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PLANT DISEASES

Chlorosis of River Birch, Red Maple, and Others

Chlorosis (yellowing) refers to leaves that are light green or yellow—not a healthy, dark green. Often, leaf veins remain dark while the rest of the blade is lighter. This condition is common on pin oaks in Illinois but also is found on silver maple, red maple, sweetgum, and birch.

Illinois soils typically have a high (alkaline) pH level, which may cause problems such as nutrient-deficiency chlorosis. You have likely seen this on pin oaks in the form of iron chlorosis. In alkaline soil, minor nutrients are often bound within the soil chemistry, making them unavailable to the tree. Iron or manganese seems to be the most limiting nutrient in a high soil pH system in Illinois. Symptoms of either are similar, with manganese deficiency most likely if symptoms are worse on older leaves and iron deficiency more a problem on new leaves first. An Extension report discussing iron and manganese chlorosis (*Report on Plant Disease, RPD*, no. 603) can be accessed at <http://www.ag.uiuc.edu/~vista/horticult.htm>.

Recently, the Plant Clinic has received many chlorotic samples of red maple and river birch. In wet periods or under root compaction or injury, symptoms are intensified. Clay subsoils aggravate the problem.

The question is how to treat trees that are deficient because of the soil pH. You might want to test the soil pH at a local lab. This provides a reference for retesting after treatment. Find out the pH level preferred by your tree. Michael Dirr, in *Manual of Woody Landscape Plants*, often lists the desired pH for trees and shrubs discussed. Soils with a pH below 6.7 seem ideal for red maples. Birches thrive at 6.5 or below. Illinois soils usually have a pH of about 7.4.

Changing the soil pH around an established tree, however, is not a quick process. If the tree is severely affected, consider spraying the foliage with a chelated-iron or manganese product available at garden centers. If you spray a small area, you may determine which element is limiting by watching for a response.

During the growing season, the leaves should become darker green in a week or so if the limiting element is applied. This treatment works only on the leaves sprayed, so the effect is temporary and benefits only the leaves currently expanded. New leaves will not turn darker green.

The treatment that is effective the longest, but which is also slowest to take effect (and most time consuming), is to acidify the soil. This is done by adding sulfur to holes dug 12 to 15 inches deep and at 2- to 3-foot intervals in a series of parallel lines 2 feet apart under the complete spread of the branches and extending just beyond the drip line of the tree. Details are discussed in *Report on Plant Disease (RPD)*, no. 603 (see Web site mentioned earlier in this article). This process takes several years to change the soil pH.

A short-term alternative for a couple of years is to inject chelated iron or manganese into the soil in the holes you dug for the sulfur. Combining the two processes may give you the longest control. Chelates can be injected directly into the trunk, but many horticulture specialists would rather avoid wounding the tree in this manner.

Soil treatment is best done when the soil is moist in April, May, or early June. (*Nancy Pataky*)

Powdery Mildew Time

We seem to be moving out of the high-moisture, root rot weather and into the hot, dry conditions that promote powdery mildew. 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 not in free moisture (rain). Based on this week's weather, powdery mildew ought to be thriving soon.

Powdery mildew is a common fungal disease on many perennials, as well as on annuals, shrubs, and even trees and turf. The most common hosts in Illinois seem to be lilac, zinnia, phlox, and rose. 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 in Illinois. Still, on one plant, the disease may spread quickly, especially in humid weather. Although this disease does not kill

plants, if your zinnias, roses, or other plants are infected, that may be a major aesthetic concern. It can do a number on dogwood trees, too. Most other powdery mildews in our landscape cause symptoms in mid-July, but the one on dogwood is active all summer. We see symptoms starting much earlier on this species; watch for it now.

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. The spores can be blown to other plant parts and cause further infection. New growth is particularly sensitive. The disease is obvious and often unsightly. Occasionally, infected foliage exhibits a purple cast rather than a white color as is true of infected apple or crabapple foliage.

To avoid problems with powdery mildew, provide conditions for adequate air flow. Plants may need to be thinned or pruned. 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—the easiest means of disease control—are not always available. Fungicides are available; and if sprays are begun at the first sign of mildew, control can be attained. Scout for the disease, and treat according to label directions. Often damage is minor, and treatment is not necessary; but watch plants with a history of problems, such as flowering dogwood. Consult the *Commercial Landscape and 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 (RPD)*, no. 617, “Powdery Mildews of Ornamentals,” is available on the Extension Web site <http://www.ag.uiuc.edu/~vista/horticult.htm> or in Extension offices and provides detailed information about powdery mildew. (Nancy Pataky)

Verticillium Wilt

This disease is often associated with stress. We have not seen many positive cases yet this season, but I expect to soon. Hot temperatures put a huge demand on the roots to absorb water. If roots are injured (by excess water, compaction, clay soils, etc.), they are not able to supply the demand. This stress causes foliar wilt, branch dieback, and often infection by the *Verticillium* fungus. Of course, the same is true of

susceptible herbaceous hosts. The fungus may have been present in a planting for years but not infect until plants are stressed—another good reason to maintain good horticultural practices.

This year, many trees, shrubs, and even perennials show weather-related problems that can mimic *Verticillium* wilt. The *Verticillium* fungus causes vascular tissue to be plugged, effectively blocking water movement in the plant, resulting in wilting of foliage and death of branches or plants. You can imagine that a root rot, root injury, trunk damage, insect injury, or any other problem that inhibits water uptake might look like *Verticillium* wilt. In fact, the disease is often blamed for unexplained deaths of plants. Maple, smoke tree, redbud, magnolia, and ash are some of the trees more commonly affected in Illinois; more than 300 plant species are susceptible—including annuals, perennials, trees, shrubs, fruits, and vegetables. We often see the problem on tomato in Illinois, so we recommend the VFN hybrids—resistant to *Verticillium*, *Fusarium*, and nematodes. *Report on Plant Disease (RPD)*, no. 1010, discusses *Verticillium* wilt and lists reported hosts.

Symptoms include wilting and yellowing, and death of leaves, branches, or entire plants. Chronic symptoms may include stunted and chlorotic foliage, leaf scorch, slow growth, abnormally heavy seed crops, and dieback of shoots and branches. Still, the most diagnostic feature is vascular tissue discolored in a striped or streaked pattern, usually brown, black, or light to dark green. As far as we know, only ash does not produce this discoloration. Samples for laboratory culturing must contain this discoloration for valid results (except on ash). Tissue must be alive but showing active wilting. The ideal branch section is thumb thickness, 8 to 10 inches long, alive, with vascular discoloration. This fungus is relatively slow growing. Fungal isolates that develop in laboratory cultures usually grow for about 7 days before the fungus can be confirmed.

Most plant species do not readily recover from this disease. In fact, it is probably more typical for infected plants to die. Still, some fast-growing trees have been able to wall off the fungus and grow well for years. I have seen this happen on a few maples and ash. There are no chemical cures; and resistant varieties are available for only a few plant species (for example, strawberry and tomato). Management recommendations include removing dead wood, watering trees in drought lasting 2 weeks, and fertilizing in the fall to improve tree vitality. Although we may not be able to save an infected plant, identifying

the problem has implications. This fungus is soil-borne. If a susceptible species is planted as a replacement, it too will become infected. Do not grow susceptible crops where *Verticillium* has been confirmed. A rotation of 5 years or more for vegetables and flowers may help reduce the amount of inoculum in the soil.

For more information, consult *Report on Plant Disease (RPD)*, no. 1010, available in Extension offices or on the Web at <http://www.ag.uiuc.edu/~vista/horticult.htm>. (Nancy Pataky)

INSECTS

Japanese Beetle

Japanese beetle adults are emerging in southern Illinois; they will emerge by the end of the month in central Illinois and in early July in northern Illinois. These 1/2-inch, stout, metallic green beetles with coppery wing covers feed on a wide range of plants.

Damage is usually heaviest on linden, birch, willow, crabapple, rose, and grape. If smartweed is in the area, watch it, as Japanese beetle usually feeds on it first. Adults eat through the upper leaf surface and usually through the entire leaf, resulting in brown or lacy, skeletonized leaves. They feed at the top of the plants on the upper side of the leaves in full sun. Thus, early feeding can be overlooked on trees unless you look at the top. Binoculars work well for this.

Adults like to feed where they have fed before. Hand-removal by homeowners, particularly in the first weeks after emergence, can greatly reduce early and later feeding. A jar containing rubbing alcohol or detergent and water can be held under a feeding beetle. Poking at the beetle causes it to fold its legs and drop straight down into the jar, where it will be killed. Harvesting the beetles daily or every other day can greatly reduce damage.

Sprays of carbaryl (Sevin), cyfluthrin (Tempo), or other pyrethroids provide about 2 weeks of control per spray. Because the beetles are present in damaging numbers for about 6 weeks, repeated sprays are needed. With the beetles feeding on so many types of plants, we recommend treating only plants in noticeable locations—trees or shrubs next to building entrances and in landscape entryways; ignore the others. Beetle feeding does not appreciably harm plant health; it is primarily aesthetic damage. By reducing the number of plants treated, you avoid high insecticide use, as well as cost to the client. (Phil Nixon)

Pine Needle Scale

In much of Illinois, it is time to treat for the second generation of the infamous pine needle scale, *Chionaspis pinifoliae*. In general, egg hatch occurs when Vanhoutte spirea is in bloom but may be later, depending on environmental conditions. The young crawlers, which move around on the plant, are much more susceptible to pest-control materials than are the mature adults. Pine needle scale attacks mugo, Scotch, Austrian, and red pines.

Mature pine needle scales are small (less than 1/8-inch long), elongated, white scales located on pine needles. Eggs overwinter underneath the scale cover of the mated adult female. From late May through June, eggs hatch into crawlers that move around on the foliage before finding a place to settle and feed. They remove fluids from the mesophyll layers of needles with their piercing-sucking mouthparts, causing the needles to turn yellow, then brown. Pine needle scale is a hard scale, so no honeydew is produced during feeding. Whole branches and even entire trees may be killed under heavy infestations. Crawlers may be blown onto other plants by wind. There are two generations per year in Illinois.

Managing pine needle scale involves maintaining plant health and using pest-control materials. Proper cultural practices, such as watering, fertility, and mulching, go a long way to minimize stress and allow plants to tolerate low to moderate populations without injury. Pest-control materials recommended include acephate (Orthene), insecticidal soap, and summer oil. The second-generation crawlers may be treated when Hills-of-Snow hydrangea blooms turn from white to green. Repeat spray applications 7 to 10 days later because the second-generation eggs hatch over a longer period. Be careful when using summer oil, as it may discolor plant foliage. (Raymond Cloyd)

Gypsy Moth Traps

Gypsy moth caterpillars are nearing the end of their feeding period and are pupating to emerge as moths. Delta traps, orange-red or green triangular cardboard traps about 10 inches long and 4 inches per side, are being placed in Illinois by federal and state personnel. The traps are open at each end and sticky inside to capture any moth that flies in. The attractant is a synthetic compound that mimics the pheromone released by the female gypsy moth to attract the male. By collecting the males, it can be determined if gypsy moths are present and roughly how numerous they are.

Participating in a federal and state regulatory program, these personnel have trespassing rights to enter property and place the traps. They will remove the traps in July or August. (*Phil Nixon*)

Spruce Bud Scale

In southern and central Illinois, the eggs of spruce bud scale, *Physokermes piceae*, are hatching; crawlers are out and about, looking for a place to feed. In a couple of weeks, they will hatch in northern Illinois. This scale attacks a wide range of spruce species, including Alberta and Norway.

Mature females are rounded, gall-like, reddish brown, and 1/4-inch in diameter. They are generally found in clusters of three to eight, located at the base of new growth or branchlets. Because they closely resemble spruce buds, they are difficult to detect. Lower branches are more likely to be infested with higher populations. With high populations, entire branches may be killed. Stressed or weakened trees generally have higher scale numbers, compared to healthy trees.

Spruce bud scale overwinters on the underside of spruce needles as young crawlers. In late spring, the crawlers move around, and females migrate to twigs and finish their development. Eventually, the female dies with eggs retained within her body cavity. In June, the eggs hatch, and crawlers move around on twigs or branches and eventually settle down to feed. Spruce bud scale is a soft scale, producing copious

amounts of honeydew, which serves as a medium for black sooty mold fungi. Also, the large quantities of honeydew attract bees. There is one generation per year in Illinois.

Treat for spruce bud scale in mid-June and July or when Hills-of-Snow hydrangea blooms are turning from white to green. Pest-control materials recommended include acephate (Orthene), diazinon, insecticidal soap, and summer oil. Apply when crawlers are active; however, be careful when using summer oil, as this may discolor foliage. (*Raymond Cloyd*)

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