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PLANT DISEASES

Pine Tip Blight

This fungal disease was originally called Diplodia blight, changed to Sphaeropsis blight, and is now, once again, named Diplodia blight. You may find it as *Diplodia pinea* or *Sphaeropsis sapinea* in the literature.

Diplodia blight is one of the most common landscape diseases on pines in Illinois. The fungus is an opportunistic or stress pathogen. Drought, heat, shade, frost, and insect damage may all predispose trees to infection. It is having a heyday this year. It does not take much effort to find a pine with this disease. Most pine species grown in Illinois are susceptible to Diplodia blight, especially Scotch, Austrian, and mugo pines. White pine is rarely affected.

The *Diplodia* fungus infects healthy, unwounded new needles, as well as trees that are experiencing stress. A characteristic symptom of this disease is the blighting of all needles at branch tips. When this occurs, most of the needles in the terminal 4 inches of growth turn brown, dry out, and may remain attached to the stem throughout the season. Often the tree develops new growth below this dead area, resulting in a zigzag pattern of stem growth. Look now for dead needles holding onto stem tips. *Diplodia* may also cause sappy stem cankers. If the canker girdles the stem, the tissue beyond the canker dies. This disease is not known to cause tree death but can cause some very unsightly damage.

Symptoms alone may not be distinct enough to confirm disease diagnosis. Some common look-alikes include drought, other canker disease, Dothistroma blight, and pine wilt disease. The presence of fruiting bodies of the causal pathogen clinches the diagnosis. Look for black, pinheadsized fruiting structures of the fungus on brown needles at the affected branch tips, on stems, and on cones. These structures do not rub off. They are embedded in the affected tissue, often more prominent at the base of needles, under the sheath.

It is not an easy task to control this disease completely. Cultural controls play an important part in the management of Diplodia blight. To reduce disease inoculum, prune and remove the dead wood or needles from the pine. To reduce the spread of the disease, removal of the dead tissue should be done in the early spring before buds open but when the foliage is dry, or during the dormant season. Removing all of the infected cones helps prevent pathogen overwintering, thus reducing disease inoculum the following spring. If possible, it is a good practice to alleviate any stress to your pine, especially by watering during times of drought.

Systemic fungicides are available to control this disease; however, if used, they should be applied only in conjunction with the cultural controls just listed. Fungicides for use against *Diplodia* are listed in the Illinois pest management handbooks. There is some debate in the literature as to their usefulness once a tree is infected. For more details about this disease, read the *Report on Plant Disease,* no. 625, "Sphaeropsis Blight or Diplodia Tip Blight of Pines," available in University of Illinois Extension offices or on the Web at http://www.ag.uiuc.edu/%7Evista/. Bosnian pine (*Pinus heldreichii*) has been touted as a good replacement for Austrian pine because of its resistance to Diplodia blight. *(Nancy Pataky)*

Pythium Root and Stem Rot of Bedding Plants

It seems odd to be discussing these wet-season root rots when only a few weeks ago much of the state was under severe drought stress. Nevertheless, the Plant Clinic has received many cases of these root rots in the last 2 weeks, following significant rain events.

Pythium root and stem rot causes the same stressed top growth as seen with other root rots. Plants that are stunted, low in vigor, or slow growing—or those that wilt easily on a warm day—may be infected with a root rot. Diseased roots cannot absorb water and nutrients needed for growth. Pythium root and stem rot occurs in overly wet, poorly drained soils and causes death of root tips. The result is the appearance of brown to black, soft, rotted roots. Be very gentle when washing suspect roots or you will wash off the rotted portion and see only the white inner root. If that happens, the white roots left behind will be much thinner than normal roots—a clue that something is amiss. A more severe in-

fection may include blackened stem tissue moving from the root system up the stem several inches.

Other stress factors may predispose plants to Pythium root rot. An example is overfertilization. Such injury causes burning of the root tips and provides sites for infection by *Pythium*. Consider all possible stress factors in the landscape, not just the disease pathogen. Diseases are often only part of the problem.

Pythium root rot in a greenhouse situation is often associated with contaminated soil, plants, or containers. *Pythium* is a soilborne fungal-like pathogen and becomes a much more complicated problem in the landscape. Control of root rots should be aimed at prevention. Use only healthy transplants. Weak plants may be diseased, and you certainly won't save time or money in the end if you use weak plants. Because poor drainage usually goes hand in hand with root rot, proper site preparation to provide good water drainage away from roots is imperative. *Pythium* is a problem on wet sites, requiring moisture to infect. 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 in one area. Remove crop residue at the end of the season to help reduce pathogen survival.

Even if all of the practices mentioned are followed, root rot may still occur. Fungicides are available to help control *Pythium*. Still, fungicides protect plant stems and roots not yet affected but cannot magically revive dead plants. Fungicides are most useful in cases in which a root rot is discovered in a flowerbed and the goal is to preserve remaining healthy plants to the end of the season. Affected plants are removed and nearby plants treated with the appropriate fungicide. Many fungicides are specific to particular pathogens, so treatment relies on accurate diagnosis of the root rot pathogen. Specific chemicals are listed by host crop in the *Illinois Commercial Landscape and Turfgrass Pest Management Handbook* or the *Home, Yard, and Garden Pest Guide*. In reality, garden plants are exposed to many different root-rotting fungi. Because these organisms are often difficult to identify and time is usually short, most landscapers use a broad-range fungicide to stop infection, at least until an accurate identification can be made by a diagnostic lab such as the Plant Clinic. Products with the broadest host labels to control a variety of fungi include a combination of mefenoxam (Subdue Maxx) + thiophanate methyl (Cleary 3336, Fungo, Domain) or a combination of metalaxyl (Subdue) + thiophanate methyl (Cleary 3336, Fungo, Domain). Banrot has a more restrictive label but also controls a range of soil fungi. Read all labels carefully before selecting a fungicide.

Consult *Report on Plant Disease,* no. 615, "Damping-off and Root Rots of House Plants and Garden Flowers," for more details on root rots. This publication is available in Illinois Extension offices and on the Internet at http://www.ag.uiuc.edu/%7Evista/horticul.htm. *(Nancy Pataky)*

Iris Problems

Not many diseases bother iris plants in Illinois. Leaf spot is a common problem but is not lethal to the plant. Bacterial soft rot and Sclerotium rot can be devastating. A few other diseases occur occasionally, such as rust, some viruses, Fusarium rhizome rot, and Botrytis.

The iris leaf spot we usually see is fungal. The *Mycosphaerella* fungus that infects daylily and gladiolus also infects iris. Lesions caused by this fungus are initially minute, yellow to brown, and are sometimes accompanied by a water-soaked margin. As the lesions grow, they merge, causing leaf tips to die and curl. This leaf spot disease is more common in cool (50° to 77°F), wet weather. Disease has been common this year. For details about the disease and suggestions on management, refer to *Report on Plant Disease,* no. 629, "Iris Leaf Spot." This report is available on the Vista Web site: http://www.ag.uiuc.edu/~vista/horticul.htm.

Bacterial soft rot has been common in iris beds in 2007. The causal bacterium is *Erwinia carotovora*. This bacterium is commonly found in soil and plant debris, and it helps speed up plant decomposition. The bacterium needs a wound to enter a plant. Iris soft rot is often associated with the wounds provided by iris borers. For information on the iris borer, refer to issue no. 2, 2003, of this newsletter. Once the bacterium enters the leaves, it causes rotting of the leaf and the attached rhizome, leaving nothing but the outer shell of the rhizome intact. Soft rot bacteria have a distinctively foul smell, something that is difficult to miss. Plants have many brown leaves.

Clean up your iris beds to get rid of the soft rot bacterium. In Illinois, it is best to do this in late July—now. In fact, most rhizomatous iris plants should be divided every 3 to 5 years to reduce the incidence of soft rot. The idea is to remove unhealthy plant material and thin out the planting to make room for new growth. Dig and lift the iris clumps from the bed and then, using a sharp knife, separate the rhizomes. To avoid spreading the soft rot bacterium, dip the knife in a bleach solution (1 part bleach in 10 parts water) before each new cut. Replant only firm, healthy rhizomes with roots and a fan of leaves. The rhizome should be just slightly exposed on the soil surface when planted correctly. Deep planting also causes rhizomes to rot.

Occasionally in Illinois, iris plants are affected by a fungal disease that causes similar symptoms. This disease is **Sclerotium crown rot**, caused by *Sclerotium rolfsii*. This fungus is more common in the South, but we see it where mulch has been used around plants over winter. Symptoms appear as they do with bacterial soft rot except rhizomes are brown, soft, and crumbly. A white mycelium of fungal strands is evident in the crown, and tan to reddish brown, mustard-seed-sized fungal structures (sclerotia) can be found on the soil surface or on the plant tissue. These structures help the fungus survive adverse conditions and may also be moved with the plant or soil. Beds infected with *Sclerotium rolfsii* require special help. Remove infected plants from the area. Also remove surrounding soil, putting it directly into a bag to get it out of the area. Be careful to avoid spreading sclerotia to other areas in the garden. Chemical options are available to be used as preventives but will not control this disease on their own. Consult the *Home, Yard, and Garden Pest Guide* or the *2007 Commercial Landscape & Turfgrass Pest Management Handbook* for options. *(Nancy Pataky)*

INSECTS

White Grubs

Japanese beetle adult emergences in east-central Illinois continue to be light, but numbers in west-central Illinois are much higher. Southern Illinois is experiencing very high numbers of beetles. Northern Illinois also has large numbers of Japanese beetles. Under these conditions, many turf areas outside of east-central Illinois should be treated with imidacloprid (Merit) or halofenozide (Mach 2). The number of beetles, along with timely rains in east-central Illinois, could support a "wait and see" strategy.

Japanese beetles and masked chafer adults are attracted to moist soils and, apparently, to green grass to lay their eggs. In years when rainfall is abundant, nonirrigated (as well as irrigated) turf stays green and attractive to egg-laying female beetles. As a result, eggs are laid over all of these areas, resulting in fewer eggs laid per square foot. The resulting larvae are usually fewer than the 10 to 12 white grubs typically necessary to cause turf injury.

In dry years, the beetles are strongly attracted to the moist soils and green grass of irrigated turf to lay their eggs, laying relatively few eggs in the dry, brown, unwatered turf areas. This results in high numbers of white grubs in watered turf, which cause damage in the form of wilted, brown turf that is easily pulled back due to the white grubs' eating the roots.

In much of Illinois, irregular rains have caused many areas of turf that are not irrigated to green up for a few days and then turn brown for a week or so until the next rain. These rains do not appear to be wetting the soil very deeply. As a result, the Japanese beetle and masked chafer adult beetles are probably laying considerably more eggs in irrigated turf. This sets up a situation in which damage is likely to become apparent in the second half of August and later, when the resulting white grubs grow large enough to cause serious turf damage.

Because the eggs laid this month will not all have hatched until the end of the first week of August, decisions concerning preventive treatments of Merit or Mach 2 need to be made based on local rainfall and adult beetle abundance. By about August 10, most of the white grubs should have hatched, allowing scouting to determine for certain whether treatment is necessary. However, both Merit and Mach 2 can take 3 weeks to kill white grubs, allowing the possibility of turf damage to occur before control is achieved. In east-central Illinois, the low Japanese beetle flight will probably result in only scattered areas of grub damage; so waiting for the grubs to hatch before determining where to treat is probably the best option.

Scout for white grubs by cutting through the turf with a heavy knife. Pull the sod back to reveal the white grubs in the root zone. Check the soil hanging to the turf roots for white grubs, as well as the soil below the roots. Till the upper 2 to 3 inches of soil with your knife to check for white grubs in that region as well. If the soil is dry, till a couple of inches deeper to check for grubs that may have migrated down to moister soil.

If at least 10 to 12 grubs per foot square are present, treat with trichlorfon (Dylox) to obtain control in about 3 days. Dylox should not be used unless grubs are present because it is short-lived and is likely to break down after about 5 days. Based on this short longevity, it is recommended that dry soil areas be irrigated a couple of days prior to treatment to bring the grubs up into the root zone where the Dylox can be effective.

When using Merit or Dylox, water the application into the soil with at least 1/2 inch of water. Mach 2 is more water soluble; but if at least 1/4 inch of rainfall does not occur within 3 days after application, water it in to avoid breakdown of the insecticide by ultraviolet light from the sun. *(Phil Nixon)*

Emerald Ash Borer Update

Emerald ash borer has been positively identified in Glendale Heights, in north-central DuPage County. With the Fermilab infestation right on the western border of DuPage County, it was expected that the borer would be found soon in that county. However, this infestation is several miles from that location.

The Illinois Department of Agriculture has drastically increased the size of the quarantined area in Illinois to 13 northeastern Illinois counties and portions of 5 adjacent counties. This change is based on a number of factors. One is the new finds of infestations in several areas of Kane, northern Cook, DuPage, and LaSalle counties. Another factor is the handling of landscape waste.

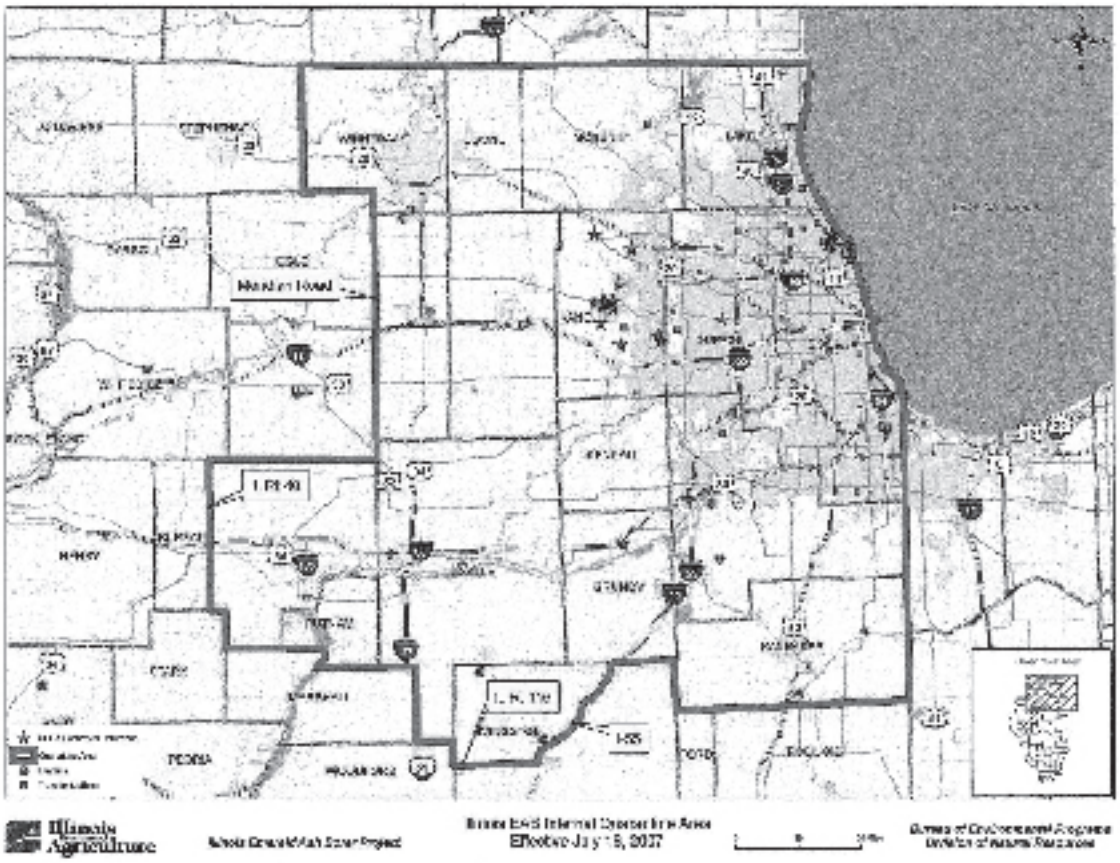
In northeastern Illinois, garbage and landscape waste is commonly hauled a considerable distance. Initially, it is moved to transfer stations, where the material is likely to sit for at least several hours. From there, landscape waste is hauled to locations where it is chipped and composted. Garbage is typically hauled to landfills. Many of these transfer stations are located outside of previous quarantine boundaries. Many of the landfills and landscape waste locations are located outside of the metropolitan area. Both the transfer and landscape waste locations, as well as the routes to them, represent likely sites of emerald ash borer infestations.

Following is a map of the quarantine area.

The quarantine requires waste haulers to cover potentially infested wood products being hauled from an infested area from June through August, which covers the adult emerald ash borer flight season. It also prohibits the removal of the following items from regulated areas:

- The emerald ash borer in any living stage of development.
- Ash trees of any size.
- Ash limbs and branches.
- Any cut, non-coniferous firewood.
- Bark from ash trees and wood chips larger than 1 inch from ash trees.
- Ash logs and lumber with either the bark or the outer one-inch of sapwood, or both, attached.
- Any item made from or containing the wood of the ash tree that is capable of spreading the emerald ash borer.
- Any other article, product or means of conveyance determined by the Illinois Department of Agriculture to present a risk of spreading the beetle infestation.

Anyone convicted of moving prohibited items from the quarantine area without prior certification by an Illinois Department of Agriculture nursery inspector may be fined up to $500.



How the emerald ash borer arrived in Illinois is unknown, but at least some of the infestations appear that it may have been transported here in contaminated firewood. To avoid the accidental introduction of the beetle to new areas, it is encouraged that only locally grown nursery stock and locally cut firewood be purchased or used. *(Phil Nixon and Illinois Department of Aqriculture)*

WEEDS

Using Vinegar as a Herbicide

Over the years, I've been told that vinegar is being used for weed-control. Because it is a food product, it is perceived as being safer than traditional synthetic herbicides. There are various recipes out there for mixtures with box salt and liquid dish soap and others with orange oil and molasses. I'm always amazed at the different combinations people come up with and how they swear that their recipe is the only one to use.

Does vinegar work, and how does it work? Vinegar contains acetic acid. That's the weed killer. According to the EPA "Fact Sheet on Acetic Acid":

Acetic acid is found in all living organisms. It is readily broken down to carbon dioxide and water. Vinegar consists of approximately 5% acetic acid and 95% water. This is also the concentration of acetic acid when applied as a pesticide product. To be effective, acetic acid needs to contact the plant leaves; the acidity of the spray solution damages and dries out the leaves.

Vinegar is nonselective and may damage any plant tissue. It does not move within treated plants, so only top growth is killed. This means perennial weeds return. Vinegar is fast acting and most effective on young, actively growing annual weeds, and good spray coverage is critical.

Studies have shown that for vinegar to be most effective, the percent of acetic acid should be 10 to 20%. That means that the vinegar in your kitchen cabinet isn't quite strong enough to do the trick. Most commercially available vinegars are only 5%. In 2002, USDA research found that control of smaller weeds was variable with 5% acetic acid, while concentrations from 10 to 20% provided 80 to 100% control. Weed species included foxtails, lambsquarters, pigweed, velvetleaf, and Canada thistle. Study details can be found at http://www.ars.usda.gov/main/site_main.htm?modecode=12=65-04-00. They issued this in their research report: "WARNING: Note that vinegar with acetic acid concentrations greater than 5% may be hazardous and should be handled with appropriate precautions."

Not your grandmother's vinegar. There are commercial food-grade formulations of vinegar available that are stronger than what you can buy at your supermarket. However, their use for weed control is not recommended. It's important to note that unless the product you are using for weed control is registered with the EPA as a herbicide, its use is illegal and a violation of FIFRA. Registered herbicides come with label directions, including use rate and required PPE (personal protective equipment). These products have been studied extensively.

We splash vinegar on our lettuce salads and think nothing of it. However, stronger forms of vinegar can be hazardous to humans. Acetic acid concentrations over 11% can cause burns upon skin contact. In fact, eye contact can result in severe burns and permanent corneal injury. This is why reading and following the label is so important.

Herbicidal vinegar finally available. Good news! Herbicidal vinegar with 20% acetic acid is now labeled for use in Illinois. The product is sold as Weed Pharm and more information is available at http://pharmsolutions.com/weed_pharm.html. At the time of this writing, their Web page does not include Illinois in their list of states where the product is registered. However, a quick phone call yesterday to the Illinois Department of Agriculture assured me that it is indeed registered for use.

Users are strongly encouraged to read and follow the label carefully. I was a little surprised to see that the Weed Pharm label signal word is DANGER. It's corrosive and causes irreversible eye damage, so goggles or a face shield is needed when handling this product. If the product is swallowed or splashed on the skin, a poison-control center should be called. Another note is that it cannot be applied directly to water. Also, the label reads, "Keep unprotected persons out of the treated area until spray residues have dried." Desirable plants need to be protected from potential spray drift. For more information, consult with the product label.

(Michelle Wiesbrook; Sources: "EPA Fact Sheet on Acetic Acid," http://www.epa.gov/oppbppd1/biopesticides/ingredients/factsheets/factsheet_044001.htm; "Fact Sheet for Vinegar/Acetic Acid Recommendations," by Oregon Department of Agriculture, http://oregonstate.edu/dept/nursery-weeds/weedspeciespage/acetic_acid_factsheet.pdf.)

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