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HOME, YARD & GARDEN PEST NEWSLETTER
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Greenhouse Management Workshop

The 6th Annual Greenhouse Management Workshop will be August 12, 2004, in Bloomington at the University of Illinois Extension Office, 402 N. Hershey Road. The workshop is scheduled from 9 a.m. to 4 p.m. Registration cost is $30 per person for Illinois Greenhouse Association (IGA) members and $45 for nonmembers. Preregistration must be received by July 31, 2004. If you have questions, please feel free to contact Raymond A. Cloyd, (217)244-7218, phone; (217)244-3469, fax; or rcloyd@uiuc.edu, email.

PLANT DISEASES

Leaf Scorch

You have probably seen environmental leaf scorch before. The leaf edges turn brown, and sometimes that necrosis moves between veins as well. Another kind of scorch you need to be aware of is bacterial leaf scorch (BLS). Although environmental leaf scorch is not pretty, it does not kill trees as does BLS.

"Leaf Scorch of Woody Plants," *Report on Plant Disease*, no. 620, is available on the Internet at http://www.ag.uiuc.edu/%7Evista/horticul.htm or in local Extension offices. The report discusses symptoms, causes, and management of scorch. We usually see environmental scorch on trees and shrubs after prolonged periods of dry, windy weather in the spring and summer. The same could occur after extremely wet, windy conditions. Scorch is also common on trees in new subdivisions or on newly transplanted trees and shrubs with inadequate root establishment. Any factor that inhibits water absorption by roots may result in leaf scorch. Environmental leaf scorch is not infectious and does not move from plant to plant. Of course, plants in a similar environment with similar root stress would be expected to show these symptoms, so sometimes the problem seems to spread. Look for healthy, live buds and live, new stem material as an indication of the plant's ability to recover. Scrape the new growth with your fingernail. It should be green under the bark. Live buds are green inside.

Bacterial leaf scorch is an infectious plant disease caused by a bacterium called *Xylella fastidiosa*. It may cause initial symptoms similar to environmental scorch, but symptoms appear in midsummer to late summer. Each spring, the tree leafs out normally; but by midsummer, the symptoms spread further in the tree. By the fourth season, the tree may be dead.

The most frequent hosts of this disease in the United States include elm, oak, sycamore, mulberry, sweetgum, sugar maple, and red maple. Oak seems to be our most common host species in Illinois. We have confirmed it on pin, red, shingle, bur, and white oaks. Kentucky reports BLS on pin, red, scarlet, bur, white, willow, and shingle oaks; silver, sugar, and red maples; sweetgum, sycamore, planetree, hackberry, American elm, and red mulberry. Look for scorch symptoms that occur in early summer to midsummer and then intensify in late summer. The scorched leaf edges or tissue between veins may be bordered by a yellow or reddish brown color, but not in all cases. The symptoms occur first on one branch or section of branches and slowly spread in the tree from year to year. It is a situation that you hope will be better next year but only gets worse. If you have seen a slow but progessive decline in your oak, leaf scorch symptoms showing each July to August, and fall leaf drop about a month ahead of healthy oaks, BLS may be present.

The bacterial pathogen is found only in xylem tissue. Xylem-feeding leafhoppers and spittlebugs are thought to spread the bacterium in landscape trees. It can also be transmitted between trees through root grafts. The transmission methods must not be very effective, though, because we do not see rapid spread of the disease from tree to tree.

The bacterial pathogen cannot be isolated in the lab as most other bacteria. It can be confirmed using serological techniques. We cannot test for this bacterium at the Plant Clinic, so we send our samples to a private lab such as AGDIA, Inc. That lab has a serological (polyclonal antibody) test for the bacterium that can be done on young twigs and leaves. There is a fee. As of this writing, the fee was $48.25 for one sample and $6.25 for each additional sample using the same test. It is suggested that you call ahead to be certain you have properly prepared the sample. Leaf petiole tissue is preferred for this test, so leaves with green petioles are the usual request. Consult AGDIA at http://www.agdia.com or call them at (219)264-2014 or (800)62-AGDIA. If you prefer to go through the

Plant Clinic with your sample, we can test for other problems but would have to bill for AGDIA testing as well. Call if you have questions.

What can you do if bacterial scorch is present? There is probably nothing you can do to keep the tree from dying. You can help by pruning out dead wood as it appears. Start thinking of tree-replacement options and plant something that is not known to host this disease. Be sure to pick a species that does well in the site. Investigate drainage pattern, soil type, amount of sunlight, and any oddities of the location. No fungicides, insecticides, or bactericides can be sprayed on a tree to positively, effectively prevent or cure this disease. There is an antibiotic called oxytetracycline present in some commercially available injectable products intended to combat *Xylella*. There is not a great deal of research in this area; but work shows that in some cases, oxytetracycline suppresses *Xylella* and may provide temporary symptom suppression when injected into trees. Researchers in Kentucky have tried such injections and do not see any benefit. National Park Service researchers have seen only short-term benefits. Injections may need to be repeated as frequently as every year, can be costly, and afford no guarantees. *(Nancy Pataky)*

Ash Problems

Ash problems have begun to appear at the Plant Clinic again this year. Earlier in the season, we saw considerable ash **anthracnose**. That fungal disease causes brown to black spots on the leaves, followed by considerable leaf drop. Anthracnose is worse in cool, wet weather as leaves emerge. Usually, a new flush of leaves emerges later, in warmer, drier conditions; and ash anthracnose does not appear again. This year, we had cool, wet weather early, followed by hot, wet weather and then cool, wet weather again. It would not be surprising to see a second wave of anthracnose on ashes. If anthracnose is the problem, leaf spots are present. Refer to *Report on Plant Disease*, no. 621, "Anthracnose Diseases of Shade Trees," available in Extension offices or on the Internet at http://www.ag.uiuc.edu/%7Evista/horticul.htm.

Another problem of late on ash trees is curling of new leaves and petioles. This symptom could be due to **herbicide drift**. Look for a pattern on your tree. Drift from application of a plant-growth-regulator herbicide (PGR) such as 2,4-D or dicamba can cause leaf curling on trees. Ash and redbud seem to be particularly sensitive. Look for a pattern in the landscape. Drift causes injury that is more severe on one side, usually the side exposed to wind. Also look for the same curling on other nearby broadleaf plants. Lawn herbicides can cause this injury, as can PGR herbicides applied to rights-of-way, fence rows, and agricultural fields. Some insects cause curling, so look closely for insects and insect injury.

One possible cause of decline in ash is **ash yellows**. This disease primarily infects white and green ash in the north-central and northeastern parts of the United States. It is a problem in Illinois, but one that is difficult to quantify because its presence is difficult to confirm. Ash yellows disease is caused by a phytoplasma (formerly called a mycoplasma-like organism). These pathogens are somewhat like virus particles, cannot be cultured in a lab, and are spread by phloem-feeding insects. They are limited to the phloem tissue of the tree. This disease is characterized by a loss of vigor over a period of 2 to 10 years before the tree dies. Symptoms include short internodes and tufting of foliage at branch ends. Leaves become pale green to chlorotic (yellowed) and might develop fall colors prematurely. The tree might defoliate, and the canopy generally appears sparse. Cankers form on branches and the trunk, causing twigs and branches to die back. Witches'-broom sprouts of growth might appear on some branches but are more common on the trunk near the ground. Cracks in the trunk may appear in this area as well.

Ash decline is a term that is often used loosely by many diagnosticians to refer to more than one condition. I think this problem is very common on Illinois ash trees. Ash decline might involve the ash yellows disease or even Verticillium wilt, but it is often used to indicate any decline of ash for which no single pathogenic cause has been identified. Ash decline usually includes branch tip death, defoliation of enough leaves to give the tree a sparse look, and a slow decline of the tree over a number of years. Trees with ash decline may appear to recover each spring and then decline once again in July and August.

To complicate matters, **Verticillium wilt** on ash also results in cankers and dieback and does not cause the typical vascular discoloration of most *Verticillium* infections. Refer to *Report on Plant Disease*, no. 1010, for more information on Verticillium wilt. It is difficult and time-consuming to distinguish between ash yellows, Verticillium wilt, and ash decline in Illinois. Diagnosis of these ash problems is dependent almost entirely on symptoms that could be caused by a variety of problems.

Ash yellows disease is caused by a phytoplasma, which is a phloem-inhabiting pathogen. It cannot be cultured in the laboratory on artificial media. Some testing services that offer specific PCR (polymerase chain reaction) tests can detect phytoplasmas in plant tissues. This is not a service offered at the University of Illinois Plant Clinic. AGDIA, Inc., a company in

Indiana has such a service. You can read about AGDIA at http://www.agdia.com/. There are likely other labs that can help. The cost for phytoplasma testing varies with the number of samples being tested. The procedure is very time-consuming and involves expensive equipment, so unit costs are lower when multiple samples are run. The cost ranges from $134 to $315. Turn-around time affects the cost; so if you need results quickly, it costs more. For this test, AGDIA would need live, thick bark from the base of the tree. It must include phloem tissues and must be deep enough to prevent phloem tissue from drying out. It is advised that you call the testing service of choice before sending a sample. It is obvious why this disease has not been confirmed frequently in Illinois.

Verticillium wilt can be detected by traditional laboratory isolations of live leaf petioles at the Plant Clinic. Ash decline cannot be confirmed with laboratory isolations because there are many factors involved, many of which are nonpathogenic. Sometimes Verticillium is involved, sometimes ash yellows, and always some sort of site or environmental stress.

There are no cures for any of these ash maladies. Suggested management to slow disease progression includes removing trees with severe dieback, watering trees in periods of extended drought of 2 weeks, and using a balanced tree fertilizer in the fall. Removing dead limbs may help. I have heard some very good testimonials involving the value of fertilization and watering to ash tree recovery. *(Nancy Pataky)*

Yucca Leaf Spots

We tend to see fungal leaf spots and blights in spring and early summer. For many diseases, this is because weather conditions are conducive to infection and the new foliage is most susceptible. Once leaves develop a thickened cuticle, they are more resistant.

Yuccas are occasionally bothered by fungal leaf spots, and this year's weather encouraged infection. Several fungi, including *Cercospora, Cylindrosporium,* and *Coniothyrium* may cause leaf spoting but do not cause widespread death of leaves. Coniothyrium leaf spot seems to be the most common of these. It is also known as brown leaf spot because the lesions turn brown. Often a yellow halo is present. Remove leaves that are spotted or shriveled because the fungus continues to sporulate on those leaves. Avoid overhead irrigation and consider the use of a fungicide to get the disease under control if overhead irrigation cannot be avoided. Weekly applications of copper fungicides or Bordeaux mix help stop disease spread. Be sure to check the label of the chosen product for clearance on yucca, recommended rates, and timing before making any applications. *(Nancy Pataky)*

INSECTS

Why Do Japanese Beetle Adults Feed on Certain Plant Types?

Japanese beetle, *Popillia japonica,* adults are a major insect pest of cultivated plants in landscapes because they feed on a wide variety of plant types (> 300 plant species), including annuals, perennials, trees, shrubs, and vines. However, certain plant types are more susceptible to attack than others (refer to Table 1, p. 4) although there may be considerable variation among susceptible plant types, especially birch, crabapple, elm, and linden. In contrast, a number of plants are less susceptible to attack by Japanese beetle adults. These plants are listed in Table 2, p. 4.

A number of factors influence the level of plant susceptibility to Japanese beetle adult feeding, including amount of sunlight plants receive and flower color. For example, Japanese beetles prefer to feed on roses located in full sun, whereas roses located in wooded areas are seldom attacked. White and yellow rose flowers tend to attract more Japanese beetle adults, thus suffering more extensive flower damage than darker colors such as apricot, orange, pink, mauve, and red.

Japanese beetles also use plant odors and damage-induced plant volatiles to locate plants. They are attracted to a complex of volatile compounds produced by plants. Studies have demonstrated that leaves of plants that have been fed upon by adult Japanese beetles (and even other herbivores) produce induced odors that attract additional adult beetles. Leaves damaged by Japanese beetle adults produce a complex mixture of aliphatic compounds, phenylpropanoid-derived compounds, and terpenoids. Research has also shown that natural sugar content and presence of odoriferous substances are important factors in determining the susceptibility of plants to attack by Japanese beetle adults. For example, plants with higher amounts of the reducing sugar dextrose suffer greater damage from adult beetles than plants with lower amounts of dextrose.

Chemical odors have also been implicated in the attractiveness of certain plants to Japanese beetles. The ornamental tree, *Ginkgo biloba,* which is not typically attacked by adult Japanese beetles, lacks certain chemical odors that are attractive to them. However, many susceptible plants such as rose and apple contain the substance geraniol, which is highly attractive to Japanese beetle adults. It is important to note that when Japanese beetle adult populations are excessive and food is a limiting factor, plants that are supposedly less susceptible to adult Japanese beetle feeding may be fed upon. *(Raymond A. Cloyd)*

Table 1. Ornamental plants highly susceptible to feeding by Japanese beetle, *Popillia japonica* adults.

Japanese maple *(Acer palmatum)*
Norway maple *(Acer platanoides)*
Gray birch *(Betula populifolia)*
Horsechestnut *(Aesculus* spp.)
Black walnut *(Juglans nigra)*
Sassafras *(Sassafras* spp.)
American elm *(Ulmus americana)*
Althea *(Althaea* spp.)
London planetree *(Platanus x acerifolia)*
Rose *(Rosa* spp.)
Black cherry *(Prunus serotina)*
Crabapple *(Malus* spp.)
American mountain ash *(Sorbus americana)*
Lombardy poplar *(Populus nigra* 'Italica')
Pussy willow *(Salix discolor)*
American linden *(Tilia americana)*

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.

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Table 2. Ornamental plants less susceptible to feeding by Japanese beetle, *Popillia japonica* adults.

Red maple *(Acer rubrum)*
Silver maple *(Acer saccharinum)*
American holly *(Ilex opaca)*
Boxwood *(Buxus* spp.)
Snowberry *(Symphoricarpos* spp.)
Winged euonymus *(Euonymus alata)*
Flowering dogwood *(Cornus florida)*
White cedar *(Thuja occidentalis)*
Yellow poplar *(Liriodendron tulipifera)*
Saucer magnolia *(Magnolia x Soulangiana)*
White ash *(Fraxinus americana)*
Green ash *(Fraxinus pennsylvanica)*
Lilac *(Syringa* spp.)
Norway spruce *(Picea abies)*
Scotch pine *(Pinus sylvestris)*
Douglas fir *(Pseudotsuga menziesii)*
Canadian hemlock *(Tsuga canadensis)*
Mock orange *(Philadelphus* spp.)
Hydrangea *(Hydrangea* spp.)
Yew *(Taxus* spp.)
Forsythia *(Forsythia* spp.)

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