UNIVERSITY OF ILLINOIS EXTENSION
HOME, YARD & GARDEN PEST NEWSLETTER
College of Agricultural, Consumer and Environmental Sciences, University of Illinois at Urbana-Champaign
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INSECTS

White Grub Damage

We are receiving reports of white grub damage to turf in east-central Illinois. We have been surprised that damage has not been reported earlier considering the size of the grub adult flight and turf moisture conditions during egg laying. Realize that the grubs are getting larger, resulting in each grub eating more. Typically, fall rainfall helps the turf roots grow faster than the grubs can eat them, but a dry spell can make the turf susceptible to damage.

One acceptable strategy to avoid grub damage at this time of year is irrigation during dry periods. This keeps the grass roots growing fast enough to feed both the plants and a marginally damaging grub population.

Insecticides applied should be those that act quickly. Trichlorfon (Dylox, Proxol) kills grubs in 3 days but may break down in 5 to 7 days. Bendiocarb (Turcam) and diazinon are also effective. Remember that diazinon can't be applied to golf courses and sod farms. Diazinon also takes up to 3 weeks to kill the grubs, although apparently the grubs don't feed during that time. At this time of year, the grubs move vertically through the soil in relation to moisture. If the turf area is dry, irrigate a day or two before insecticide treatment to bring the grubs up into the root zone where they can be controlled. *(Phil Nixon)*

Effect of Water pH on Pest-Control Materials

Resistance is often blamed for the failure of an insecticide or miticide to manage a given pest or pests. However, another possible reason for lack of control may have to do with the pH of the spray solution. pH is a measurement of the concentration of hydrogen ions [H^+] in a solution. It is a scale indicating the degree of acidic and basic properties of water. The pH scale ranges from 0 to 14. A pH value below 7 is acidic, whereas a pH value above 7 is basic or alkaline. A pH of 7 is considered neutral.

Many common insecticides and miticides are susceptible to breakdown if the pH of the water is not within an acceptable range. When the pH is greater than 7, a process known as alkaline hydrolysis occurs. Alkaline hydrolysis is a degradation process in which the alkaline water breaks apart insecticide or miticide molecules. This process releases individual ions (electrically charged atoms), which may then reassemble with other ions. These new combinations may not have any insecticidal or miticidal properties.

Insecticides and miticides are more susceptible to alkaline hydrolysis than fungicides and herbicides. Many insecticides and miticides degrade under alkaline conditions. For example, Malathion, Kelthane, Dylox, and Turcam are very sensitive, degenerating within a few hours after being diluted in alkaline water. In general, the carbamate (for example, Sevin) and organophosphate (for example, Dursban) chemical classes are more susceptible than chlorinated hydrocarbons (for example, Lindane) or pyrethroids (for example, Talstar). However, other pest-control materials can be affected by high pHs. For example, a pH above 8 can reduce the efficacy of the *Bacillus thuringiensis* (Dipel, Thuricide, and Javelin) toxin and the insect-growth regulator azadirachtin (Azatin).

Higher temperatures can increase the rate of insecticide degradation. Alkaline hydrolysis occurs more rapidly when temperatures are high. For example, at a pH of 9 and a water temperature of 77°F, acephate (Orthene) loses 50% of its activity in about 5 days, and fenvalerate (Mavrik) loses 50% of its activity in 1 to 2 days.

The following are ways to avoid water pH problems:

1. Follow manufacturer directions regarding the desired water pH. The ideal pH range for most insecticides and miticides is between 5.5 to 6.0.
2. Regularly test water pH because the pH of water can change during the season.
3. Apply insecticides and miticides as soon as possible after mixing. It is advisable to use a spray mixture within 6 hours or less to avoid potential pH problems.

4. Don't leave insecticides or miticides sitting in a spray tank for an extended time.
5. Adjust water pH with buffers or water-conditioning agents. Buffers or water-conditioning agents are compounds that reduce the damage caused by alkaline hydrolysis and adjust the pH of the spray solution to maintain it within a pH range of 4 to 6. In addition, other materials, such as vinegar (acetic acid), are often used to acidify water. *(Raymond Cloyd)*

PLANT DISEASES

Disease Avoidance or "What Could I Have Done to Prevent This?"

Of the hundreds of tree, shrub, and herbaceous plant samples submitted each year to the Plant Clinic, only about 15% are actually disease problems. A great percentage are problems that can be traced to poor horticultural choices, such as the wrong plant for the location (pin oak in a high-pH soil, leading to iron chlorosis), lack of soil improvement before planting (rhododendron in a tight soil, predisposing it to Phytophthora root rot), poor planning (five trees in the space needed for one mature tree, setting up a decline syndrome), or similar situations. We tend to go with our hearts in plant selection rather than our brains, and we don't always follow time-tested advice about plants.

Here is some advice that you should follow now to avoid problems later. Hopefully you will also save time and money in the spring. Too busy to bother? Weather too wet to work in the yard? If you choose to ignore this advice, then next spring you can expect to perform extensive pruning of dead canes on your roses (from canker disease), to replace plants that have been frost heaved out of the soil, to replace turf that has been molding under the snow (Fusarium snow mold), and to deal with plant diseases of stressed plants (including cankers, wood rots, root rots, and decline). Of course, none of these problems is fatal, but you do have some choices to make now.

In many cases, once a pathogen infects a plant, the plant and the homeowner have to deal with it for the life of the plant. A good example is Cytospora canker of spruce (see issue no. 15). The fungus invades trees under stress. Management practices include pruning, watering, and fertilizing to establish tree vitality, but the fungus will remain in the tree until its death.

Many disease problems are best controlled with preventive measures. Chemical-rescue treatments may act as temporary solutions but are usually not the answer for long-term disease control. These fall lawn and garden cleanup procedures will help prepare plants for winter and discourage development of disease problems.

1. Keep grass mowed until it stops growing. This helps prevent winter injury and damage from fungal snow molds.
2. Prune oak trees in the dormant season so as not to increase the risk of oak wilt. Pruning from September to early March is recommended because pruning during the growing season releases sap that attracts bark beetles, which transmit the oak wilt fungus. Oak wilt is a potential threat in all of Illinois and can kill mature oaks in one season.
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 as well as to prevent bacterial leaf spot of Prunus species.
4. Provide suggested 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. Plants that have been located out of their natural range are often weakened in this way and predisposed to cankers and insect feeding.
5. Prune tree and bush fruits according to recommendations by Extension horticulturists.
6. Removal and burning (where possible), composting, or burying plant debris helps 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 (if they are otherwise horticulturally acceptable), 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 as well. Try to obtain a variety that is also resistant to powdery mildew and rust.

8. Make a map of your flower and vegetable gardens. Next year, move related plants 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.
9. Divide perennial flowers (where appropriate), remove rotted or diseased parts, and replant in a new location. Let the cut edges dry before replanting to avoid soft rot bacteria and other soilborne root rots.

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

Oak Problems

This article is one of those reverse-role articles. We have been seeing many oak problems in central Illinois, and I would like some feedback from you concerning occurrence of the problem in your areas. I will gladly summarize reports received and print a summary in the next newsletter. I am not referring to oak wilt, Verticillium wilt, iron chlorosis, oak leaf skeletonizing, or bacterial scorch. This problem seems to be something different.

The problem we are seeing is on oaks in the red oak group. The symptoms include bronzing and necrosis of the foliage, poor stem growth the last several years, a progressive decline over several years, and scattered dieback in the crown. The leaf symptoms are not always the same. They sometimes resemble an oak wilt pattern but are far less uniform. You might see a half-leaf symptom, and you might also see an edge burn or scattered blotches of necrosis. Wood does not show vascular discoloration. Cankers are not abundant on the wood. It is possible that a few trees have bacterial scorch, but symptoms don't always start on older leaves as they do with that disease. The pattern is scattered in the entire tree, not limited to one area that annually increases in size, as we see with bacterial scorch. We have tested a few samples (through AGDIA, Inc.), and they have been negative for *Xylella fastidiosa*, the causal pathogen of bacterial scorch.

I have been blaming root stress, possibly drought followed by flooding, but I do not have enough information to make this claim with much conviction. Often the trees that are affected are 30- to 50-year-old trees that have been on the site relatively undisturbed. The trunks are not visibly injured, and lawn herbicides are not a consistent factor. One local arborist said that obscure scale was present on one of his samples but not on several others.

This problem is not related to the leaf skeletonizer problem we discussed in issue no. 5 of this newsletter. You can tell me if you are seeing that problem (probably on your white oaks), but what I really want to hear about is this red-oak group problem. Give me the facts as succinctly as possible at npataky@uiuc.edu, or drop me a line at Plant Clinic, 1401 W. St. Mary's Rd., Urbana, IL 61802. Respond by Tuesday, September 26, if you want your information included in the summary in the next newsletter. Thank you for any help you have to offer. While you are at it, please comment on what we could do next year to make the newsletter more helpful to you. *(Nancy Pataky)*

Verticillium Wilt of Ash

Verticillium wilt was discussed in issue no. 8 of this newsletter, so I won't go into all the details of diagnosing the disease. The Plant Clinic has received many ash samples with dieback symptoms, marginal necrosis of leaves, and general lack of vitality. Several of these have been confirmed to contain the *Verticillium* fungus, the cause of Verticillium wilt.

This disease causes a staining of the vascular system in most species, but it rarely causes a discoloration of the wood of ash. Because you do not have that symptom to guide you in diagnosis, look for poor stem growth (compare to healthy ash trees in your area), scorching of leaf margins (though not always present), and a thin canopy. If you would like to have the disease confirmed, you will need to send branch and leaf tissue to a diagnostic lab. The ideal sample is a terminal foot of stem growth with leaves still attached and those leaves exhibiting scorching. The lab personnel will remove the leaves on their own because the leaves stay fresh that way. Cultures will be prepared from cross sections of the base of the leaf petioles. Dry samples are not of any use in the lab. Because the Plant Clinic is now closed, follow the management recommendations listed below, and sample next spring if symptoms recur.

There will not be any miracle cure once Verticillium wilt is confirmed, but this knowledge will help somewhat in management. The worse scenario is that the tree will die; and that is possible. Because *Verticillium* is soilborne, you will have to replace the tree with a nonhost species; and your list will be limited. On a more cheerful note, ash trees grow quickly and may be able to "wall off" the fungus in the wood and continue to grow and develop for years. Water the tree in periods of drought lasting 2 weeks. This fall, apply a general tree fertilizer and remove any dead wood. More information about Verticillium wilt is in *Report on Plant Diseases* No. 1010. *(Nancy Pataky)*

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, 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. The newsletter is edited by Erin Cler, typeset by Oneda VanDyke, and proofread by Phyllis Picklesimer, all of Information Technology and Communication Services.*

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