. Fertilization is usually recommended in early spring or late fall.

(Nancy Pataky)

Diagnostic Tip: Fire Blight or Canker?

We have seen both diseases in abundance in 2002. Details on fire blight can be found in issue no. 2 of this newsletter; and details on cankers are in issues 2, 11, and 13. Sometimes these diseases look alike, and diagnosis can be confusing. Both problems kill the cambium on woody plant material. Both may initially cause wilting and browning of foliage because water flow is restricted with infection. Fire blight tends to happen more quickly; but if you do not keep a daily vigil, you may miss this fact.

Fire blight causes young shoots to wilt and quickly turn brown. The newest growth is most susceptible. Often the tip of the shoot curls over in a “shepherd’s crook.” This crooking is not always present. Fire blight is caused by a bacterium. Keep in mind that no fruiting bodies form with bacterial diseases. The fire blight bacterium may enter stem tips, a flower bud, or side shoot. The browning it causes is continuous from the tip back to where tissue turns green again. Green tissue is not interspersed with the dead tissue. Besides, the sapwood under the bark is dead as far back as leaves die. Peel back the bark, and you see brown wood underneath.

Cankers are caused by fungal pathogens and therefore often have fruiting bodies embedded in the dead tissue. Canker fungi often cause localized dead wood; this is the area we refer to as the canker. Usually the dead area is surrounded by live, green wood. If you proceed down the stem, you find more dead spots—not a continuous death of wood as with fire blight.

Consider the weather pattern when trying to distinguish between fire blight and cankers. Fire blight occurs most frequently in spring and fall during wet periods. Infection occurs on the most succulent tissues on rapidly growing plants. We see summer infection as well but not in periods of drought. Cankers occur all season long and infect plants under stress.

Always check reference books to determine whether a plant has been reported to host fire blight. Most plants can get canker diseases. When in doubt, send a sample to the Plant Clinic or consult with your local Extension office. (Nancy Pataky)

Hawthorn Rust

In past years, cedar-apple rust has drawn attention to rust galls on junipers and leaf spots and defoliation on apples and crabapples. Now, we see a related rust causing galls and stem distortion on hawthorn. The damage is far worse than the temporary defoliation on the crabapples. I do not know why this disease has spread in the landscape.

Cedar-hawthorn rust (fungus name, *Gymnosporangium globosum*) causes the typical yellow-orange, rusty-colored pustules on the leaves of hawthorn. The spots appear on the upper leaf surface, and eventually the cuplike structures of the fungus (aecia) appear on the underside of the leaves. These cups are only about 1/4 inch in diameter but when massed are quite visible and spectacular (to pathologists anyway). These structures produce spores that are released in the morning hours or with rain. Often, homeowners first notice this disease when they see an orange, spore-covered sidewalk or lawn below their hawthorns. If the disease is severe, the leaves turn yellow and drop early. Cedar-hawthorn rust causes the leaf spots described. Occasionally, it also infects the fruit. The other host of this disease is cedar, most often eastern red cedar. The galls produced on the cedar are similar to the cedar-apple rust galls, but smaller. They are spherical, flattened on the stem side, perennial, and reddish brown. Resistant varieties would be ideal against these rusts. English hawthorn is reported to be resistant to cedar-hawthorn rust. Also, some junipers are resistant to this fungus.

The disease that causes more damage on hawthorn is cedar-quince rust. The causal fungus is still a *Gymnosporangium*, but a different species—*G. clavipes*. The cedar-quince fungus does not usually cause a leaf spot. It may infect a large leaf vein, causing the leaves to curl and die. It typically infects the fruit, petioles, and stems, causing much tissue distortion. The fruit become covered with fungal aecia, giving them an orange, fringed appearance. The fruit then dry and drop. These fruit infections were common in 2002.

Presently the fruit are still attached, but dried. You can still see the rust disease on these fruit. The stems develop spindle-shaped galls that may girdle the stems and kill all tissue beyond that point. The winter host for cedar-quince rust is juniper. Many species can be infected, but eastern red cedar is the most common in Illinois. The stems become roughened and swollen at the point of infection, but no large gall is visible. Typical rust sporulation occurs on the swollen stems in the spring.

Both juniper and hawthorn are necessary for these diseases to occur. Both are used commonly in the landscape, so it is not a practical management tool to separate the hawthorns from their alternate host (junipers). Protection of the hawthorn with fungicides is an option that may be considered if these rusts are problems on specimen or high-value hawthorns. Sprays are used in the spring to protect new growth and developing fruit. Consult the *Illinois Homeowners' Guide to Pest Management, Commercial Landscape & Turfgrass Pest Management Handbook*, and *Report on Plant Disease*, no. 802, for more information. If your hawthorns have a chronic problem with rusts, mark your calendar now to spray next spring. Sprays in summer do not provide disease control for the hawthorns. As a general rule, cedars are not targeted for disease control. (*Nancy Pataky*)

INSECTS

Sound Cultural Practices Reduce Problems with Wood-Boring Insect

The eventual loss of pest-control materials such as chlorpyrifos (Dursban), lindane, and dimethoate (Cygon) means limited options for managing wood-boring insects (beetles and caterpillars). As a result, serious consideration should be placed on implementing sound cultural practices, as opposed to relying on pest-control materials.

Properly implementing sound horticultural practices has the greatest impact in maintaining healthy plants in the landscape. Cultural practices such as watering, mulching, pruning, fertilizing, and plant selection and placement—when properly performed—reduce plant stress, which is a cause of most insect and mite problems.

Water. Under- or overwatering trees often leads to stress, increasing susceptibility to wood-boring insects. For example, stressed plants emit volatile chemicals that attract wood-boring beetles. These beetles use the chemicals emitted to help them easily locate plants whose natural defenses have been compromised by improper watering practices. Underwatering plants may lead to higher populations of spider mites (especially two-spotted spider mite) because there is less moisture in the air from ground and foliar evaporation, resulting in lower relative humidities and drier conditions. These conditions favor spider mite development.

Extreme fluctuations of wet and dry soil conditions such as we have experienced in Illinois may be detrimental to plant health and promote stress. Extended

periods of wet soil kill plant roots due to lack of oxygen. These roots are not available later to take up water when dry conditions persist. The symptoms resulting from this kind of stress may not be expressed on large trees for 3 or 4 years; however, the trees are susceptible to attack from wood-boring insects. This often leads to confusion as to the cause of plant death. In this case, the wood-boring insects are secondary, whereas the stress due to extreme wet and dry soil conditions was the primary cause of plant death.

Mulch. Proper mulching moderates soil temperatures, conserves moisture in the soil, reduces competition from other plants, reduces weed pressure, prevents soil compaction, and minimizes soil erosion. However, improper use of mulches can often lead to increased plant susceptibility to insects. For example, applying too much mulch or covering the plant crown prevents the bark from exchanging oxygen, and the plant suffers from asphyxiation. This leads to plant stress and a higher probability of attack from wood-boring insects. It is best to keep mulch at least 4 inches away from a tree trunk. Thick mulches (more than 6 inches) also provide a moist, protective environment that voles find attractive. Voles feed on the bark (cambium) and can potentially girdle plants, thus killing them.

Pruning. Proper pruning during the growing season generally involves removing dead, diseased, damaged, and weakened growth to maintain plant health and vigor. However, excessive pruning during the growing season, such as removing large portions of the plant canopy, results in spurts of succulent growth highly susceptible to insects. Suckers produced from heavy pruning are also susceptible to aphids and other insects because this succulent tissue lacks a protective waxy covering. Besides, improper pruning cuts, such as stubs, emit volatile odors that attract insects and provide easy entry sites for wood-boring insects.

Pruning trees or shrubs at certain times of the year may increase problems with some wood-boring insects. For example, it is generally recommended to avoid pruning birch trees, especially white birch, from May through August because bronze birch borer adults are flying around looking for places to lay eggs. Pruning during this time creates wounds that emit odors, which attract adult females.

Fertility. Over- and underfertilizing plants often lead to stress or the production of susceptible growth. An excessive application of highly soluble nitrate fertilizers (generally used for turf) generates lush, weak growth that is susceptible to attack by insects.

Besides, excessive amounts of fertilizer cause plants to allocate more resources to leaf production, diverting resources from the production of defensive compounds, thus increasing susceptibility to wood-boring insects. Conversely, plants unable to obtain sufficient quantities of nutrients are also more prone to insect and/or mite attacks because their natural defense system has been compromised.

Besides the cultural practices mentioned, other practices may increase problems with wood-boring insects. First, avoid injuring the base of trees and shrubs with lawn mowers or weed-whackers because this removes essential cambium tissue that is responsible for transporting food upward to the leaves. This type of injury, which can be easily avoided, places undue stress on plants. Many wood-boring insects are opportunistic and thrive on stressed plants. Second, newly planted trees and shrubs are highly susceptible to wood-boring insect attack. For example, the flat-headed appletree borer attacks recently planted trees or shrubs because they are initially stressed. It is important to properly water plants, provide adequate drainage, and mulch young plants to minimize any stress.

Plant selection and placement. Proper selection of a planting site results in healthy plants that are better able to defend themselves and less susceptible to pest attack. For example, white birch trees located on the south side of a white house are more susceptible to bronze birch borer attack because white birches cannot tolerate the extreme sunlight conditions and the reflective heat projected. It is best to use a tree or shrub that tolerates these conditions. Be sure

to consult available resources for information on proper planting zone, light requirements, soil conditions, soil pH, mature plant size, and other factors before selecting and planting any plant material.

Proper implementation of sound horticultural practices such as watering, mulching, pruning, fertilizing, and plant selection and placement is important in maintaining plant health. However, when these practices are improperly performed, problems with insects, mites, or both are likely, which may require pest-control materials. Therefore, maintaining sound cultural practices can often alleviate the need for using pest-control materials. (*Raymond Cloyd*)

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