Above: fletcher scale on arborvitae, right: oak lecanium scale; below left: spruce bud scale; below right: smaller European Elm bark beetle gallery

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Above: fletcher scale on arborvitae, right: oak lecanium scale; below left: spruce bud scale; below right: smaller European Elm bark beetle gallery

Pests susceptible to control based on degree day forecasts ( )=Degree day ranges
- Taxus mealybug (1800-2100)
- Black vine weevil (500-2100)
- Euonymus scale (900-2100)
- European elm scale (900-1200)
- Fall webworm (1800-2100)
- Japanese beetle (900-1200)
- Leaf crumpler (1800-2100)
- Lecanium scale (900-1200)
- Locust borer (1800-2100)
- Peach tree borer (1800-2100)
- Pine needle scale (1600-1700)
- Round headed apple tree borer (500-1700)
- San Jose scale (500-2900) repeat applications because of overlapping generations
- Scurfy scale (1300-1500)
- Spruce bud scale (1500-2100)
- Two-spotted spider mite (900-2100)
- White marked tussock moth (1800-2100)
- Willow aphid (1600-2000)
- Yellow-necked caterpillar (1600-2200)

Above: spider mite damage on burning bush; right: Japanese beetle
Kimby Decker, New Inspector for Summer

Kimby Decker will be working with us this summer and fall as a nursery inspector. Kimby is originally from Dover, Delaware and she has a B.S. degree from the University of Delaware in Plant Protection. She came to Lexington in 2004 to work on a Masters Degree in Entomology with Dr. Ken Yeargan as her advisor. Kimby completed her degree in May. Kimby will be working in Central Kentucky this summer and will be working in western Kentucky this fall. Beginning in January, Kimby and her husband will begin working in Middle East teaching English as a second language. Kimby will also be working in the agriculture field there.

Conifer Bark Beetles
David Shetlar, Ohio State University
From publication HYG-2557-95

There are numerous species of bark beetles which attack weakened or dying pines, spruces and firs. The most common species belong to the genera Dendroctonus and Ips. Numerous species of these beetles are always present where conifers are grown.

Plants Attacked
All conifers may be attacked by various species of bark beetles. Usually, pines and spruces will only be attacked if they are under environmental, cultural or disease stress.

Damage
Bark beetle adults usually attack trees which are under stress, have been freshly killed or are in the process of dying. Occasionally adults will lay eggs in trees which were temporarily under stress and the larvae may girdle these live trees when the tunnels of several individuals cut off the plant vascular system. Bark beetles which kick out sawdust-like shavings when they enter the tree trunk are making use of a freshly killed tree, and are not the cause of death. Occasionally, bark beetles can attack apparently healthy trees in sufficient number to gain a foothold. This often happens where a large number of pines or spruces were damaged from storms or fire and the large population of new bark beetles have nothing else to attack.

Description and Life Cycle
These cylindrical, brown to black beetles are usually very small, 1/6 to 1/8-inch, but can cause considerable damage. Fortunately, most species in the northeastern United States only attack weak or dying trees. Some species attack branches or cones but the ones which can kill a tree attack the trunk.

The pine engraver, Ips pini (Say), will serve as an example scolytid-type bark beetle. Adults overwinter in pupal cells hollowed out of the bark. These adults emerge in the spring and females locate a suitable tree for egg laying. A female will chew a round hole into the bark and go down to the cambium layer. A male soon joins the female and mates with her in this "nuptial chamber." The female then deposits its three to six eggs in galleries set off from the central chamber. The eggs hatch into small white grubs with brown heads. These grubs continue to tunnel away from the central chamber. Upon completing their growth, the grubs burrow into the bark and pupate. Up to three generations per season may occur in New York to Ohio.

Control Hints
Generally, bark beetles do not attack small or vigorously growing conifers. Attacks occur when trees have been damaged or are weakened by over crowding, drought, saturated soils or disease.

Strategy 1: Cultural Control - Sanitation - Remove any dead or dying trees and grind, chip or burn the remains. Wind blown or burned conifers nearby should be removed and destroyed.

Strategy 2: Cultural Control - Maintain Health of Trees - Conifers planted in good soil and properly fed and pruned will rarely be successfully attacked by bark beetles. During periods of drought, water the trees. In heavy soils, attempt to provide drainage.

Strategy 3: Insecticide Sprays for Recently Transplanted Trees - Larger pines and spruces (tree diameter of four inches or more) which have been recently transplanted may need protection for the first year, especially if drought conditions are encountered. Treat the trunk and major branches with a protectant insecticide in mid-May, early July and late August.

Strategy 4: Insecticide Protectant Sprays - Occasionally, several trees in a wind break or landscape planting will be attacked by bark beetles. This generally indicates that the trees were weakened by something and the surrounding trees may also be under stress. Remove the attacked trees and apply a protectant spray to the nearby trees until they are showing signs of good growth and color.
Effects Of Hot Dry Weather On Insects & Their Relatives
Lee Townsend, Extension Entomologist
Univ. of Kentucky

Aphids, leafhoppers, planthoppers, thrips, and mites may be more troublesome than normal as the current hot weather continues. These cold-blooded animals will develop faster than normal because of the increased temperature and may have one or more extra generations as a result. For example, coupling faster development with the normally high reproductive rate of aphids and mites can mean much higher populations of these sap-feeding insects, and more damage on some plant species. However, some studies indicate that sap feeders are adversely affected when feeding on stressed plants due to low leaf water content and turgor pressure. Some fungi specifically attack insects and mites, providing an important component of natural control during most years. The impact of these fungi usually is greatly reduced during dry periods so its impact is lessened. Greater survival of more potential pests can mean damaging populations. In addition to lower humidity, rain may wash of small stages of some pests, providing some physical control.

Potato leafhoppers can be very abundant in alfalfa. In fact, the deep root system of the plant may make it some of the lushest food around for many insects. Leafhopper feeding causes the familiar hopperburn, yellow wedged-shaped areas on leaf tips. They also cause slower growth and reduced root reserves that can affect winter survival of stands.

Corn leaf aphids have been associated with dry years. Gummed up developing tassels in whorl-stage corn can pose pollination problem for seed producers and potentially in grain fields. In some cases, infestations can continue after tasseling at levels that kill leaves above the ear, affecting grain fill. Check for infestations regularly to keep from being caught by surprise.

Levels of corn rootworm damage that normally would go unnoticed can cause visible wilting because of under-developed root systems and/or water stress. There is no rescue treatment for rootworms.

Bark beetles and other wood borers may be more problematic as stress trees are less able to cope with attack. Reduce water stress on newly-planted trees and use a preventative pyrethroid spray on trunk and main branches. Trees in residential or commercial landscapes, especially parking lots, are prone to heat and water stress and potential damage from mowers and string trimmers. Wounds, plus a reduction in the ability to produce defensive chemicals, increase susceptibility to infestation.

Be especially alert for signs of insect activity on crops and landscape plants. Look for early signs of infestations and follow their progress for a few days to see if an insecticide application would be useful. When temperatures are high, toxicity from applications of pyrethroid insecticides (bifenthrin, cyfluthrin, cypermethrin, esfenvalerate, permethrin, etc.) is reduced and control may be less than satisfactory.

Gypsy Moth Trapping Update

The map below shows the areas where gypsy moth traps have already been placed. The lighter shaded areas will hopefully be filled in by June 30. These traps will be checked once during July for any gypsy moths then removed in August. A final report on gypsy moth will be in the September newsletter.

The picture at left shows the style of trap we use for this program.
Honeylocust Plant Bug

Katherine Mazzey Penn State Extension Program Assistant and Michael Masiuk, Extension Agent, Penn State Univ.

The Honeylocust plant Bug, *Diaphnocoris chlorionis* (Say) became a pest in the 1950’s and 1960’s with the introduction of the thornless cultivars. It easily escapes detection because the color of the nymph and adult closely matches that of new plant growth. If the infestation is extensive, complete defoliation can occur.

Plants Attacked

As its name suggests, the honeylocust plant bug attacks the honeylocust tree (*Gleditsia triacanthos*). Yellow-leaved cultivars, such as the popular “Sunburst,” appear to be more susceptible to honeylocust plant bug damage than green-leaved cultivars.

Insect Identification

The eggs are a light color and approximately 1/8 inch long. The nymph is a miniature of the adult. The adult is light green to yellow and approximately 1/8 inch long when fully grown. It has a four segmented antennae and a beak-like mouthpart.

Life History

Over-winter as an egg

Spring: The eggs hatch when the buds on the honeylocust begin to open. The nymphs crawl to young leaves and feed. Approximately 30 days later (late May to early June) the adults appear

Summer: The adults lay their eggs under the bark of 2 and 3 year old twigs. This is where the eggs remain for the winter.

There is one generation a year.

Damage Symptoms

Both the nymph and adult feed on the foliage of the plant, although the most serious damage is caused by the nymph, early in the season. Damage includes severe leaf distortion, discoloration and dwarfed leaflets. Severe defoliation weakens the tree and increases its susceptibility to invasion by secondary insect and disease pests. Complete defoliation of the host plant is possible.

Management Options

Cultural: Selecting plants that are resistant will prevent spread. The cultivar ‘Sunburst’ seems to be more susceptible to damage. It is important to look for activity early in the season. To be effective, treatment should occur when the leaves first open.

Chemical: Formulations of acetamiprid, bifenthrin (Bifenthrin Pro Multi-Insecticide, Onyx Insecticide, Talstar F, Talstar Lawn & Tree Flowable, Talstar GC Flowable, Talstar Nursery Flowable, and TalstarOne Multi-Insecticide only), carbaryl, chlorpyrifos (Dursban 50W only), cyfluthrin, cyfluthrin and imidacloprid, deltamethrin, horticultural oil, insecticidal soap, lambda-cyhalothrin (Battle GC, Demand CS, Scimitar CS, Scimitar GC, and Scimitar WP only), permethrin (Astro Insecticide and Permethrin Pro only), pyrethrins and piperonyl butoxide, and thiamethoxam are labeled for plant bug management.

Management Hints: Registered insecticides should be directed against young nymphs 7 to 10 days after bud break in early May.

How To Minimize Insecticide and Miticide Resistance

Raymond A. Cloyd, University of Illinois, Dept of Natural Resources & Environmental Sciences

1. Use a variety of management strategies:
   - **Cultural** -- maintain proper watering and fertility practices. Avoid stressing plants.
   - **Sanitation** -- remove weeds, old plant, and growing medium debris.
   - Biological -- parasitoids, predators, entomopathogenic fungi/bacteria, and beneficial nematodes.
   - **Plant Resistance** -- grow (if available) insect tolerant plants.
   - Scouting -- evaluate effectiveness of management strategies and determine population dynamics of pests.
2. Rotate chemical classes with different modes of activity.
3. Minimize use of persistent materials, which can increase insect/mite exposure time.
4. Minimize the use of tanks mixes. Pests may develop resistance to multiple insecticides.
5. Use materials with non-specific modes of activity: soaps, oils, neem compounds, insect growth regulators, and entomopathogenic fungi and bacteria.
6. Spot spray. This avoids exposing entire pest population to pesticide.
7. Time applications to kill most vulnerable stages. May result in the use of reduced rates and/or less frequent pesticide applications.
Euonymus Scale
Lee Townsend, Extension Entomologist
Univ. of Kentucky

Female Euonymus scale females (about 1/16 inch long) have dark brown to gray, somewhat pear-shaped bodies. The white coverings of males are distinctly smaller and narrower. When abundant, these armored scales can completely encrust twigs and leaves of Euonymus, pachysandra and bittersweet. They use their piercing-sucking mouthparts to feed on sap. Moderately to heavily infested plants grow very slowly, if at all, and yellow spots may appear on the foliage. Heavy infestations can cause branch dieback and may even kill some plants.

Fertilized females pass the winter with their eggs hatching over a two-week period from late April to early May in central Kentucky. The tiny crawlers can be active into late May and are adults four- to six-weeks later. Crawlers that hatch from these eggs are active from late July into early September.

Scale control can be challenging and may need to be repeated over several seasons. Proper timing of insecticide applications is a major key to success. Applications must target newly hatched scale crawlers which are active in May and again in June and July. They are very susceptible to control measures while moving over plant surfaces to find a feeding spot. Once settled, they begin to secrete a waxy covering that shields them from sprays.

Alternatives for crawler control
Cultural control
Scales tend to thrive on stressed plants. Following a recommended fertility program and watering regime will promote plant health. However, over-fertilization favors scale buildup. If practical, improve plant sites to reduce stress and promote growth. Severely prune back heavily infested branches and protect new growth with insecticide applications.

Insecticidal Sprays
Horticultural oils kill by suffocation or after penetrating over-wintering stages of the insect. Consequently, they may not be effective where several layers of scale coverings have accumulated.

Dormant oils are typically applied during February or March but may not be very effective against armored scales. Highly refined supreme, superior, or summer oils can be used on many trees and shrubs during the growing season. Read the product label for guidelines on plant sensitivity and temperature restriction before buying and using these products.

Insecticidal soaps are long chain fatty acids that kill susceptible insects through direct contact. Like horticultural oils, they require thorough coverage. Soaps leave no residue so repeated applications may be needed for some pests. These products may burn the foliage of sensitive plants, such as Japanese maple, so check the label for information about the plant species that you intend to treat.

A variety of natural and synthetic insecticides are labeled for use as sprays to control scale crawlers on landscape trees and shrubs. While the residual life of these products is generally longer than oils and soaps, timing, coverage, and precautions on damage to some plant species are very similar to those for oils and soaps.

Systemic insecticides
Imidacloprid (Bayer Advanced Garden Tree & Shrub Insect Control Concentrate) is applied as a drench around the root zone of infested plants. This water soluble insecticide is taken up by the roots and transported throughout the plant where it is ingested by sap feeding insects. This provides a means of scale control without reliance on sprays. However, it may need to be applied several weeks before crawlers are active for best results.

Evaluating Control
The success or failure of control efforts may not be readily apparent but here are some things to check.

Live scales should produce a liquid when mashed, dead scales will be dry and not "bleed" when crushed.

New foliage should have a healthier appearance once the scale burden has been removed. Buds should break a little earlier than when the plant was infested and expanded leaves should have normal color and turgor.

Natural Enemies
Scale insects can be attacked by a variety of lady beetles, predatory mites, and small parasitic wasps. Lady beetle adults and larvae can be seen but mites and parasitic wasps are very difficult to see. You can conserve natural enemies by using insecticidal soaps and oils which have limited impact on beneficial species in comparison to other control alternatives.

Control Measures
Crawlers may be managed with formulations of acephate, acetamiprid, azadirachtin (Ornazin 3% EC only), buprofezin, carbaryl, chlorpyrifos (DuraGuard ME and Dursban 50W only), cyfluthrin, cyfluthrin and imidacloprid, deltamethrin, dimethoate, dinotefuran, horticultural oil, hydrophobic extract of neem oil, insecticidal soap, lambda-cyhalothrin (Battle GC, Demand CS, Scimitar SC, Scimitar GC, and Scimitar WP only), malathion, methidathion, and pyriproxyfen.

Management Hints: Select and apply horticultural spray oil according to label directions. Apply crawler treatments in late May through June. Second-generation crawlers may require treatment from late July through early August. Repeat applications may be necessary. Prune and destroy heavily infested twigs and branches.
Emerald Ash Borer Found in Pennsylvania

On June 22, Emerald Ash Borer was found in Cranberry Township, Butler County, PA. The specimens were collected by USDA seasonal employees traveling towards Pittsburg from the Ohio/Pennsylvania state line. Inspection of an ash tree with declining crown and splitting bark revealed 2 live adults. The ash tree was planted in a business area.

This area is approximately 30 miles from the latest find in Ohio. This find was at a welcome center along I-76 near New Springfield, Ohio.

Businesses with a nursery license (not nursery dealer) need to make sure they have submitted a renewal form for the license year July 1, 2007 – June 30, 2008.

Degree Day Totals through June 27, 2007
Bardstown—1778
Bowling Green—1915
Covington—1635
Henderson—1797
Huntington WV—1690
Lexington—1676
London—1762
Louisville—1748
Mayfield—1746
Paducah—1937
Princeton—1991
Quicksand—1742
Somerset—1554

Degree Day Totals through June 27, 2006
Bardstown—1418
Bowling Green—1690
Covington—1256
Henderson—1457
Huntington WV—1453
Lexington—1365
London—1447
Louisville—1413
Mayfield—1436
Paducah—1845
Princeton—1783
Quicksand—1451
Somerset—1334

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