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PLANT DISEASES

Opportunity for Ash Problem Education

I am a plant pathologist, so logically, my newsletter articles typically focus on disease problems. Recently, however, I became aware of an educational opportunity that involves more than diseases and should be valuable to professionals dealing with ash tree problems. In issue 14, we discussed difficulties in distinguishing between ash yellows, ash decline, and Verticillium wilt. From the disease aspect alone, a seminar on ash problems would be wonderful. This seminar and workshop put on by the Morton Arboretum has much more to offer. Here is the scoop.

The ash seminar is 8 a.m. to 4 p.m. on Friday, November 14, 2003. There is also a separate ash workshop scheduled for Saturday, November 15, from 8 a.m. to 3:30 p.m. You can register for either day or both. The location for the seminar is the Thornhill Education Center at the Morton Arboretum in Lisle, Illinois. The workshop will be at the arboretum research center and will incorporate both field and classroom diagnostic skills and management strategies. Topics include ash species for the Midwest, disease threats to ash, insect pests of ash trees, the emerald ash borer, insects and the state borders, and planting limitations and possibilities for ash. There will be a tour of the Morton Arboretum ash collection.

Besides the excellent arboretum staff, seminar speakers include Wayne Sinclair of *Diseases of Trees and Shrubs* acclaim; Stanton Gill from the University of Maryland; David Roberts of Michigan State University; Stan Smith, who recently retired from the Illinois Department of Agriculture; and Rex Bastian of Hendrickson the Care of Trees.

CEUs are available for both days for some organizations, including at least INA and ILCA. Check with the arboretum staff to determine whether your organization is offering CEUs. The class fee is $117 for day one, $98 for day two, or $190 for both. For further information, to request a brochure, or to register, please call The Morton Arboretum at (630)719-2468. *(Nancy Pataky)*

Confirmations of Bacterial Leaf Scorch

Bacterial leaf scorch (BLS), caused by *Xylella fastidiosa*, was confirmed in Illinois a few years ago on oak. Although it may occur on elm, oak, sycamore, mulberry, sweetgum, sugar maple, and red maple, it has been confirmed through the Plant Clinic in Illinois only on pin, shingle, and bur oak species. Clinic samples are sent to a private testing lab in Indiana—Agdia, Inc. There an ELISA (enzyme-linked immunosorbent assay) test can be performed on the fresh stem, leaf, and petiole tissues. Agdia lists a large host range for *Xylella fastidiosa*, including at least 28 families of both monocots and dicots.

In 2003, the Plant Clinic sent nine Illinois oak samples to Agdia for BLS testing. Six were positive, including red and pin oaks from Champaign County and a white oak from Cook County. Why should we be concerned if BLS is present in Illinois? This disease is not just an aesthetic problem to a tree. It can kill a mature tree in 3 to 6 years. Read the details about this disease in issue 13 and learn to recognize the symptoms of BLS. *(Nancy Pataky)*

How to Prevent Plant Disease

Most of us readily accept the notion that, if we take care of ourselves, we are less likely to have health problems. Of course, there is no guarantee that we won't become ill; but our own actions often prevent disease problems. Why then is it so difficult to convince homeowners that action now can help prevent plant disease problems next year in their plants? Plant health is an important management tool for disease and insect problem prevention. Taking the part of the devil's advocate, I suppose we won't ever really know our actions did any good: If we don't see the disease or insect, then we assume it must never have been a threat. Please trust horticulture and plant pathology specialists on this topic. Research has shown over and over again that stressed plants are more susceptible to disease, more likely to be injured by insect infestations, and more likely to decline than vigorous plants that are not under stress.

Many gardeners wait until a problem occurs, then scramble to correct it. The next step usually involves asking for a quick chemical cure (which usually does not exist). Consider instead what can be done now to help prevent future disease problems in the lawn and garden. Many disease problems are best controlled with preventive measures. Chemical rescue treatments may act as temporary Band-Aids but are usually not the answer for long-term disease control.

These fall lawn and garden cleanup procedures help prepare plants for winter while discouraging development of disease problems.

1. Keep grass mowed until it stops growing. This helps prevent winter injury and damage from fungal snow mold diseases. Remove leaves from grass in the fall, also to prevent snow mold development.
2. Prune oak trees in the dormant season to reduce the risk of oak wilt. Pruning from September to early March is recommended because pruning during the growing season causes sap flow, attracting bark beetles, which may transmit the oak wilt fungus.
3. Prune trees and shrubs to remove all dead and seriously cankered wood, as well as any crossing and interfering branches. Opening up the center of woody plants helps promote faster drying, lets in more light, and reduces foliar and stem diseases. This is a common practice to help prevent fire blight on rosaceous hosts, anthracnose and fungal leaf spots of trees, bacterial leaf spot of *Prunus* species, as well as many other diseases.
4. Provide winter protection for roses, evergreens, thin-barked young trees, and other sensitive plants. Winter injury causes wounds that become infected with secondary canker fungi. Many of the rose cane cankers infect such injuries.
5. Prune tree and bush fruits according to recommendations by University of Illinois Extension horticulturists. Pruning at the wrong time can cause more cankering and dieback.
6. Remove and burn (where possible), compost, or bury plant debris to help reduce foliar and stem disease next year. It is usually safe to compost any leaf material, but diseased stem and root tissues should be burned or buried, not included in a compost pile.
7. Look over a variety of seed and nursery catalogs. Select resistant varieties and plant them where you've had problems in the past but have no rotation options. Choosing disease-resistant hybrids, varieties, and species is usually the least expensive and best long-term method of disease control. If you have had problems with scab on crabapple, consider replacement with a scab-resistant variety showing flower and fruit color that you prefer. Try to obtain a variety that is also resistant to powdery mildew and rust.
8. Make a map of your flower and vegetable gardens. Rotate annuals to another area of the garden to reduce soilborne pathogens that cause Rhizoctonia and Fusarium root rots. Now is also a great time to make soil amendments to improve soil drainage. Phytophthora and Pythium root rots are known problems in poorly drained areas.
9. Divide perennial flowers (where appropriate), remove rotted or diseased parts, and replant in a new location. Let the cut edges dry a day or two before replanting to avoid soft rot bacteria and other soilborne root rots.
10. Water stressed trees and shrubs periodically until hard frost. Much of Illinois experienced 6 to 8 weeks of drought in the summer of 2002, a dry fall and winter, and additional drought stress this past summer. Trees and shrubs suffer root injury in those times but may not show wilting. Plants exhibiting early fall color, leaf rolling, or dieback are stressed plants. Water them to promote root growth now. Late-fall or early-spring fertilization with a balanced fertilizer helps promote growth on these stressed plants.

Of course, these measures cannot guarantee a lack of plant disease in your garden, but they can help reduce disease incidence. *(Nancy Pataky)*

INSECTS

Asian Longhorned Beetle

Asian longhorned beetle is in the news again, with a new infestation being found in the Toronto, Canada, area. This infestation appears to be limited to an area of about four square blocks in an industrial area of the city. In the Chicago area, eradication efforts are being successful, with two areas declared eradicated last fall. No infestations have been found so far this year. If that trend holds, two more areas will be declared eradicated at the end of 2003. This will leave only the Ravenswood area of Chicago. If no more infestations are found, it will be declared to be free of the beetle in 2008. Unfortunately, the New York City infestation continues to spread, so it does not appear that eradication of the beetle in North America is in the near future.

In the meantime, it is important to remain vigilant for signs of this insect. It attacks a variety of trees, including maple, box elder, poplar, plum, alder, birch, willow, horsechestnut, elm, ash, and hackberry. The adult beetle emerges through a hole that is perfectly round and 3/8 to 1/2 inch in diameter. The beetles are shiny black and about 1-1/4 inches long. They have long antennae banded in black and white, and the back of the beetle has about 40 white spots of various sizes.

After mating, the female chews a 1/4-inch-diameter hole with sloping sides through the bark, laying an egg in the cambium area. This type of hole is diagnostic for this pest, not being produced by any other insect in North America. The egg hatches into a larva that tunnels extensively through the cambium area before eventually tunneling deeper into the wood. Larvae are legless, white, and elongate, with a brown head area. Full-grown larvae approach 3 inches in length and create large tunnels through the wood. Infested trees show severe dieback of the canopy.

The larva pupates in the tunnel that it creates, with the adult chewing the large, round hole in the bark through which it emerges. Adult emergence is most common during June and July, but adults have been found from spring to December. The adult beetles can fly at least 0.6 mile but most commonly only fly to the next host tree, which may be a very short distance.

Funding and other support from the City of Chicago, Illinois Department of Agriculture, USDA–APHIS, and other federal agencies have allowed the quick removal of infested trees. Infested trees are chipped into pieces small enough to kill any larvae, pupae, and adults—and then burned, which kills all stages of this beetle. Removed trees have been replaced with support from the City of Chicago. Potential host trees outside the core-infestation areas were treated with Mauget-applied Imicide (imidacloprid) to kill egg-laying adults, larvae, and emerging adults. *(Phil Nixon)*

Bark Beetles

Bark beetles can be destructive pests in forests and urban landscapes. Urban expansion, which generally involves forests that are cleared to make room for new housing or commercial development, can be stressful to trees that remain, thus increasing susceptibility to bark beetles. Most of the plant-damaging bark beetles that feed on stressed trees are in the family Scolytidae. There are two groups: bark beetles and ambrosia beetles. Ambrosia beetles cultivate and feed on a fungus called “ambrosia” that stains wood and reduces the value of timber. Most bark and ambrosia beetle species tend to live in recently cut, injured, or unthrifty trees that are in the process of dying. Older trees are usually not attractive to beetles. However, certain species do prefer trees that are completely dead, whereas other species normally attack and kill healthy, vigorous trees.

Bark beetles live under the bark of trees, right at the surface of the wood, and feed on phloem tissue. In general, beetles complete one generation in the tree, then abandon it, and search for another suitable tree for development. The major genera of bark beetles are *Dendroctonus*, *Ips*, and *Scolytus*. Certain species of *Ips* and *Scolytus*, because they etch the sapwood, are referred to as “engravers.”

Bark beetles are small, cylindrical, and less than 8 mm in length. They are typically brown to red in color. Many bark beetles are specific in the tree species they attack. Bark beetles reproduce in the thin layer of plant tissue between the bark and wood. After tunneling through the bark, the female beetle excavates a gallery in the inner face of the bark and the wood. The female then chews small niches in the sides of this gallery and lays a single egg in each. Adults protect the eggs (and larvae that emerge) by remaining in the gallery system to prevent entry by natural enemies such as parasitoids and predators into the galleries. The eggs hatch into legless white larvae that chew and create their own galleries, which are at right angles to the galleries where the eggs were laid. After several weeks to several months, depending on the species of bark beetle, the larvae reach maturity, and pupate in the tunnels. Larvae transform into adults that chew through the bark to the surface. Bark beetles normally overwinter beneath the bark.

Bark beetles tend to feed on dying trees although they may attack living trees, particularly conifers, and kill them. However, bark beetles can successfully colonize healthy conifers only when they overwhelm the tree defenses by mass attack. Adults and larvae interrupt nutrient flow by feeding in the phloem. Trees infested with bark beetles exhibit characteristics such as faded foliage at the top or middle of the tree canopy and reddish brown frass or hardened pitch tubes on the trunk.

Bark beetles are also capable of transmitting diseases. For example, Dutch elm disease, which is responsible for the decline of American elms throughout the United States, is vectored by two bark beetles: the smaller European elm bark beetle, *Scolytus multistriatus*, and the native elm bark beetle, *Hylurgopinus rufipes*. In general, the fungus is introduced by the adult beetle and spread by the larvae. The fungus

spreads inward and causes the plugging of the water transport system (xylem).

Trees can differ significantly in their susceptibility to bark beetle attack, depending on location, vigor, age, and physiology. Trees growing on poor sites tend to be attacked more than trees growing on choice sites because considerably more beetles are required to kill a vigorously growing tree than a tree growing at a slower rate. Bark beetles primarily attack drought-stressed trees. They generally overwhelm a tree's defenses by inundating it with sheer numbers of beetles. Beetles release pheromones, which attract other beetles to a site. In addition, females and males are attracted to the odors or chemicals produced by drought-stressed trees. For example, many trees that are drought-stressed emit an abundance of volatile chemicals such as terpenes, particularly alpha-pinene, which attracts bark beetles to stressed conifers. Also, drought-stressed trees have lower defenses than healthy trees. For example, the production of the defense chemical oleoresin is linked to the colonization success of bark beetles: Trees with low levels tend to be attacked by greater numbers of bark beetles than are trees that produce high quantities.

As plants dry up or dehydrate during droughty conditions, cavitations (collapse) of the water columns in the xylem tissue produce acoustical, ultrasonic, emissions that are sensed by bark beetles, which aids them in detecting drought-stressed trees.

The primary strategy to avoid dealing with bark beetles is maintaining the health of trees through proper watering, fertility, mulching, pruning, and eliminating any stress, such as mechanical injury caused by mowers or weed-whackers. *(Raymond A. Cloyd)*

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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 and typeset by Virginia Cuppernell, Information Technology and Communication Services.

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