Illinois Pesticide Applicator Training
All Illinois Pesticide Applicator Training sessions have ended for this season but will resume late fall 1998. Pesticide testing is still available by appointment at the Illinois Department of Agriculture facilities in Springfield and Des Plaines. No walk-ins will be accepted at these facilities—you must pre-register. To make an appointment at the Springfield office, call (217) 785-2427. For Des Plaines, call (847) 294-4343.

Study materials for the pesticide exam are available through University of Illinois Extension. The best way to study for the exam is to thoroughly read the training manual. If a workbook is available for a testing category, work through all of the practice questions. To order study materials, call the University of Illinois Pesticide Applicator Training automated phone line at (800) 644-2123. If you already know your ordering information, press option #3. To speak to someone directly, press option #5. Someone is usually available to take your calls between the hours of 8:30 a.m. and 5:00 p.m., excluding holidays.

Remember, in Illinois a pesticide-use license is required to apply not only restricted-use but also general-use pesticides in the course of employment. In other words, if you apply pesticides at work or get paid for applying pesticides, you must have a pesticide-use license, regardless of the type of chemical used (dry and liquid included). A person applying a general-use pesticide on his or her own property is exempt from this requirement. However, a license is required to purchase and use restricted-use pesticides. Restricted-use pesticides will be identified as such on the labels. All others are general-use pesticides.

Moss Problems in Turf
Moss invading lawns and other turf areas is a common problem this season. Keep in mind that moss is not likely to invade or crowd out grasses in a healthy stand of turf. In general, mosses are not the cause of turf decline but a symptom of environmental conditions or management levels that are unsuitable for supporting quality turf. Mosses may invade turf environments that feature any or a combination of the following conditions:

- low soil fertility
- poorly drained soils
- compacted soils
- excessive shade
- poor air circulation
- high humidity

Poor turf-care practices are another cause of moss problems. General neglect, irregular mowing, lack of fertilizer, and overwatering are common problems leading to poor turf growth, which can, in turn, lead to moss problems.

Mosses are small, primitive, leafy, green plants that develop fine, tangled mats over the turf surface. There are more than 13,000 species of mosses, approximately 50 of which can be found in lawns. Mosses are not always found in low pH soils; some mosses are commonly found on alkaline soils. Adding limestone is a common “remedy” mentioned for moss control but is not suggested unless a soil test has shown the pH needs to be raised. Many soils in Illinois have high pH values; adding limestone will make this pH go even higher, creating more problems for the turf.

Cultural Controls for Mosses. Any cultural practice that encourages proper turf growth and development should be employed to control moss. Evaluate the site and make all necessary corrections to favor turf growth. Specifically, for encouraging turf growth and discouraging moss growth:

- provide adequate soil drainage
- prune trees to allow more light to reach turf
- improve air circulation over the turf site
- reduce soil compaction using cultivation (core aeration or slicing) where appropriate
- maintain adequate soil fertility for the type of grass growing on the site and for the type of site (i.e., sunny or shady)
• avoid excessive irrigation
• avoid short mowing (mow as high as use of site allows)
• control thatch
• grow turfgrass species/cultivars best adapted to the setting disrupted by moss

Eliminating Moss. Moss can be eliminated, at least temporarily, by hand raking when it first appears. Ferrous ammonium sulfate or ferric sulfate (iron sulfate) can also be used to control moss. The moss will temporarily burn away but tends to return fairly quickly unless the environment and/or turf management program is altered. Focus on the cultural options listed above for a more permanent answer to moss problems in turf. (Tom Voigt and Bruce Spangenberg)

INSECTS

Spittlebugs
Spittlebugs are numerous in northeastern Illinois on chrysanthemums, shasta daisies, roses, and pines. Meadow spittlebug commonly attacks deciduous plants, particularly clover, and many flowers, as well as arborvitae. Pine spittlebug attacks Scotch, Austrian, and white pines, spruces, and firs. The meadow spittlebug usually causes little damage, but the pine spittlebug requires control if it is numerous.

Both spittlebugs overwinter as eggs in the stems of plants. The hatching nymphs feed on stems and secrete a frothy liquid from the anus and the epidermal glands. The nymphs then spread this spittle over their body until they are entirely enclosed in what appears to be a blob of white spit. The nymphs take up to seven weeks to mature. If you remove the spittle, you can see that meadow spittlebug nymphs are green and pine spittlebug nymphs are brown. Both spittlebugs emerge as brownish adults that look like wide leafhoppers. They are about 3/8 inch long and elongate to oval in shape. Adult meadow spittlebugs vary in color, ranging from tan to dark brown and may have light stripes running along their sides. Pine spittlebug adults are either a mottled medium brown or dark reddish brown.

Both nymphs and adults feed on plant sap. However, in heavy infestations, the wounds caused by pine spittlebug feeding result in resinous deposits that can restrict sap flow. Pine spittlebug feeding sites also serve as an entrance point for Diplodia shoot blight. Meadow spittlebug is rarely numerous enough to cause damage. Most damage caused by meadow spittlebug is aesthetic, due to the presence of the spittle masses.

Pine spittlebug nymphs can be controlled with a forceful spray of acephate (Orthene), carbaryl (Sevin), or dimethoate (Cygon). Meadow spittlebug nymphs can be washed off of plants with forceful streams of water. In rare instances, acephate or carbaryl may be needed. (Phil Nixon; Jim Schuster, Countryside Extension Center; and staff at The Morton Arboretum)

Periodical Cicadas
Periodical cicadas will emerge this year throughout most of the southern two-thirds of the state. Emergence should begin in early June and last about three weeks. Outside Illinois, this emergence of the Great Southern Brood will cover most of Missouri, western Kentucky, and much of the southeastern United States north of Florida and south of Kentucky and Virginia. Very small trees may be subject to heavy damage by this insect’s egg-laying activities.

Periodical cicadas occur in most areas of the eastern half of the United States. In the northern half of the country, these insects have a 17-year life cycle; those in the southern half have a 13-year life cycle. Rumors floating around the state suggest that 13- and 17-year emergences will coincide this year, which would cause very heavy damage. Let’s set the record straight. First, only a single brood of 13-year cicadas is expected to emerge this year. Also, there is apparently only one region in North America where 13- and 17-year broods emerge in the same area—and that is in a small area near Clinton, Illinois.

Nymphs that hatch from eggs inserted into stems drop to the ground, burrow into the soil, and find a root to feed upon. The nymphs suck sap from the roots until the last year of their life cycle, when they emerge from the soil in the late spring, climb a tree, and emerge as adults. The adults are black, about 1-1/4 inches long, and have red eyes. They have clear wings with orange veins. The adults do little feeding, spending most of the daylight hours involved in reproductive activities. Male cicadas sing during the day to attract females. Mated females select twigs and branches up to one inch or more in diameter and insert their eggs into slits made with their ovipositors. Very little egg-laying occurs in the first ten days after emergence. Eggs are laid mostly during the last ten days of the female cicada’s adult life.

We anticipate emergence of the 13-year cicadas this year from Hancock and eastern McDonough counties south to Morgan, Sangamon, and Macon
counties and also from Ford, southern Livingston, and western Iroquois counties south. The rest of southern Illinois is included in this 13-year brood emergence, except Iroquois, Vermilion, Edgar, Clark, Crawford, Lawrence, and Wabash counties on the east and Alexander, Pulaski, Massac, Union, Jackson, Perry, and southern Randolph counties in southern Illinois.

Periodical cicadas are a threat to small trees with trunk diameters of two inches and smaller. Their egg-laying may cause trunks and branches to snap off in windy conditions. Avoid planting very small trees before an emergence in areas where cicadas are likely to appear. Realize, though, that even in the regions listed above, some areas will have few cicadas or none at all. If an area has been cleared of trees and shrubs within the last few hundred years or was originally prairie, periodical cicadas are unlikely to be present. These insects do not fly very far from where they emerge. That fact, combined with their long generation times, means that the spread of periodical cicadas is very slow.

Insecticides are only marginally effective against cicada, with carbaryl (Sevin), bifenthrin (Talstar), permethrin (Astro), lambda-cyhalothrin (Scimitar), and cyfluthrin (Tempo) providing only a small amount of control. Young trees with small trunks should be protected with hardware cloth, screening, or tree wrap during the few weeks that the adult periodical cicadas are present. (Phil Nixon)

Bronze Birch Borer
With the fading of blooms on Vanhoutte spirea, it is time to apply controls for bronze birch borer. Bronze birch borer attacks white-barked birches, tunneling as larvae in the cambium beneath the bark and eventually girdling the tree. Damage first appears as dead twigs at the top of the tree. If more than one-third of the branches on the tree have died, control efforts are unlikely to save it. Adults emerge at this time of year through 1/8-inch-wide, D-shaped holes in the trunk. The 1/2-inch long, elongate, bronze-black beetles mate, and then females lay eggs in niches that they chew in the bark. The hatching larvae tunnel into the cambium to feed.

Chemical control consists of spraying the trunk and larger branches three times at two-week intervals with chlorpyrifos (Dursban). An alternate method is to apply a band of dimethoate (Cygion) as a concentrate to the trunk. Treat only once in a band that is equal to the diameter of the trunk but no wider than six inches. Make sure that you buy a product that has this application on the label; it will be listed as a control method for birch leafminer.

Dimethoate acts systemically through the bark to kill the larvae in the cambium. Because of this systemic action, it can be applied any time within the next month to achieve control. However, immediate applications should provide a higher level of control. Realize that this insecticide is effective due to the birch tree’s thin bark and the activity of the bronze birch borer larvae just under the bark. On other trees and borers, the bark is usually thicker and many other borers feed deeper into the wood, making this application ineffective. Also, dimethoate is labeled for use on very few trees and tends to be phytotoxic if over-applied or applied to unlabeled plants. (Phil Nixon)

Scouting Report
Refer to last week’s issue (May 13, 1998) about insect pest emergence that coincides with various stages of bloom of Vanhoutte spirea. Be particularly watchful for pine needle scale crawlers. They should be present throughout much of Illinois.

Sawfly larvae have been found on black locust (Robinia pseudoacacia) in northern Illinois. This sawfly will also attack rose acacia (Robinia hispida). (Phil Nixon; staff at The Morton Arboretum)

PLANT DISEASE

Elm Yellows (Elm Phloem Necrosis)
We’ve all heard of Dutch elm disease, the fungal vascular disease that killed so many American elms in the United States. Dutch elm disease is still with us, but a more current concern about elms is a disease called elm yellows, also known as phloem necrosis.

Symptoms of this disease may appear any time during the summer but are most common in mid- to late-summer. Symptoms of elm yellows include yellowing and drooping of foliage followed by leaf drop and death of branches. This pattern may occur on one or a few branches or may quickly involve the entire tree. Susceptible trees may show symptoms over the entire tree in a matter of a few weeks. Tolerant trees become stunted and may develop bunched, prolific growth at the tips of branches or on the trunk. The inner bark tissues of infected trees often exhibit a butterscotch or light brown discoloration in small streaks or flecks. Although trees infected with the Dutch elm disease fungus usually show
vascular discoloration in symptomatic branches, the
discoloration from elm yellows is not usually in the
branches—it is more commonly found in the trunk. A
simple field test to help with diagnosis of this disease
involves taking a few chips of the stained phloem
tissue, placing it in a closed container for a few
minutes, and then checking for a wintergreen odor.

Elm yellows is caused by a phytoplasma (formerly
called a mycoplasma-like organism). Phytoplasmas
are bacteria-like organisms that have no cell wall, are
too small to be seen with a compound microscope,
and cannot be cultured in plant diagnostic labs.
Generally, diagnosis is based on symptoms in the
field. For this reason, no confirmed cases have been
reported by the University of Illinois Plant Clinic, but
confirmation has come from several knowledgeable
tree specialists in the state. The disease is believed to
be spread by such phloem-feeding insects as leafhoppers.
The phytoplasma overwinters in infected tree
roots and witches’ brooms.

What is the fate of infected trees? Some may live
for several years, but most infected elms die within
one or two years of symptom development. There is
no cure. The good news is that elm yellows does not
move into new areas as quickly as Dutch elm disease.
Removal of infected trees is advised to remove inocu-
ulum sources from the area. Siberian elm seems to be
resistant to this disease problem. Watch for the devel-
oment and release of resistant Asiatic or European
elms. For additional information about this disease
consult Report on Plant Diseases No. 660 or the book
Diseases of Trees and Shrubs by Sinclair, Lyon, and
Johnson, as well as many web sites discussing elm
yellows. (Nancy Pataky)

Juniper Blights

Phomopsis blight is the most common tip blight of
junipers in the Midwest. Most damage occurs on
eastern red cedar and on creeping, Rocky Mountain,
and savin junipers. Still, you may see the fungus on
arborvitae, white cedar, cypress, Douglas-fir, fir, yew,
and larch, as well as junipers. The newest growth is
susceptible to infection and becomes resistant once
needles become a normal, dark green. Infection
occurs on the youngest needles, starting as yellow
spots. Shoot tips then turn light green and finally
brown. However, the first symptom usually seen by a
homeowner is the reddish brown color of shoot tips. A
grayish band is often visible at the base of the dead
shoot, and in this band are pinhead-sized black
fruiting bodies (pycnidia) of the fungus. The pycnidia
are visible with the naked eye or with the aid of a
hand lens. Occasionally a stem canker is also found in
association with this disease.

Infection by Phomopsis can occur when succulent
new growth is present in wet weather. The fungus is
also very persistent. Spores germinate under moderate
temperatures (60ºF to 82ºF) and high humidity within
seven hours after coming into contact with the new
foliage. If the foliage dries before infection occurs,
the spores are not killed; they begin growth again with
wet weather. Pycnidia form three to four weeks after
infection. Spores are dispersed by splashing rain.
Watch for this disease soon.

If tip blight symptoms occur in the spring, but
before new shoot growth has begun, then Kabatina
blight is the most likely cause. This fungus was
present last summer, formed fruiting bodies from
February to May, and is evident in the spring on one-
year-old twigs. Kabatina requires wounding for
infection to occur.

Phomopsis blight may be controlled by pruning
and removing infected foliage when the plant is dry
and by using preventive fungicides. If you are willing
to start your planting over from scratch, use resistant
varieties for the easiest long-term control. If replant-
ing is not an option, then pruning is important because
the most common source of the fungus is infection
from the previous year. Prune only dry foliage, to
avoid spreading spores. Pruning is a form of wound-
ing and may increase the chance of infection with
Kabatina, but by pruning in dry weather this risk will
be lessened. Fungicide recommendations are provided
in the Illinois Commercial Landscape and Turfgrass
Pest Management Handbook, 1998–1999, as well as
the Illinois Homeowners’ Guide to Pest Management.
Report on Plant Diseases No. 622 contains more
details about Phomopsis blight. (Nancy Pataky)

Sphaeropsis Blight of Pine

We expect to see another banner year for Sphaeropsis
blight of pine. The injury seen so far in 1998 is last
year’s damage, but be ready for this perennial prob-
lem. This disease of pine has been quite devastating
the last several years. The fungal pathogen thrives in
cool, wet weather and often invades injured wood. We
have experienced lengthy, cool, and wet spring
weather for the past two years, and winter freeze-
thaws have been common. Ideal weather conditions,
plenty of fungal inoculum, and susceptible pines have
set the stage for Sphaeropsis blight. We see most
problems on Austrian and Scotch pines, but other
The fungus (*Sphaeropsis sapinea*) infects young, healthy, unwounded needles of new candles (new growth), which is where we see the typical blighting of branch tips. All needles in the terminal six inches or so of growth turn brown and dry out. This phase of the disease is unsightly but does not cause branch death. Usually the tree develops new growth below the dead area and results in the crooked-looking branches so typical of Austrian pine. The fungus may, however, also infect the twigs of trees weakened by stress (such as drought, compacted soil, root injury, hail, or winter injury). Cankers develop on the twigs, usually causing noticeable sap exudate at the canker. When the canker girdles the twig, tissue beyond that point dies. In the last two or three years, we have seen an increase of *Sphaeropsis* twig blight at the clinic. This disease is difficult to control. In fact, even the best efforts do not always give 100 percent satisfactory results. The first step is to recognize the disease. Look for black, pinhead-sized fruiting bodies of the fungus in the brown needles at the tips of branches. The combination of tip blighting and these fruiting bodies is probably enough evidence to implicate *Sphaeropsis* blight. If necessary, laboratory confirmation is quick and easy.

Next, remove all dead wood (or as much as possible) from the tree. This is best done in the dormant season but can be done at other times when the foliage is dry. Cones are the next target for control. You will find hundreds of the black fruiting bodies of this fungus on cones, which serve as a major overwintering site. Remove cones from the tree and the surrounding ground.

We don’t always advocate fungicide sprays for disease control, but in this case chemicals are necessary for near-complete control. Three sprays are recommended: one at budbreak, one at half-candle elongation (about 10 to 14 days after the first spray), and another at 10 to 14 days after the second spray. Chemical options are listed in the *Illinois Commercial Landscape and Turfgrass Pest Management Handbook, 1998–1999*. Homeowners can check the listings in the *Illinois Homeowners’ Guide to Pest Management*. For more details about this disease, consult *Report on Plant Diseases* No. 625. (Nancy Pataky)

### Disease Briefs

**Anthracnose** continues to worry homeowners. The amount of leaf drop due to anthracnose on ash has visibly increased. Infected sycamores look like they won’t survive the summer. The disease has begun to show on maples in central Illinois as well. Don’t panic. Just remove fallen leaves (to make you feel better) and keep the trees watered in periods of drought stress later in the summer. They will begin to look better in a few weeks.

**Taphrina leaf blisters** on oak have become quite visible this past week. Remember, the infection has been present since budbreak or soon after and there is nothing to do now. The blisters will turn yellow, then red, and eventually brown.

Although we have seen a few cases of crabapples and pears that seemed to have **fire blight**, samples have not confirmed that to be the case. We still have not had a confirmed case of fire blight at the clinic this season. (Nancy Pataky)
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