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INSECTS

Wood-Boring Insects

Be on the lookout for wood-boring insects (beetles and moths), a problem in nurseries and landscapes. Insects active at this time of year include bronze birch borer (*Agrilus anxius*), flat-headed appletree borer (*Chrysobothris femorata*), round-headed appletree borer (*Saperda candida*), peachtree borer (*Synanthedon exitiosa*), and viburnum crown borer (*Synanthedon fatifera*). In general, females lay eggs on exposed bark; eggs hatch into larvae that tunnel through the cambium. Larvae feed within the sapwood or heartwood; adults feed on leaves or flower nectar.

The key to managing wood-boring insects is to keep plants healthy and avoid stress by maintaining proper cultural practices—watering, fertility, mulching, and pruning. Also, avoid mower or weed-whacker injury to the base because this removes essential cambium tissue that transports food upward to leaves. This injury places undue stress on plants. Many wood-boring insects are opportunistic and thrive on stressed plants; healthy plants are less susceptible. Pruning trees or shrubs at certain times of year can increase problems with wood-boring insects. For example, generally avoid pruning birch trees, especially white birch, May to August because bronze birch borer adults are flying around looking for places to lay eggs. Pruning during this time creates wounds that emit odors, attracting the females. Newly planted trees or shrubs are highly susceptible to borer attack. For example, the flat-headed appletree borer attacks recently planted plants because they are stressed, increasing their susceptibility; it is important to properly water and mulch young plants to minimize stress.

Pest-control materials may be used to avoid problems with wood-boring insects. Phasing out of chlorpyrifos (Dursban), due to the Food Quality Protection Act (FQPA), is causing concern about availability of effective pest-control materials for managing wood-boring insects; chlorpyrifos will not be available to homeowners at the end of 2001. However, it will still be available for commercial operators for several years. Presently, the alternative pest-control materials

that have demonstrated efficacy against various wood-boring insects include dimethoate (Cygon), lindane, and permethrin (Astro). Residual activity often depends on bark characteristics, with activity generally lower on smooth bark (as in birch) compared to ridged or furrowed bark. The insecticide binds more easily to rough bark; also, there is less potential for wash-off from rain or irrigation. It is important to thoroughly soak the bark up to 5 feet from the tree base because adult borers tend to lay eggs there.

The timing of bark applications is critical. Make them before eggs hatch or when adults emerge because most insecticides do not penetrate bark after insect entry. Once larvae are inside the tree, very little can be done except maintain plant health.

Recent studies show that imidacloprid (Merit, Imicide, and Pointer) may have some activity on wood-boring insects; however, more data is needed. Also, using beneficial nematodes may be an option in managing wood-boring insects. (*Raymond Cloyd*)

Sucking Insects

Scout for sucking insects on nursery and landscape plants now to prevent significant injury. The main scales and mealybugs now are oystershell scale (*Lepidosaphes ulmi*), scurfy scale (*Chionaspis furfura*), Fletcher scale (*Parthenolecanium fletcheri*), pine needle scale (*Chionaspis pinifoliae*), and taxus mealybug (*Dysmicoccus wistariae*).

Scales and mealybugs use piercing-sucking mouthparts to feed within the vascular tissues. This results in stunted plants, leaf yellowing, and death of plant parts (branches). Soft scales (Fletcher scale) and mealybugs produce a clear, sticky fluid exudate (honeydew), an excellent growing medium for black sooty mold fungi. Also, it attracts stinging insects, including yellowjackets. Ants, which protect scales and mealybugs from natural predators and parasitic wasps (parasitoids), are attracted as well. Hard scales (oystershell, scurfy, and pine needle) don't produce honeydew. They cover themselves with their exudate.

Managing soft and hard scales and mealybugs involves avoiding plant stress by properly implementing cultural practices, including watering, fertilizing, proper plant placement (sun vs. shade), and selection. Pest-control materials are another option in nurseries

and landscapes. These include acephate (Orthene), carbaryl (Sevin), chlorpyrifos (Dursban), diazinon, dimethoate (Cygon), insecticidal soap, malathion, and summer (horticultural) oil.

These materials are normally applied as a spray to plants and kill insects by contact. They are most effective after egg hatch, when vulnerable crawlers are present. However, many also kill the natural enemies, which may lead to target pest resurgence or secondary outbreaks. Scales and mealybugs are sedentary most of their lives, vulnerable to attack by natural enemies, which may sometimes provide sufficient control.

Systemic insecticides such as imidacloprid (Merit, Pointer, and Imicide) are used to manage these pests in nursery and landscape plantings. Imidacloprid kills mealybugs and soft scales but not hard scales. Hard scales feed differently than soft scales. Hard scales tend to burst and destroy plant cells on which they feed, often bypassing vascular tissues that transport food throughout the plant. The hard scales may not take up enough active ingredient to die.

Scouting early, and timing insecticide applications (if necessary), minimizes problems with these pests on nursery and landscape plants. (*Raymond Cloyd*)

Insect Problems Up in Warm, Dry Weather

The recent warm, dry weather may mean more insect pest problems. In central Illinois, many days were in the mid-80s, while the normal high is in the high 60s. The heat is accelerating insect development. A major phenology plant, Vanhoutte spirea, came into full bloom in central Illinois near the end of April; around the third week of May is more typical. In northern Illinois, The Morton Arboretum staff is noticing insect pests appearing early as well. Many of us are just settling into the early spring insect pests such as Eastern tent caterpillar, European pine sawfly, and spruce spider mite. Now, we have to think about bronze birch borer, oystershell scale, and gypsy moth.

The dry weather throughout the state will cause more insect pest problems. A major natural control factor for caterpillars, aphids, beetle larvae, and most insects is fungal diseases. They are more prevalent and aggressive in moist, cool weather. The dry weather allows more insects to survive. The only good thing entomologically is that dryness also increases the number of predatory and parasitic insects surviving to attack the pests. The bottom line is to be watchful for insect pests to be numerous and early. (*Phil Nixon and Donna Danielson of The Morton Arboretum*)

Scouting Watch

The following is a prediction of the stage of development of several species of insects, based on the blooming of bridal wreath spirea or Vanhoutte spirea (*Spiraea x vanhouttei*). This information is from *Coincide* by Donald A. Orton. The 190-page book published in 1989 is available from the Labor of Love Conservatory, 468 S. President, Suite 103, Carol Stream, IL 80188-2894; (630)668-8597.

Phenology information is listed for scouting and identifying potential problems. It helps you know when to look for certain pests. It should not be used as a biological calendar spray schedule. (*Phil Nixon*)

Full bloom:

- Birch leafminer young larvae
- Elm leaf beetle young larvae
- European pine sawfly feeding larvae
- Gypsy moth feeding larvae
- Pine needle scale crawlers (first generation)

Full to late bloom:

- Lilac (ash) borer newly hatched larvae
- Oystershell scale (brown) crawlers

Finishing bloom:

- Bronze birch borer newly hatched larvae

Most blossoms brown, a few still white:

- Flat-headed appletree borer larval hatch
- Peach tree borer newly hatched larvae
- Viburnum borer newly hatched larvae

Bloom finished:

- Oystershell scale (gray) crawlers

PLANT DISEASES

Benomyl Announcement

DuPont has voluntarily pulled benomyl from the market. Their April 19 announcement is detailed here. Benomyl has not been available for landscape use for years, but many of you still have product and may be interested in this announcement. Contact Rich Carver, product registration manager, DuPont Crop Protection, with questions.

Also, please note that a new fungicide is available for homeowners. I am sure it will be confused with benomyl because of the name. The product is Bonide Bonomyl, which contains thiophanate-methyl as an active ingredient. You will see this product in the new *Home, Yard, and Garden Pest Guide*. (*Nancy Pataky*)

WILMINGTON, Del., April 19, 2001—Today DuPont informed its customers around the world that it will discontinue the manufacture of its fungicide benomyl and will phase out sales of Benlate® in all its forms from the global market. No sales will occur after December 31, 2001, and we expect all product will clear the channels of trade by the end of 2002.

DuPont advised customers that this is not a product recall, but a voluntary business decision based on a review of global market conditions and other factors. The decision is part of the recently announced restructuring to improve the overall competitiveness of its agricultural businesses.

A significant element of the reason to withdraw is that the company is no longer willing to bear the high and continuing costs of defending the product in the U.S. legal system where factors other than good science can influence outcomes. In addition, there are significant ongoing costs and resources necessary to meet increased regulatory requirements around the world and keep the product active. The company believes those resources are better applied to other areas of the business.

DuPont remains fully confident that Benlate® is safe when used as directed. The 30-year-old fungicide has been an excellent crop protection option for growers worldwide.

Pine Bumps, Swellings, and Galls

If you examine Scotch pine, particularly in Christmas tree nurseries, you may notice swollen areas or golf ball-sized lumps on the branches or trunks. We receive calls and samples each year about these symptoms, so I'd like to discuss the two most likely culprits, pine-oak gall rust and pine-pine gall rust. (Either may be called eastern gall rust.)

Pine-oak gall rust. As with cedar-apple rust, the fungus causing pine-oak gall rust (*Cronartium quercuum*) requires two different hosts to complete its life cycle. In Illinois, the primary coniferous host is Scotch pine; but jack, Austrian, mugo, ponderosa, and red pines may also be infected. Deciduous hosts include red, pin, and bur oaks.

Symptoms on pine include swollen areas on the branches, lumps or galls up to 4 inches across, and slowed growth. Mature galls often have white to yellow, blisterlike ridges (fruiting bodies) that rupture through the bark and produce yellowish spores. Severe infections may result in witches'-broom (multiple shoots growing from a gall), death of branches, and possibly death of the entire tree. Symptoms on oak leaves are similar to those on crabapple infected with cedar-apple rust. Small, dark brown spots with yellow borders are visible on the upper surface, and reproductive structures develop on the underside.

In spring, mature galls on pine release windblown spores that infect expanding oak leaves. About a week after infection, orange spores are released from the underside of infected leaves, causing more oak leaf infections. Two to 3 weeks later, hairlike structures are produced on the underside of infected leaves, and different spores are released that infect pine needles, succulent stems, and expanding candles. New pine infections take 2 to 4 years to develop into galls that release spores capable of infecting oak leaves.

Pine-pine gall rust is caused by *Endocronartium harknessii*. In Illinois, the primary host is Scotch pine, but jack and ponderosa pines may be infected. Pine-

pine gall rust is similar to pine-oak gall rust in severity, symptoms, and formation of galls. Pine-pine gall rust does NOT infect oaks or need two hosts.

Management. Purchase seedlings and young pines from a reputable source, and inspect the trees before planting. Keep in mind that you cannot detect an infection until 1.5 to 2 years later. Although the field symptoms of these two rusts are virtually indistinguishable, there are microscopic differences in spores from the pine hosts. While on-site, examine nearby oak hosts for rust lesions indicating pine-oak rust.

Infected pine branches and/or whole trees should be removed before spring because the rust galls release infectious yellow-orange spores each spring. To protect pines in nurseries from new infections, apply Bayleton or mancozeb (several trade names) every 7 to 14 days during pine shoot elongation. Fungicides are not recommended for landscape trees.

Because pine-oak gall rust has a few extra steps in the spring infection cycle, peak pine infection is likely later than for pine-pine gall rust. The literature indicates that the pine-infecting spores are released 2 to 3 weeks after the first orange spores develop on the underside of oak leaves. (*Bruce Paulsrud*)

Crown Gall and Replacement Plants

Most master gardeners and landscapers can recognize crown gall on plants; or at least they consider it when the galls are spotted. It is most often confused with insect galls but resembles the rust galls described on pine and a few fungal galls. Galls from crown gall disease appear as a mass of undifferentiated tissues; insect galls have galleries, or pockets, with or without insects. Abnormal growths on plants, called burls, can resemble crown galls. The bark of the host usually remains on the burls but is not present on crown galls.

Crown gall is a disease caused by a bacterial pathogen, *Agrobacterium tumefaciens*. The bacterium enters the plant through a wound, and the plant forms a gall. Actually, crown gall is an odd plant disease. The bacteria cause uncontrolled cell division in the host plant, resulting in gall formation. Genetic coding from the bacterium becomes incorporated into the host's coding. As you can imagine, this system has been studied and used extensively in research on genetic manipulation. Consult *Report on Plant Disease (RPD)* no. 1006 for details. Contact your local Extension office or view it at <http://www.ag.uiuc.edu/~vista/horticult.htm>.

The bacterium survives for long periods (many years) in the soil. Once you have an infection, you live with weakened plants or you replace them. Obviously, you must use a species that is not a host. Unfortunately, many plant species are susceptible. At the

clinic, the most common host is creeping euonymus, but crown gall may occur on rose, lilac, willow, honeysuckle, and other common landscape plants. The conifers are resistant to this disease.

Plants reported not to host crown gall include andromeda, baldcypress, barberry, beech, birch, black gum, boxwood, catalpa, cedars (true), deutzia, Douglas fir, firethorn, ginkgo, golden-ralintree, hemlock, holly, hornbeam, larch, linden, magnolia, mahonia, pine, redbud, serviceberry, smoke tree, spruce, sweet-gum, tuliptree, yellowwood, yew, and Zelkova. As conifers are not hosts, replace that infected euonymus ground cover with a recumbent juniper. Do not buy plants with galls. As plants may have the disease and be symptom-free, do not move seemingly healthy ones from an infected bed to a new site. (*Nancy Pataky*)

Disease Notes

In general, plants look healthy now. Here are some specific diseases we have seen at the clinic.

Anthracnose of shade trees requires cool, wet conditions the 2 weeks after budbreak. As many sycamores, oaks, maples, and ash trees susceptible to anthracnose opened in warm, dry weather, anthracnose may be sparse. Reports of ash and sycamore anthracnose are coming from wetter areas. Slow to leaf out, sycamores appear to have the bud blast stage of anthracnose. As a reminder, fungicides are not recommended for anthracnose of shade trees. Help the tree produce a new flush of foliage by watering.

Cedar–apple rust, cedar–hawthorn rust, and cedar–quince rusts are now sporulating on cedars in central Illinois. I have also had reports of galls producing spores in northern Illinois. If you have problems with these rusts on apples, crabapples, and

hawthorns, try to locate the alternate host in your area now. If it is on your property, remove new galls next winter before they mature. Mark your calendar now. Sprays for apples, crabapples, and hawthorns should have been applied about 2 weeks ago to protect them from spores released over the past 2 weeks.

White pines have been the number-one host this week. They do not have an infectious problem or something that will easily go away. Affected pines generally lose color in entire branches, or the tree suddenly wilts and dies. Roots are sparse, with rotted cortex tissues. Lab tests have failed to reveal a cause, and the problem has been dubbed **white pine decline**. This problem will be discussed in an upcoming issue. Meanwhile, fungicides and insecticides cannot help. Concentrate efforts on cultural conditions by providing water during drought, mulching to maintain a more uniform soil temperature, and fertilizing with acidic fertilizer in the fall. (*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.

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