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## PLANT DISEASES

### Need Some Diagnostic Help?

I am always looking for helpful books, CDs, fact sheets, and Web sites to use in plant problem diagnosis. Here are a few items that you may not have heard about yet but that are extremely helpful to staff at the University of Illinois Plant Clinic.

*Diseases of Woody Ornamentals and Trees in Nurseries*, edited by Ronald K. Jones and D. Michael Benson, 2001. This soft-bound book is 482 pages on disease problems in nurseries, but the information is just as useful to diagnosis of trees planted in landscapes. One hundred and one concise chapters get right to the point, including symptoms, methods of disease spread, and management. There are chapters on general diseases that affect many hosts, chapters by tree host, and chapters on disease management. There are 89 different authors or contributors to the text, mostly plant pathologists working in research or Extension. The pictures are concentrated in one section but include 160 color plates. Amazingly, this book sells for \$89. It is printed by APS (American Phytopathological Society) Press; ISBN number, 0-89054-264-3. Go to the APS Press Web page, <http://www.shopapspress.org/disofwoodora.html>, to learn more about the book and how to order it.

*Abiotic Disorders of Landscape Plants, A Diagnostic Guide*, by Laurence R. Costello, Edward J. Perry, Nelda P. Matheny, J. Michael Henry, and Pamela M. Geisel, 2003. This book is also a soft-cover, keeping cost reasonable. There are 242 pages discussing noninfectious plant problems such as drought, nutrient deficit, wind damage, gas injury, girdling and kinked roots, and graft incompatibility. There are also chapters on diagnosing abiotic disorders, lab analysis of soil, water, and tissue samples, and problems that resemble abiotic disorders. I particularly like the color pictures that are spread throughout the text. This book is a University of California Agriculture and Natural Resources publication, #3420; ISBN number, 1-879906-58-9. The cost is only \$35 on the ANR Communication Services Web site, <http://anrcatalog.ucdavis.edu/InOrder/Shop/Shop.asp>. You can also call (800)994-8849 to order from University of California.

A few new CDs are available from the American Phytopathological Society with images of plant diseases. Their entire CD-ROM collection can be viewed at <http://www.shopapspress.org/titles-by-category-cd-rom-collection.html>. These CDs may be of particular interest: *Diseases of Herbaceous Ornamentals and Roses*, *Diseases of Woody Ornamentals and Trees*, *Nutrient Deficiencies and Toxicities of Plants*. There are also CDs with images of diseases of fruit, vegetables, and turf. Read the terms of use and license agreement before buying CDs. Prices start at \$55. (Nancy Pataky)

### Plant Clinic Hibernates September 15<sup>th</sup>

The University of Illinois Plant Clinic is a seasonal operation. It closes for the season on September 15<sup>th</sup>, 2005. By the time this text goes to press, it will be too late to use the lab for this year. Refer to issue no. 16 of this newsletter for other sources of help with your plant problems. Campus contact names and telephone numbers are listed there. Follow this link to the list of University of Illinois Extension office contacts <http://web.extension.uiuc.edu/cie2/offices/findoffice.cfm>. The Plant Clinic will open for business again on May 1, 2006. (Nancy Pataky)

### Trees: Drought and Disease

In keeping our landscapes looking attractive, we naturally spend time and money providing supplemental water to plants. The drought situation has become severe in the 2005 growing season, and this is just one more appeal to spend time and money watering trees.

Symptoms of drought, or lack of water, include wilting, leaf margin necrosis, leaf drop, and even death of plants. The symptoms may not be so noticeable on trees this season. Trees in prolonged water deficit, as we have experienced this summer, grow more slowly or may stop growing altogether. This can be seen as the amount on stem growth at the tip of the stems. Buds set this year will be small and will affect next year's growth as well. Drought-stressed trees may have smaller than normal leaf size, less intense leaf color, fewer leaves, and possibly early fall color development. If the water deficit lasts a long time, stem tips die and we see typical dieback symptoms and branch decline. Some tree species can withstand the stress of

drought more readily than others.

For this reason, some of your trees may be affected while others are apparent escapes. U of I Extension has a Web site called *Hort Corners*, <http://www.urbanext.uiuc.edu/hort/index.html>, with a section about trees, including a list of trees based on exposure. Trees are listed for sites that may be windy, wet, alkaline, compacted, exposed to salt or pollution, or dry. Trees recommended for dry sites can be found at <http://www.urbanext.uiuc.edu/treeselector/bytolerance.cfm?display=3>. Barring other site stress, those trees would be expected to perform better in drought stress than trees recommended for wet sites.

Other factors can cause the same symptoms as drought stress. In a year like this, it is not too difficult to identify trees with drought symptoms; but keep in mind these other possibilities. Too much water, especially on poorly drained sites, can cause similar symptoms. Often these other factors involve trunk or root injury of some sort. Underground gas leaks, salt damage, wind, sun exposure, insect injury, construction injury, root compaction, and chemical injury are a few possibilities. Look for contributing factors on the site and changes that occur just prior to symptom expression. For example, newly planted trees are more susceptible to drought stress. The roots may take as many as three growing seasons to develop a root system able to withstand moderate drought stress.

Another major drawback to drought stress on trees is increased susceptibility to diseases. Research in Wisconsin has shown that pines growing in a site with water deficit are more likely to become infected with *Sphaeropsis* blight. The *Hypoxyton* fungus is known to infect weakened and dying oaks, causing dieback and decline. Armillaria root rot and many canker pathogens infect weakened trees.

Drought-stressed trees need to be watered now. Although most of the fine roots that absorb water for trees are in the top 8 in. of soil, these fine roots become less absorbent and may shrivel up in extended drought. A greater percentage of water is then necessary deeper in the root zone. It is difficult to give a cookbook method of watering trees because length of drought stress, soil drainage, soil type and texture, competing vegetation, exposure to sun, and other factors vary with each case. For most drought-stress situations in Illinois, water so that the soil is moist to about 10 in. The roots extend far beyond the drip line of a tree, sometimes as much as four times the distance from trunk to branch tips. Concentrate watering in the drip line and beyond. Watering a few inches from the trunk is not very helpful. In periods of drought, water once a week as described above.

If you cannot provide supplemental water to all your landscape trees, concentrate on small trees and

most shrubs. Species to pamper include mountain ash, birch, dogwood, redbud, crabapples, tuliptree, rhododendrons, and azaleas. Keep up this watering during drought until the ground freezes. If water is not provided, expect to do extensive pruning and removal of dead wood next spring. (Nancy Pataky)

### Tuliptree Stress

Have you noticed tuliptrees with scattered yellow leaves and black spots between veins? These leaves may even have green veins like chlorosis, but leaves are scattered in the trees. You certainly will notice them when they fall from trees soon.

The spotting described is not caused by a pathogen. A few affected trees have been assayed for pathogens and none found. This condition is attributed to environmental stress and appears after hot, dry weather in midsummer. I have had a few calls about this condition and would expect more from drought-stricken areas as leaves fall. This appears to be a condition that occurs only in hot, dry weather. We have records of this problem occurring in August of most years. There is a row of tulip trees on campus that shows scattered yellow leaves whenever we have a drought period. This year, the condition has been occurring since about mid-July. Affected leaves will drop early.

What can you do to help the trees? Water them as described in article no. 3 of this newsletter. You can see a picture of affected leaves on page 477 of *Diseases of Trees and Shrubs* by Sinclair, Lyon, and Johnson. (Nancy Pataky)

## INSECTS

### Spruce Spider Mite

Guess what? It is that time of the year for the “cool mites” to be active: In this case, the notorious and “ever popular” spruce spider mite, *Oligonychus ununguis*. As temperatures start to decline, spruce spider mites will be active, feeding on conifers such as arborvitae, Douglas fir, hemlock, juniper, spruce, and some pine species. Spruce spider mites use their styletlike mouthparts to remove plant fluids and chlorophyll (green pigment), which results in foliage appearing bronze or brownish.

Adult mites are oval-shaped and about 1/60 (0.016) inch long. Adults are black or tan; nymphs, light gray-green. Adult females lay round, brown eggs under bud scales or in the axils of needles, which overwinter on plants from September through November. Eggs hatch into nymphs during late summer through early fall (like right now!!!). In general, spruce spider mite takes 3 to 6 days to go from egg to nymph. The nymphs, which are mobile and active, feed mainly on needles—preferring older ones. There may be up to

three generations per year in Illinois, depending on environmental conditions.

Spruce spider mite presence can be determined by knocking the mites off branches onto a white sheet of paper, where they are easier to observe. When spruce spider mites are crushed, they produce a green streak, in contrast to predatory mites, which leave a red streak when crushed.

The primary method of managing spruce spider mite involves properly implementing cultural practices such as watering, fertilizing, and mulching. Providing appropriate moisture and fertility is the best way to avoid plant stress and minimize having to deal with excessive populations of spruce spider mite.

Pest control materials such as bifenthrin (Talstar), hexythiazox (Hexygon), summer oil, and insecticidal soap may be used to manage established spruce spider mite populations. These materials mainly work by contact activity, which means that it is important to thoroughly cover all plant parts with sprays to obtain sufficient mite control. Hexygon is a miticide that primarily has activity on mite eggs. Be sure to consider that improper use of any of these pest control materials can lead to extensive mite outbreaks because most of these materials are nonselective and harmful to the natural enemies of spruce spider mite. One of the best ways to quickly reduce a population of spruce spider mites is a hard spray of water. Although this method may not always be feasible, it removes all the mite life stages (including eggs) from plants and preserves any natural enemies. Exercise extreme caution when using summer oils on blue-needled conifers, as the oil may cause discoloration. As always, be sure to read the label carefully prior to applying any pest control material—with the exception of water, of course.

(Raymond A. Cloyd)

### New Miticides for Outdoor Production

Shuttle and Judo are two new miticides for use in field and container nurseries to control spider mites, including twospotted spider mite (*Tetranychus urticae*) and spruce spider mite (*Oligonychus ununguis*).

**Shuttle** is a miticide also available from Arvesta Corporation (San Francisco, CA). The active ingredient is acequinocyl. The miticide is formulated as a 15% soluble concentrate (SC). Shuttle is primarily active on twospotted spider mite. This miticide works strictly by contact activity, controlling all mite life stages, including eggs. It is fast-acting and provides long-residual control. The mode of action is similar to that of fenpyroximate (Akari) and pyridaben (Sanmite); all three materials are mitochondria electron-transport inhibitors (METIs). However, whereas both Akari and Sanmite work in blocking electron transfer

at Complex I in the mitochondria, Shuttle binds to the Qo center of Complex III, causing inhibition of electron transfer. Regardless, it is still important to avoid using any one of these three in succession in a rotation program. Research conducted at the University of Illinois has demonstrated that Shuttle is extremely effective in controlling twospotted spider mite 28 days after a single application.

Judo is available from OHP Inc. (Bradenton, FL), formerly Olympic Horticultural Products, and contains the active ingredient spiromesifen. The product is formulated as a flowable (suspension concentrate) containing 4.0 lb of active ingredient per gallon or 480 grams active ingredient per liter. Judo has a unique mode of action compared to the other insecticide/miticides currently available. The active ingredient works as a lipid biosynthesis inhibitor. Lipids are a group of compounds made up of carbon and hydrogen. They include fatty acids, oils, and waxes. Lipid molecules are responsible for a number of functions such as cell structure in membranes and sources of energy. No other commercially available product has this mode of action. Judo is similar to pyridaben (Sanmite) in terms of target pests, with activity on both mites (twospotted spider mite) and whiteflies. The material is active on all life stages—even the eggs—of both mites and whiteflies. The label rate is 2 to 4 oz per 100 gal. Judo has translaminar properties providing up to 30 days of residual activity, similar to other miticides, including hexythiazox (Hexygon), bifenazate (Floramite), and abamectin (Avid). The restricted-entry interval (REI) is 12 hours. Our research at the U of I has shown that one application of Judo is very effective in controlling twospotted spider mite for up to 14 days. (Raymond A. Cloyd)

### Scouting Watch

**Sod webworm** moths were reported last week flying in high numbers on golf courses and lawns. These are light-colored, tan moths about one inch long whose wings fit tight against the body, looking tubelike when sitting on the grass or near lights at night. They have elongated palps that look like a snout sticking out of the front of the head. These moths lay eggs as they fly across the turf in their jerky motion. They typically do not fly higher than your head or more than 30 feet or so before landing. If the drought continues, spray bifenthrin (Talstar), carbaryl (Sevin), halofenozide (Mach 2), spinosad (Conserve), or trichlorfon (Dylox) about 2 weeks after peak moth flight. This will coincide with newly hatched larvae, which eat the

grass blades at night. There is a microsporidian, like a bacterial fungus, that is common and kills the larvae. However, it is most effective when it is moist, which is why sod webworms are usually not a problem in irrigated areas or years with timely rainfall. It is this need of moisture by the microsporidian that causes sod webworm damage to be more severe on berms and south-facing slopes.

**Galls** are numerous on oaks throughout the state. Many of these are leaf galls that look like spiny balls, called hedgehog galls, or shallow cups, called oak spangles. Most oak galls are caused by cynipid wasps, although oak spangles is caused by a gall midge, a tiny fly. Although galls are noticed by clientele, only the gouty oak gall and horned oak gall that are woody and girdle twigs appear to harm the tree. We do not recommend control of any other oak galls. In addition, any control efforts must be made before the gall forms, when the eggs are hatching and before the larvae get established in the plant tissue. For most gall insects, not enough is known about the biology and life cycle to know when egg hatch occurs.

**Bagworms** have pupated, meaning that insecticide applications will not be effective until next June or July. If you can afford the labor, next year's infestations can be greatly reduced by hand-picking the bags through the winter and into June before the eggs hatch. About every other bag will be a female bag that contains 300 to 1,000 eggs. Do not drop the bags on the ground because the larvae will hatch out next spring and crawl up the tree or any nearby upright object. They will then balloon to susceptible trees. Destroy the bags by burning or put them in the trash.

**Asian longhorned beetle** eradication appears to be progressing well. As of early September, no beetles or infested trees have been reported in Illinois by the Illinois Department of Agriculture and the U.S. Animal and Plant Health Inspection Service. This follows the small numbers of four in 2004 and eight in 2003, all in the Ravenswood area of Chicago.

**West Nile virus** continues to be a problem in Illinois this year; so far, there have been 105 human cases, with two deaths in the state. Hot, dry weather is conducive to the northern house mosquito, *Culex pipiens pipiens*, the main transmitter of this disease. It prefers to lay its eggs in putrid, stagnant water common during droughts in tree holes, clogged gutters, old tires, tin cans, wading pools, bird baths, and other containers. Clean these out or dump and refill them weekly. Use insect repellent to protect yourself from disease-carrying mosquito bites, particularly in the evening and early morning when this mosquito is most active. (*Phil Nixon*)

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*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. For subscription information, phone (217)333-2666 or (800)345-6087, or e-mail [acesnews@uiuc.edu](mailto:acesnews@uiuc.edu). Web subscriptions are available (<http://www.ag.uiuc.edu/cespubs/hyg>).

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