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PLANT DISEASES

Hot, Humid Weather Preferred!

A group of disease pathogens prefers hot, humid weather! These are the powdery mildews. Recent outbreaks on zinnia, phlox, lilac, sycamore, and oak confirm this preference. Powdery mildew fungi in Illinois all prefer hot, humid days. The spores germinate on foliage when relative humidity is 23 to 99% but not in free moisture (rain). Look for this disease now on many perennials, as well as annuals, shrubs, and even trees and turf. Common hosts in Illinois are lilac, zinnia, phlox, and rose, but other species are affected.

Although powdery mildew is not thought to be a major threat to plant growth, it is undesirable in production systems and on focal plants in the landscape. It may spread quickly, especially in humid weather.

Refer to issue 10 of this newsletter for preventive practices. If you see powdery mildew now, you can slow the spread by using a fungicide. Scout for the disease and then treat the plants according to label directions. Often damage is minor and treatment unnecessary; but watch plants with a history of problems. 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 Extension offices. *Report on Plant Disease,* no. 617, "Powdery Mildews of Ornamentals," is available at **http://www.ag.uiuc. edu/~vista/horticul.htm** or in Extension offices and provides details. *(Nancy Pataky)*

Elm Yellows

Elms have two major wilt disease problems in Illinois. Most of us know Dutch elm disease. Its causal fungus can be isolated in most labs in about a week. That disease was discussed in issue 12. This season, we have received many positive cases.

The lesser known disease is elm yellows, or phloem necrosis. It is caused by a phytoplasma (type of pathogen) found only in the phloem tissue. This fact, along with the fact that the infected phloem turns brown, gives the alternate name of phloem necrosis. Because elm yellows and Dutch elm disease can appear similar, it is important to know the differences.

Symptoms of elm yellows may appear anytime during summer but are most common in mid- to late summer. Look for symptoms now: yellowing and drooping of foliage, followed by leaf drop and branch death. This pattern may occur on one or a few branches or quickly involve the entire tree. Susceptible trees may show symptoms over the entire tree in a few weeks. Tolerant trees become stunted and may develop bunchy, prolific growth at branch tips (witches'-brooms) or on the trunk. Inner bark tissues of infected trees often exhibit a butterscotch or light brown discoloration in small streaks or flecks. Although trees infected with Dutch elm disease usually show vascular discoloration in symptomatic branches, discoloration from elm yellows is not usually in the branches—it is more often found in the trunk. A simple field test involves taking a few chips of stained phloem tissue, placing them in a closed container for a few minutes, and checking for a wintergreen odor.

Phytoplasmas are bacteria-like organisms with no cell wall, too small to be seen with a compound microscope; and they cannot be cultured in diagnostic labs. Confirmation usually involves extracting DNA from a diseased plant, amplifying a DNA frag-ment by polymerase chain reaction (PCR), and identifying it. Such procedures are available at a high cost (due to labor and equipment). Some specialty labs, such as AGDIA, Inc., offer this service. Generally, diagnosis is based on symptoms in the field and eliminating Dutch elm disease as a possibility. For this reason, no confirmed cases of elm yellows have been reported by the U of I Plant Clinic, but confirmation has come from several knowledgeable tree specialists in the state. Phloem-feeding insects such as leafhoppers are thought to vector this phytoplasma, which overwinters in infected tree roots and witches'-brooms on elms.

There is no cure for elm yellows; infected trees usually die within a year or two. The good news is that elm yellows does not move into new areas as quickly as Dutch elm disease. Remove infected trees to remove inoculum sources from the area. Siberian elm seems to be resistant to this disease. For more information, see *Report on Plant Disease,* no. 660, or the book *Diseases of Trees and Shrubs* by Sinclair, Lyon, and Johnson. *(Nancy Pataky)*

Rhizoctonia Root Rot of Annuals and Perennials

How do you know that herbaceous plants have a root rot problem? It likely will be fairly obvious by poor top growth, wilting, stunting, or off-color or nutrient-stressed foliage. Look at suspect plants more closely for mechanical injuries to the stem, insect feeding, stem or foliar lesions, evidence of drought stress, etc. Some root rots also discolor the stem a few inches above the ground. Others affect only roots. Dig an infected plant including the root system. Wash the roots by soaking them in a bucket of water. Then examine them for symptoms. Healthy roots should be firm, have white tips, and be white internally. Rotted roots are brown or black, often soft or shriveled, and do not have nice, white root tips.

Annuals and perennials may host many species of root rot fungi, including *Pythium, Phytophthora, Rhizoctonia, Sclerotinia,* and *Sclerotium*. All are soil-borne and have fairly wide host ranges, meaning they can infect many different plant species. *Rhizoctonia* is the one most common now. A disease of midsummer, it thrives in hot weather and does not require moisture to infect. Ordinarily, it infects at the soil line and may move up or down the stem. A dry rot may be seen at the soil line, making this disease easy to spot. The stem at the ground line appears dry and wiry.

Control of root rots should be aimed at prevention. Use only healthy transplants. Don't try to save by buying weak plants. They may be diseased, and you certainly won't save in the end. You would have diseased plants and have inoculated your soil with the pathogen. Proper site preparation to provide good water drainage away from roots is imperative. This fall, dig the soil in the entire planting bed to a depth of about 10 inches and work in organic matter if drainage needs to be improved. Use a balanced fertilizer if desired, but keep rates low on new transplants. Rotate plantings in the garden every 2 or 3 years with unrelated plants to help prevent the buildup of pathogens. This practice is extremely helpful in preventing *Rhizoctonia*. Remove crop residue at the end of the season to reduce pathogen survival.

Even if these practices are followed, root rot may occur. Fungicides are available to control the major groups of fungi. The fungicides protect plant stems and roots not yet affected. Their use seems most significant in production areas or in cases where a root rot is discovered in a flower bed and the goal is to preserve remaining healthy plants to season's end. Fungicide options are too numerous to list here. Specific chemicals are listed by host crop in the *Illinois Commercial Landscape & Turfgrass Pest Management Handbook* or the *Illinois Homeowners' Guide to Pest Management*. After determining the chemicals registered on your crop, consider this information obtained from *Diseases of Woody Ornamentals and Trees in Nurseries:* Fungicides that have good efficacy against *Rhizoctonia* include thiophanate-methyl, iprodione, triflumizole, azoxystrobin, trifloxystrobin, fludioxonil, and PCNB. Consult *Report on Plant Disease,* no. 615, "Damping-off and Root Rots of House Plants and Garden Flowers." *(Nancy Pataky)*

Diagnostic Tip

As diagnosticians, we often receive foliage with spots, blotches, or scorching. More often than not the question is "Why is this plant dying?" Although leaf spots and blights can injure plants, loss of even half the leaf area is not enough to kill a tree or shrub. If the plant is declining or dying, something more is involved. In most cases, the leaves do not provide enough information to tell why the plant is dying. Annual stem growth may help in diagnosis.

Get a sample of a terminal branch including about 15 inches of stem and all attached leaves. It is important that this branch be on the outside of the plant. You can determine the annual growth if you follow the tips of the branch to a series of very close rings encircling the stem. That is one year's growth. Continue down the stem to the next set of rings for the previous year's growth, etc. Most tree species put out 8 to 10 inches per year in our area. Look in Michael Dirr's book, *Manual of Woody Landscape Plants*, for the growth to expect for many woody species. If the sampled tree is growing only an inch a year, it is obviously stressed. Determine how long the tree has been growing poorly. If you can get the client to think about changes that happened when growth slowed, you may get your best clues to the cause of decline. This information, along with leaf symptoms, weather information, soil type, drainage, etc, can lead you to the cause(s) of the decline. *(Nancy Pataky)*

INSECTS

Twospotted Spider Mite

High temperatures, humidity, and low rainfall experienced over much of Illinois the past weeks have created conditions favorable for outbreaks of twospotted spider mite, *Tetranychus urticae.* For example, feeding injury is apparent on euonymus.

Under moist conditions, when rainfall is sufficient, spider mites are generally not a problem because naturally occurring fungi keep the populations in check. However, under conditions of low rainfall, populations of natural fungi decline, allowing spider mite populations to increase rapidly.

Twospotted spider mites are considered warm-season mites because they are mainly active from late spring to early fall. Summer temperatures allow them to overwhelm populations of beneficial insects and mites that control them at moderate temperatures.

Twospotted spider mites feed on a wide range of trees and shrubs, including ash, azalea, black locust, elm, euonymus, maple, oak, poplar, redbud, and rose. They also feed on many herbaceous annuals and perennials, including marigold, pansy, aquilegia, buddleia, clematis, daylily, delphinium, phlox, rudbeckia, salvia, shasta daisy, and verbena.

Twospotted spider mite adults are oval, about 1/16 inch long. They vary in color from greenish yellow to reddish orange, with two lateral dark spots that are visible when the mite is viewed from above. The adults and nymphs can be found on all areas of plants but are often more numerous on older leaves. These mites produce fine silk, which is sometimes seen between leaves and between the petiole and stem. Rainfall usually washes this webbing away.

Twospotted spider mites mainly feed on leaf undersides, removing chlorophyll (green pigment) from individual plant cells with their styletlike mouthparts. They generally feed near the leaf midrib and veins where the highest levels of amino acids are present. The leaves appear stippled with small silvery gray to yellowish speckles. Heavily infested leaves appear bronzed, turn brown, and eventually fall off.

Warm and dry conditions favor rapid mite development and increased feeding and reproduction. The life cycle from egg to adult can occur in 5 days at 75°F. Female spider mites, which don't have to mate to reproduce, live 2 to 4 weeks and can lay 100 to 300 eggs. Twospotted spider mites spend the winter in protected places, such as weeds, in ground litter, or in debris. They do not overwinter on plants, so applications of dormant oil sprays are not effective.

Management of twospotted spider mite involves maintaining plant health, sanitation, and/or the use of pest-control materials. Avoid any type of plant stress by proper watering and fertility as this minimizes potential problems with spider mites. For example, lack of moisture or overfertilizing plants, especially with nitrogen-based fertilizers, results in higher mite populations. Monitor for spider mites by knocking them off plant parts (branches) onto a sheet of white paper, where they can be seen more easily. Plant-feeding spider mites produce a green streak when crushed, whereas predatory mites produce a red streak. A hard spray of water (not a registered pesticide … yet) can dislodge spider mite eggs and live mites. Removing plant debris and weeds eliminates overwintering sites. Also, many weeds, especially broadleaves, are hosts for spider mites.

Pest-control materials recommended for managing spider mites outdoors include abamectin (Avid), bifenthrin (Talstar), dicofol (Kelthane), hexythiazox (Hexygon), insecticidal soap, and summer oil. Concentrate sprays on leaf undersides. Avid has translaminar properties, meaning the active ingredient penetrates the leaf surface and resides in leaf tissues—killing spider mites feeding on the underside of leaves. As a result, coverage of leaf undersides is less critical. Hexygon primarily kills the egg and nymphal stages, with no activity on adults. Avoid using organophosphate-based insecticides (for example, Orthene, Malathion, Dursban, and Diazinon) because they may stimulate female spider mite reproduction. Make spray applications before populations are high and aesthetic injury is visible. Note that many of these pest-control materials are harmful to beneficial insects and mites that naturally feed on spider mites, potentially making continual use of these materials necessary once applications begin. *(Raymond Cloyd)*

White Grubs

Conditions throughout Illinois continue to favor heavy infestations and resulting damage of Japanese beetle grubs and annual white grubs in irrigated turf areas. The majority of these eggs will have hatched in central and southern Illinois within the first few days of August. Hatch should be completed in northern Illinois by about August 10.

Applications of imidacloprid (Merit) or halofenozide (Mach 2) made during July or earlier should provide control. These insecticides can still be used until about August 10. After that, grub injury may be possible before the insecticide provides control. Because these insecticides take about 3 weeks to kill the grubs, clientele may discover live grubs. Once grubs have hatched, trichlorfon (Dylox) is usually the insecticide of choice, providing control in about 3 days. Because it is a short-lived insecticide, grubs should have hatched before it is applied.

We are receiving some reports of large white grubs being found during tree planting and other soil work. These are probably 3-year white grubs, May beetle larvae, in their second year. They pupate in late summer, emerge as adults, and stay underground through the winter to emerge next spring. Usually there are not enough to cause serious damage. Marginally damaging numbers can be managed by watering the plants—helping them grow roots faster than the grubs can eat them. In general, insecticides are not very effective against large white grubs. Dylox may be the best choice of the three listed here.

Adult grub beetles are being seen, sometimes in large numbers, in scattered areas in Illinois. These beetles look like masked chafers (annual white grub) —about 1/2-inch, tan June beetles. They are probably a species of May beetle *(Phyllophaga)*, but identification has not been confirmed. Masked chafer emergence this late in the summer is unlikely. The genus *Phyllophaga* contains many species, with a variety of beetle appearances and life cycles. *(Phil Nixon)*

Cicada Killers and Sand Wasps

Cicada killers are very common in Illinois. These large wasps approach 1-1/2 inches long. They have black bodies with yellow bands; their wings are reddish transparent. Females dig holes in the soil into which they drag cicadas and other large insects that they capture. An egg is laid on the paralyzed insect, and the hole covered up. A new hole is built, and the cycle repeats. Males patrol aerial territories, buzzing around people and anything else that enters. Females deliver a painful sting if grabbed barehanded or stepped on while barefoot. Males cannot sting. If possible, learn to coexist with these generally harmless insects. If this is not feasible, applying carbaryl (Sevin) dust to nest openings or sprays of diazinon or permethrin to nesting areas should provide control.

Sand volleyball courts and playgrounds commonly get these and other related sand wasps. Although the chances of stinging are small, the intimidation factor is great; and there may be hundreds of holes per volleyball court. With children or scantily clad adults playing on or diving onto the surface during play, there is a reluctance to use an insecticide. Because these are diurnal insects, if the sand areas can be covered with a tarp during daylight hours, the wasps are likely to abandon the site. Another possibility is to install weed-barrier fabric 3 to 5 inches below the surface. These wasps tend to burrow 6 to 8 inches deep, and the weed barrier should discourage them. We have little experience with either method but feel they should work. If anyone tries them, please contact me with the results. Contact information is at the end of the newsletter. *(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.

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