Sudden Oak Death Quarantine—Where Are We Now?

As reported in last month, on March 26, 2004, John Obrycki and Richie Farmer signed an order to quarantine all plant material from the State of California. This was done in response to the finding of Sudden Oak Death (SOD) disease at Monrovia Nursery – Azusa location and Specialty Plants. Both of these nurseries lie outside the 12 quarantined counties of California.

Since that time, the USDA has posted an Interim Ruling which would allow the shipment of possible infected nursery stock to our state. In the USDA ruling, only known hosts and associated hosts (see inside list for details) are to be sampled for presence of the disease. We do not feel that this gives us a very high comfort level, given the number of new host plants that are determined each year. For example in the year 2000 only 3 hosts were known, that number grew to 8 in 2001, 17 in 2002, and 59 in 2004. It is clear that the host range of SOD is not clearly defined as plants like Camellia, a Rose species and several Viburnum species have been added this year.

Pests susceptible to control based on degree day forecasts

( ) = Degree day ranges

- Bagworms (700-800)
- Birch leafminer (275-500)
- Black vine weevil adult (500-1000)
- Bronze birch borer (400-800)
- Oystershell scale (275-600)
- Taxus mealybug (300-500)
- Euonymus scale (500-700)
- European pine sawfly (200-600)
- Flatheaded apple tree borer (500-1600) apply 3 applications @ 3 wk intervals
- Hawthorn leaf miner (300-500)
- Peach Tree Borer (500-2100) 2-4 sprays
- Pine needle scale (200-600)
- Roundheaded apple tree borer (600-1600) apply 3 applications @ 3 week intervals
- San Jose Scale (500-1800)
- Two spotted spider mite (900-2100)

Source: Coincide by Don Orton, retired nursery inspector, IL Dept of Ag.
Sudden Oak Death con’t

Kentucky has filed a Special Needs Exemption with Ann Veneman, the Secretary of the U.S. Department of Agriculture. In this exemption, all plants in the genera referenced on the Federal SOD list and any plants that have not been tested to determine susceptibility will be denied entry into Kentucky. This request was made because Kentucky’s favorable climate, plant diversity and large oak forest population is at an extremely high-risk for introduction and establishment of SOD.

We have added a “hot topics” button on our web site (www.uky.edu/Agriculture/NurseryInspection) so look there for more information on Sudden Oak Death has it becomes available.

Beginning in early May, nurseries and nursery dealers that have received nursery stock from California in the past will be visited by either people from our office or from the USDA. Plants in the nurseries will be examined for symptoms of SOD. Planting around the nursery will also be inspected for symptoms of SOD. This is to determine if SOD may have spread into the nearby landscapes during previous years. Any leaves that show symptoms similar to SOD will be collected and brought to the University of Kentucky’s Plant Disease Diagnostic Laboratory where they will be tested for SOD.

This is part of a nationwide survey that has been implemented by the USDA to determine if this disease has spread outside of the known quarantined areas in the western United States.

Leaf symptoms of Sudden Oak Death

Purchasing Trees with Verticillium Wilt Harms Kentucky Nurseries

John Hartman, Extension Plant Pathologist, Univ. of Kentucky

During recent weeks, Verticillium wilt disease has been discovered in some Kentucky nurseries growing 6 to 8 ft. maple trees supplied only a month before from an out-of-state grower.

Many of these infected trees were recently transplanted into Kentucky nurseries and then were uprooted for examination in our plant disease diagnostic lab. Verticillium wilt, which is caused by the fungus Verticillium albo-atrum, is capable of causing a serious vascular wilt of a wide range of woody plants. Several of our common landscape trees such as ash, catalpa, katsura tree, magnolia, maple, redbud, smoketree, and tuliptree are susceptible to Verticillium wilt.

Symptoms. In the recent case, the ‘Autumn Blaze’ maples were just breaking dormancy when they were examined, but they drew the attention of the growers because some of the young trees were showing symptoms of twig and branch dieback. Cutting into and examining the xylem tissues revealed dark greenish-black streaks of discoloration, particularly in the lower trunk portions of the tree. In some trees, the stained areas included nearly the entire vascular cylinder while in others only a tiny narrow streak may have been present. The staining extended up the trees some distance, but generally did not extend out to the branches and twigs. Some of the healthy-looking trees with no branch or twig dieback were cut into, and these too showed internal xylem staining.

Laboratory cultures confirmed the presence of the causal fungus.

Disease biology. The Verticillium fungus survives as resistant, dormant microsclerotia for many years in soil. Thus, soil in some fields of these nurseries may now be contaminated. The fungus infects plant roots through wounds, or in some cases, direct penetration of susceptible root tissue. From the root infections, the fungus spreads into the plant through the xylem. Xylem tissues become blocked so that stems and leaves no longer are supplied with adequate water and mineral elements. After the tree dies, the fungus returns to the soil as tiny resistant fungal microsclerotia. These structures can also be spread by wind, in soil, and on equipment. Many herbaceous and weed hosts are also susceptible so it is hard to avoid contaminated soil. Verticillium wilt is favored by landscape stresses such as wounding and drought.

Infected trees provided with good growing conditions only rarely recover from this disease.

Management

• Where Verticillium wilt has been diagnosed, only replant with disease resistant plants. Conifers such as hemlock, pine, taxus and spruce are not affected. Other trees that are typically free of this disease include: beech, birch, crabapple, mountain ash, dogwood, hawthorn, holly, honeylocust, mountain ash, oak, pear, planetree, sweetgum, sycamore, willow, and zelkova.

• The red maple cultivars Armstrong, Autumn Flame, Bowhall, October Glory, Red Sunset, Scarlet and Schlessinger have also been reported as resistant.

• Keep plants as healthy as possible. Good nursery care includes good site selection, proper transplanting, good water management, a prudent fertility program, and pruning out dead branches. Be aware that pruning out infected branches does not eliminate Verticillium from the plant since infections originate and spread from the roots.

• Fungicides are not effective for control of this disease.
Cool Season Spider Mites
Mike Potter, Extension Entomologist, Univ. of Kentucky

Most people don't think about spider mites infesting landscape plants until later in the summer. While this is true for twospotted spider mites and European red mites which thrive under hot, dry conditions, the spruce spider mite and southern red mite prefer cooler temperatures and are most active in the spring and fall.

Spruce Spider Mite-(damage shown at left) this mite feeds on more than 40 species of conifers. Most often attacked are spruce, pine, juniper, fir, arborvitae, hemlock, taxus and false cypress. Prolonged feeding causes yellowing, browning, and premature needle drop, often originating from the canopy interior. Heavy attacks can cause branch dieback or death of the entire plant.

Spruce spider mites overwinter in the egg stage attached to the base of needles or on the bark. Eggs hatch in early spring, and mature in 2 to 4 weeks. Damaging populations may be reached in April and May, before warm summer temperatures slow their activity. Populations rebound in the fall with the return of cooler weather, and feeding may continue into December or beyond if winter temperatures remain mild. Damage inflicted by mite infestations present now (during spring) often go unnoticed until the heat and dryness of June and July.

Southern Red Mite- This is the most common and destructive spider mite on broad-leaved evergreens, especially Japanese and American hollies, azaleas, viburnum, roses and rhododen-

Drone. Feeding on the undersides of leaves causes stippling, browning, occasional distortion, and premature leaf drop. Southern red mites overwinter on the egg stage on the undersides of leaves. Like the spruce spider mite, its numbers are greatest during cooler periods of the spring and fall.

Diagnosing Infestations- Spider mite populations can increase rapidly and cause extensive damage in a very short time. Therefore timely inspection of susceptible landscape plants is key. An efficient way to sample vegetation for mites is to hold a sheet of white paper under a branch and tap the foliage sharply. If mites are present, they will be dislodged and appear as slow-moving specs on the paper. Spider mites are tiny about the size of the period at the end of this sentence. A 10 – 20 power hand lens is helpful for clearly seeing the mites, which will appear yellow, green, orange, purple, black or nearly transparent.

Mite-infested foliage has a stippled or flecked appearance where the mites have fed. Also visible may be webbing, pale-colored cast "skins" shed by developing mites, and spherical, often translucent eggs. When scouting for spider mites, pay particular attention to plants having a history of mite problems. Spider mites often re-infest the same plants year after year.

Controlling Infestations- Spider mites are one of the more difficult landscape pests to control. When buying new plants, it pays to inspect the lower leaf surfaces for evidence of mites. Spraying plants with a strong stream of water from a garden hose will dislodge some mites off leaf surfaces. The approach is generally more effective on smaller plants with nondense foliage and low mite populations. If used, water sprays should be directed upward against the lower leaf surfaces and the technique will need to be repeated on regular intervals. Low populations of spider mites will sometimes be held in check by naturally occurring predatory mites, which feed on both eggs and active stages.

Elimination of moderate to heavy infestations usually requires the use of specific pesticides known as miticides. Effective homeowner products are limited to such options as horticultural oils and insecticidal soaps. Nursery and landscape professionals may also want to consider using Hexygon, Joust, Morestan, Pentac, Scimitar or Talstar. Always read and follow the directions accompanying the product. Some miticides (e.g., oils) may harm or discolor certain types of landscape plants.

Good spray coverage is essential. Thoroughly wet the foliage and try to contact as many mites as possible, paying particular attention to leaf under surfaces where most mites are living. In most cases, two or more applications at 5-10 day intervals will be needed for satisfactory control. Spider mite eggs which have not yet hatched are unaffected by most miticides; the same is true of larvae and nymphs that are molting. During molting, spider mites remain inactive beneath the former skin, which serves as a barrier against insecticides. The quiescent mites also do not feed, rendering products that kill by ingestion temporarily ineffective. Consequently, if only one application is made, some of the mites will survive and the infestation will persist.

Regulatory Specialist
David Hoff has been working with our office since December 2003 as a Regu-
latory Compliance Specialists. His job responsibilities include contacting unli-
censed businesses and informing them about KRS 249 and asking that busi-
nesses post their nursery/nursery dealer licenses. This summer he will be help-
ing with gypsy moth trapping in south-eastern Kentucky.
Mite Damage in Greenhouse Ornamentals
By Lee Townsend, Extension Entomologist, Univ. of Kentucky

Two spotted spider mites are not the only acarines that can cause headaches for greenhouse growers. Tiny cyclamen mites and broad mites can be significant pests, as evidenced by samples received at the Plant Disease Diagnostic Lab last week. The small size of the latter two species means the first indication of an infestation often is severe plant injury or distortion. By then, the infestation may be so severe that bringing it under control can be a serious challenge.

Cyclamen and broad mites, translucent to light brown and less than 1/100 inch long, feed on a wide range of ornamental plants. Their feeding can produce a variety of effects including brittle, twisted, puckered or otherwise deformed leaves and shriveled buds and flowers. Cyclamen mites tend to feed in developing buds while broad mites live on the underside of leaves. Regular and careful plant examination of any distorted or abnormal leaves is the key to detecting infestations. That takes some effort because these mites move to shaded spots in plant crowns under surfaces of leaves to avoid light. Their small size also means that a strong hand lens is needed to see them.

It is usually best to discard a few infested plants as soon as they are detected rather than to try to eliminate established infestations. It is easy to spread mites around on your hands as you work with plants.

Many mite control products work by contact so very thorough spray coverage is essential for best effect. Often, eggs and some specific stages of the mite life cycle are not susceptible to acaricides / insecticides so repeated applications are necessary. In addition, it may be important to rotate classes of acaricides to reduce the potential problems with resistance. Control alternatives are available in Entfact 450 - Some insecticides / acaricides labeled for use in greenhouses and interior plant scapes. www.uky.edu/Agriculture/Entomology/entfacts/trees/ef450.htm

Natural enemies of important mite species are commercially available and may be used to manage pests in enclosed situations like greenhouses.

Crown Gall of Ornamentals
By Jacqueline Mullen and Austin Hagan, Extension Plant Pathologists, Auburn University

Crown gall is a soilborne bacterial disease caused by Agrobacterium tumefaciens. The host range of this bacterium is very wide and includes annual periwinkle, arborvitae, ash, begonia, birch, cactus, camellia, chrysanthemum, coleus, coreopsis, cypress, dianthus, dogwood, elm, euonymus, fig, gardenia, geranium, hawthorne, holly, hydrangea, impatiens, ivy, juniper, kalanchoe, ligustrum, maple, marigold, oxalis, pachysandra, pecan, petunia, philodendron, phlox, poplar, prunus, pyracantha, oak, ornamental pear, rhododendron, rose, Russian olive, saintpaulia, salvia, sunflower, verbena, viburnum, willow, wisteria, zinnia, and more. In addition to ornamentals, cotton, grape, tobacco, and many vegetables are also susceptible to attack by A. tumefaciens.

Symptoms. Initially, small, soft, green or white swellings appear on lower stems at the soil line or crown of the plant. Swellings or galls may also appear on roots and sometimes on the lower stems or trunks. As the galls continue to develop and enlarge, the surface layers may become brown, woody, and roughened. With old galls, the surface layers often decay and slough off. Galls can be spherical or contorted into a variety of shapes. Plants with galls usually become unthrifty and possible stunted. Plant death may eventually occur.

Persistence And Transmission. Agrobacterium tumefaciens is a soilborne bacterium that is often introduced into landscape beds on diseased plant material or infested soil. The bacterium enters through wounds on the roots or crowns of the plant. These wounds may occur as points of lateral root emergence, or they may be caused by pruning, insects, cultivation, or other mechanical damage. Once inside the plant, the bacterium transfers some of its genetic material into the plant's cells. These cells begin to enlarge and multiply at an abnormally rapid rate, and small swellings begin to appear on the roots and crowns. Once gall formation begins, the development will continue even in the absence of live bacteria. As galls age and start to decay, bacteria are released into the soil where they may survive for 2 years.

Control. Crown gall of ornamentals can be controlled by the following strategies:

- Avoid introducing A. tumefaciens from diseased or galled plant material into landscape beds. Plant a resistant crops in the area once the disease is introduced.
- Carefully inspect new plant material for evidence of galls or swellings on roots, crowns, or lower stems. Do not bring diseased plant material into the landscape area.
- Avoid injuring roots and stems when establishing plants.
- Control insects that may feed on lower stems, crowns, or roots.
- Once the disease is discovered, carefully remove all infected plants. Also, if possible, remove soil in the area of the galls.
- Always wash cutting and pruning tools thoroughly with soap and water and disinfect them frequently. Disinfect tools by immersing them in alcohol or germicidal soap.
- For 2 to 3 years after the discovery of crown gall-infected plants, rotate the area to a nonhost plant. Plants reported to by nonhosts for A. tumefaciens include andromeda, barberry, birch, boxwood, cedar, firethorn, golden-rain-tree, holly, maidenhair tree, mimosa, mountain laurel, redbud, smoke tree, sweet gum, and tuliptree.
Bark Beetles

Eric Day, Virginia Cooperative Extension, Virginia Tech University

Over 600 beetles in the family Scolytidae are commonly referred to as bark beetles. Species identification is difficult because nearly all bark beetles are black or brown, cylindrical, hard-shelled, and between 1/8 and 1/3 inch long. Luckily, similarities in their life cycles and in the injury they cause usually make species determination unnecessary for making control decisions.

Adult bark beetles bore through the bark to the cambium layer of suitable host trees. Females excavate a tunnel between the bark and wood along which they lay their eggs. Upon hatching, each grub burrows away from the egg tunnel and feeds on the live bark tissue (phloem) and outer cell layers of wood (xylem). The resulting network of egg and larval tunnels beneath the bark is called a gallery. The "shot hole" appearance of the bark in infested trees indicates that numerous beetles have matured, chewed exit holes, and flown off to find new breeding sites. From one to six generations per year are typical depending on the species.

As a general rule, bark beetles attack trees that are weakened or dying due to stress factors such as drought, disease, smog, mechanical injury, or alteration of the water table and root damage due to nearby construction. They are also attracted to recently cut wood which still has bark. In pines, resin often oozes from the bark where beetles first attack, producing conspicuous pitch tubes. Some beetles become trapped in the pitch and die. A healthy tree produces enough pitch to prevent successful attack by many beetles, but sometimes by sheer numbers alone bark beetles are able to overwhelm and kill healthy trees. This may happen to trees which are near heavily infested breeding sites. Once a bark beetle is successfully established in a tree, it emits a chemical called a pheromone which attracts other beetles to the same tree. Once infested, trees almost never recover and control efforts are usually futile. Bark beetles do not attack trees and wood that are dead and dried, nor dying or recently cut wood if the bark is removed.

Several of our most common types of bark beetles are listed below, along with characters which should help you identify them. Remember that there are many other species which may be encountered in shade trees and wooded areas from time to time.

Ips Beetles. Bark beetles in the genus Ips are commonly called engraver beetles or simply Ips beetles. They can be distinguished from other bark beetles by their scooped-out hind ends. Ips galleries, found in pines, have egg tunnels in the form of an H or a Y. Though capable of attacking the entire tree, Ips beetles are usually confined to the crown.

Southern Pine Beetle. One of our smaller bark beetles, the southern pine beetle is barely 3/16 inch long. Following long, dry spells or poor forest management, outbreaks occur that rapidly kill large areas of pine forests. Southern pine beetles attack mainly the middle or upper part of the tree trunk. All ages and sizes of pine trees are potential hosts. Their egg and larval tunnels wind around in an unorganized pattern. Healthy, vigorous trees and proper forest management practices reduce the likelihood of outbreaks and tree losses.

Black Turpentine Beetle. This beetle is large for a bark beetle, about 1/3 inch long. It attacks pine trees at the base of the trunk, and may also breed in stumps. Black turpentine beetle grubs feed together and excavate large patches under the bark. A common characteristic of this beetle's attack is the presence of a glob of pitch, about 1/2 inch in diameter, at the exit hole. Sometimes there will be large numbers of white pitch globs on the dark bark.

Elm Bark Beetles. There are two species of bark beetles which attack elms. Both of them are capable of transmitting Dutch elm disease when they feed on healthy trees. The European elm bark beetle feeds in the crotches of one- to three-year-old-twigs; the native elm bark beetle feeds in the thick bark of trunks and limbs. Native elm bark beetles construct egg tunnels across the wood grain. Egg tunnels of the European elm bark beetle are parallel to the grain. Both make galleries and breed only in recently killed or dying elm wood three inches or larger in diameter.

Other common bark beetles include: Shothole Borer which attacks fruit trees, wild cherry, serviceberry, and occasionally elm; Peach Bark Beetle in stone fruits, mountain ash, elm, and mulberry; Pityogenes spp. and Pityophthorus spp. in pines; Phloeosinus spp. in cypress and junipers; Ash Bark Beetle in ash; Birch Bark Beetle in birch, beech, wild cherry and red gum; and Hickory Bark Beetle in hickory.

On healthy trees bark beetles may attack individual twigs and branches that are dying from shading out or other causes. For example, some species breed only in the dead or dying twigs, branches, and limbs of pines. These bark beetles will not breed in live branches, and thus are not a progressive destructive threat to healthy parts of trees.

Control

The old adage about an ounce of prevention being worth a pound of cure is especially appropriate here. Once a tree becomes infested with bark beetles, it usually dies rapidly. Bark beetles attack weakened, stressed, or dying trees. Preventative measures include: 1.) maintaining healthy, vigorous trees; 2.) eliminating beetle breeding sites, such as recently dead or cut trees, limbs, slash, and firewood with bark; and 3.) applying residual insecticides to susceptible but as yet uninfested trees, especially those under stress and therefore attractive to bark beetles. Treating infested materials before bark beetles emerge will kill them as they chew their exit holes. Always read and follow the instructions on the pesticide label.
New Insect Reference Book Available

Dr. Whitney Cranshaw of Colorado State University has put together an excellent book entitled “Garden Insects of North America”. This book is the most comprehensive and user-friendly guide to the common insects and mites affecting yard and garden plants in North America. It describes the vast majority of species associated with shade trees and shrubs, turfgrass, flowers and ornamental plants, vegetables, and fruits-1,420 of them. It is 656 pages and has multiple color pictures on almost every page. This book would be an excellent reference guide for garden centers, master gardeners, production nurseries, sod producers, landscape contractors and landscape maintenance operations.

For individual copies, the cost is only $25 plus $3.50 shipping. For a box of eight copies there are no shipping costs. Orders can be placed by sending a check to:

BugsBooksDirect
c/o Whitney Cranshaw
1400 West Lake Street

If you have any questions about the book, you may email them to bugbooksdirect@yahoo.com

Degree Day Totals through April 26, 2004
Bardstown—343
Bowling Green—406
Covington—262
Henderson—397
Huntington WV—384
Lexington—326
London—371
Louisville—357
Mayfield—371
Paducah—453
Princeton—465
Quicksand—380
Somerset—362

Degree Day Totals through April 28, 2003
Bardstown - 352
Bowling Green - 430
Covington - 289
Henderson - 381
Huntington WV - 368
Lexington - 319
London - 355
Louisville - 343
Mayfield - 375
Paducah - 400
Princeton - 419
Quicksand - 422
Somerset - 427