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KENTUCKY PEST NEWS

ENTOMOLOGY · PLANT PATHOLOGY · WEED SCIENCE

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CORN

Northern Leaf Blight

By Paul Vincelli

A case of Northern leaf blight of corn was confirmed from a continuous corn field in the Green River Area of Kentucky. This isn't surprising, given mild, wet weather for much of the season. However, it is a disease to be aware of, because some corn hybrids are rather susceptible to this disease, and damaging epidemics can develop on these hybrids if conditions permit (see Figure 1).

Figure 1. Susceptible (left) vs. resistant corn hybrids in a commercial field in Western KY, under epidemic conditions of northern leaf blight.

Key Features of Biology

Northern leaf blight (NLB) is caused by the fungus *Setosphaeria turcica (=Exserohilum turcicum, =Helminthosporium turcicum).* Symptoms of the disease include elliptical, grayish-green or tan lesions 1 to 6 inches long with smooth margins. During damp weather, greenish black fungal sporulation is produced in lesions (Figure 2).

Figure 2. Large, cigar-shaped spots of Northern leaf blight, with greenish black sporulation in the centers of spots on the left. Note also the much smaller orange-brown lesions of gray leaf spot.

Older leaves are affected first, so the disease is usually most severe on them. Severely affected leaves can be killed when lesions coalesce. On hybrids carrying an Ht_1, Ht_2, or Ht_3 resistance gene, long, yellow to tan lesions with wavy margins and no sporulation are observed on leaves infected with *S. turcica*. These resistance-reaction lesions can be easily confused with Stewart's wilt (Figure 3).

Figure 3. Stewart's wilt of corn. Note necrotic lesions with wavy margin; these run in the direction of leaf veins.

Like the gray leaf spot fungus, the NLB fungus survives in undecomposed corn residue, so the disease is worse under reduced- or no-tillage and also in a continuous-corn production system. Spores are spread by air currents. Strains of this fungus also infect sorghum, johnsongrass and Sudan grass but evidence indicates these strains do not attack corn. Yield and test weight can be substantially reduced in susceptible hybrids if cool, wet weather prevails, although many hybrids grown in Kentucky have adequate resistance.

Management

The main management tool is the use of resistant hybrids, especially when grown without rotation under conservation tillage. Hybrids with either single-gene (Ht) or multiple-gene resistance are available. Rotate away from corn for 1-2 years.

If a particular field is diagnosed with NLB and the hybrid is known to be highly susceptible, fungicides MIGHT be useful. If a susceptible to highly susceptible corn hybrid is at the silking stage and NLB lesions are found within 2-3 leaves of the ear leaf on at least half the plants examined, and the field is thought to have a high yield potential, a fungicide application might help protect from yield loss if cool, wet weather prevails for the next 6-8 weeks. But don't go out and spray reflexively. Carefully consider whether these conditions have been met in your field. Even if they have, keep in mind that a positive economic return doesn't always occur from a fungicide application, even if the risk factors for disease are in place.

Overall, the strobilurin fungicides provide the longest-lasting control of foliar diseases in corn, so those are the ones I would use if considering applying a fungicide. The strobilurin fungicides include Headline® and Quadris® as well as pre-mixes containing strobilurins (Quilt® and Stratego®).

Japanese Beetle and Corn Pollination

By Ric Bessin

Within the delayed planting in some corn fields, tasseling and pollen shed is occurring later this year, so much so that pollination interference by Japanese beetle may be an issue. In a more typical year much of the corn sheds pollen and pollinates prior to the peak of the Japanese beetle emergence and flight. This may be more of a concern in extreme western KY where Japanese beetle numbers are considerably high than in other parts of the state.

Figure 4. Japanese beetle feeding on corn silks.

One of the preferred foods for Japanese beetle is corn silks. Generally this is not as serious an issue if the corn has already pollinated (prior to pollen shed), but when this occur prior to pollen shed the result can be pollination interference and partially barren ears. Fortunately corn pollinates relatively quickly after silk emergence, pollen shed occurring a couple of days after silk emergence. Growers concerned about Japanese beetle should scout their fields soon after tassel emergence and silking. Prior

to pollen shed, our recommendation is to treat for Japanese beetle if there are two or more per ear and they are clipping the silks back to ½ inch or less. Growers should also determine how far the infestation extends into the field, as Japanese beetle numbers are much higher on the outside boarder rows than they are in the interior of the field. When treatment is needed, it often just the boarder rows that need treatment. If corn has already pollinated, then no treatment for Japanese beetle is needed.

For a list of recommended insecticides, growers can consult ENT-16, *Insecticide Recommendations for Field Corn.*

SOYBEAN

Fungicide Applications to Soybean: Stop, Look and Listen before Spraying
By Don Hershman

Each year since 2003, Kentucky soybean producers have had to decide if applying a fungicide to their soybean crop was in their best interest or not. Quite naturally, soybean producers want to maximize the yield potential of their soybean crops. Application of a fungicide, when needed, has been shown to be one means to achieve this end. However, producers also realize that maximizing yield does not necessarily mean maximizing profits. Treatments must be economical in order to be viable. It's that simple.

There are some who would tell producers to apply a fungicide no matter what, because the past yield performance of treating is just too favorable NOT to apply. I do not subscribe to this philosophy. Instead, I tell producers to make fungicide use decisions based on need, as determined by a disease risk assessment, for each field where a fungicide appliction is being considered. It is not acceptable, and in the long term may not be sustainable, to treat fields without first establishing the need to spray.

The data figures, below, are a case in point. The figures come from a summary of multi-state, multi-cultivar, small plot trials conducted in various Midwestern states by Pioneer Hi-Bred International, Inc, Agronomy Sciences, during 2004-2008. Although Kentucky is considered to be a southern state, its soybean crop is more like that in lower Midwest than states like Arkansas, Louisiana, or Mississippi. Thus, the Pioneer studies done in the Midwest are *directly applicable to us.* I have decided to focus on the results of the Pioneer studies since neither Pioneer, nor their parent company DuPont, sell foliar fungicides that are being commonly being used in soybean. Pioneer also does not carry the label "too conservative" that has recently been applied to many university studies by some soybean producers. The Pioneer studies and this article focus on Headline and Quadris since these two fungicides represent the majority of soybean acres sprayed in the Midwest and Kentucky

Figure 5 summarizes the results for Headline applied at 6 fl oz/A at the R3 (early pod) growth stage. **Figure 6** summarizes the results for Quadris applied at 6.2 fl oz/A at R3. Fungicides were applied, without reference to disease risk, in 15-20 gal/A, and included adjuvants recommended by their respective manufacturers (BASF [Headline] and Syngenta [Quadris]). Little foliar disease developed in any test, any year.

The results of both treatments are fairly similar, and the associated "piano graphs" are not unlike what you may have seen from a variety of sources, including many Land Grant universities. Almost without exception, there is a trend towards an overall positive yield response when treating. Our studies and many others have shown a similar trend. Headline produced a higher yield in treated plots 78 out of a 100 times (78%), while Quadris produced the same statistic, but treatments differed in average yield response over all trials (3.7 for Headline vs. 2.9 bu/A for Quadris). However, when economics were applied (Pioneer placed this at 3 bu/A and I think few would argue with this figure), Headline produced an economical result 51% of the time and Quadris 47% of the time. University trials typicially show a less favorable response when data are subjected to appropriate statistical analyses, but lets assume for the sake of argument that 50% is about right.

Folks, 50% represents the same response I would get if I were to flip a coin 100 times. The bottom line in the above examples is that while the overall positive yield response looks very favorable, the

true measure of the treatments – economics- is about a 50-50 proposition at best. I hope you count this as compelling evidence that you should avoid spaying without determining the need to spray. There is no statistic available to support my next statement, but my guess is that the economic response rate would be >80% if spray decisions were based on a disease risk assessment. It is true that benefits associated with stess tolerance and/or improved growth efficiency, as indicated on the Headline label and in marketing literature for both Headline and Quadris, may also occur when the fungicides are applied. However, there is presently no way to predict when, and to what extent, these benefits will occur.

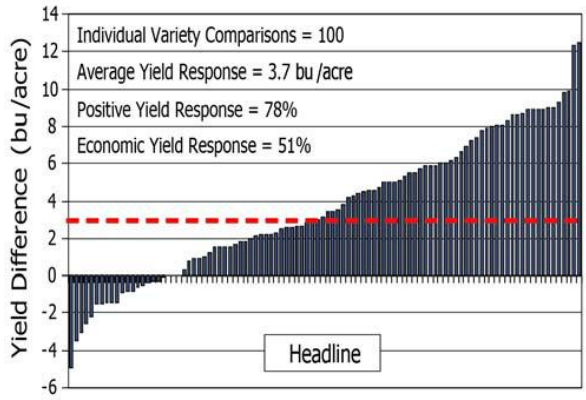

Figure 5. Yield reponse to Headline @ 6.0 fl oz/A (2004-08); the dashed red line indicates the 3 bu/A breakeven point. ***Source: J. Trybom and M. Jeschke. 2009. Foliar Fungicide Effects on Soybean Yield. Crop Insights, Vol 19, No. 1.***

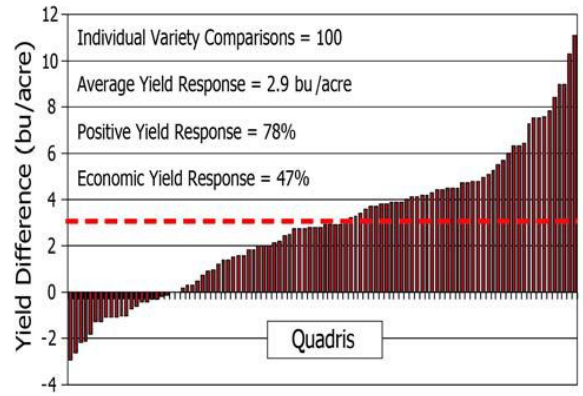

Figure 6. Yield response to Quadris @ 6.2 fl oz/A (2004-08); the dashed red line indicates the 3 bu/A breakeven point. ***Source: J. Trybom and M. Jeschke. 2009. Foliar Fungicide Effects on Soybean Yield. Crop Insights, Vol 19, No.1.***

Now that I have established that basing fungicide spray decisions on a disease risk assessment is essential, just what does this assessment involve? **Figure 7** lists the various factors that need to be considered as part of your risk assessment in soybean. Most of the factors determine the risk that one or more foliar fungal diseases will develop and reduce yield. The factors do not account for the many other diseases that can hurt soybean yield, but are not controlled adequately (or at all) by foliar fungicides applied at the R3 growth stage. This underscores that there is, and always will be, a risk associated with applying a fungicide. You might make all the right decisions and do all the right things, and a disease, such as charcoal rot, might negate the value of treating. Similarly, if a crop experiences serious drought or some other event or condition that compromises yield, all benfits associated with spraying a fungicide might evaporate. Farming, as you all know, is just risky business.

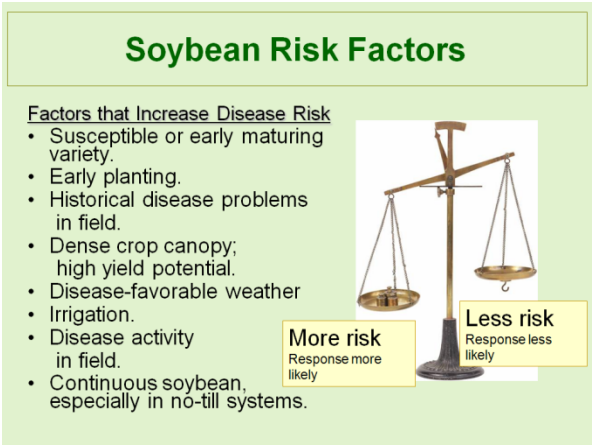

Figure 7. Factors that favor disease and, therefore, a response to foliar-applied strobilurin fungicides, such as Headline and Quadris.

TOBACCO

Update on Blue Mold and Other Diseases

By Kenny Seebold

Blue mold has begun to advance in certain parts of the country, slowly but surely. As of July 14, the disease has been reported in Pennsylvania, Tennessee, and more recently in eastern Virginia.

The latter case is almost certainly related to movement of inoculum from Tennessee during the 4th of July weekend. During this same time frame, our colleagues at the North American Plant Disease Forecast Center predicted moderately favorable chances of inoculum moving through eastern Kentucky. We haven't had any reports of blue mold, however, from the threatened areas to date.

The overall blue mold risk will be fairly low through the beginning of next week for Kentucky, assuming that disease did not crop up from the 4th of July event. Fungicide applications targeted at blue mold are not needed unless active blue mold is found; however, those seeing target spot may consider making an application of Quadris at 8 fl oz/A around layby for protection against this disease. Having Quadris in place for target spot will also help protect against blue mold. If the blue mold situation changes, we'll post an alert through the Kentucky Blue Mold Warning System and on the Kentucky Tobacco Disease Information Page (www.uky.edu/Ag/KPN/kyblue/kyblue.htm). Please urge producers (particularly in eastern KY)to check their crops regularly for blue mold, and let me know if you suspect or find the disease in your area.

Check Tobacco Barns for Hornets and Bumble Bees before Harvest
By Lee Townsend

Paper wasps, hornets and yellowjackets, and bumble bees often nest in and around barns but also can occur in some unexpected places. In addition to painful stings, people working high up on rails in a barn can be injured as they try to escape these angry insects. As if this were not enough, some people can have a severe allergic reaction to the venom of these insects. Wasps, hornets and yellowjackets are more dangerous and unpredictable than honey bees and should be treated with respect; nests should be eliminated with great care and in a specific manner.

Paper wasps, hornets and yellowjackets construct nests of a paper-like material which is a mixture of finely chewed wood fragments and salivary secretions of the wasps. Paper wasps typically build their umbrella-shaped nests under eaves and ledges. These wasps are not as aggressive as yellowjackets or hornets, and can be eliminated rather easily with a wasp and hornet spray sold at most grocery and hardware stores. These formulations have an added advantage in that they often spray as far as 20 feet.

Treatment of wasps, hornets, and yellowjackets is best performed at night; paper wasps can be eliminated during the daytime provided you do not stand directly below the nest during treatment. Most wasp and hornet sprays cause insects to drop instantly when contacted by the insecticide. Standing directly below a nest increases one's risk of being stung. Following treatment, wait a day to ensure that the colony is destroyed, then scrape or knock down the nest. This will prevent secondary problems from carpet beetles, ants and other scavenging insects.

Hornets are far more difficult and dangerous to control than paper wasps. The nests resemble a large, inverted tear-drop shaped ball which typically is attached to a tree, bush or side of a building. Hornet nests may contain thousands of wasps which are extremely aggressive when disturbed. Treatment can be accomplished by applying a wasp freeze-type, aerosol insecticide or dust formulation (Sevin) directly into the nest opening.

Hornet nests have a single opening, usually toward the bottom, where the wasps enter and exit. It is essential that the paper envelope of the nest not be broken open during treatment or the irritated wasps will scatter in all directions, causing even greater problems. Following treatment, wait at least a day before removing the nest to ensure that all of the wasps are killed. If hornets continue to be observed, the application may need to be repeated.

Bumble bees can nest in small piles of hay, paper, or other similar materials, usually at ground level. Look for activity around the barn and deal with it before the rush of housing begins.

Tobacco Insects
By Lee Townsend


Figure 8. Tobacco Hornworm

Tobacco hornworms can be very destructive to tobacco during the latter part of the

growing season. Eggs are laid from late July through early September with the larvae feeding through mid-September. This creates the potential for lots of feeding damage from topping time until plants are taken to the barn. One well-timed insecticide application can reduce feeding significantly but may not protect tobacco if egg-laying continues for several weeks.

Check tobacco about a week before harvest so that a "clean up" spray can be applied if necessary. Be sure to check the harvest interval and restricted entry interval for the product you use. Cutting before this interval has passed can mean insecticide residues above the legal tolerance level. Products containing endosulfan (Thiodan, Phaser, etc.) are no longer recommended by the UK College of Agriculture because of concerns about the residues of this insecticide on tobacco grown for export. Many products containing other active ingredients are available and provide effective pest control without leaving undesirable residues.

The number of hornworms present can be determined by carefully examining groups of 20 plants at randomly selected locations over a field. Use a minimum of 5 locations per acre. Hornworms feed in the upper 1/3 of the plant and can be found hanging from the underside of the leaf. In August and September many of them may have small, white, football-shaped objects on their backs. These are cocoons of a tiny wasp that develops inside the hornworm and kills it. Hornworms with these cocoons should not be included in your counts because they are no longer feeding.

Winged tobacco aphids and some small colonies were found on untreated tobacco, also. The period of potential concern is from 4 to 6 weeks after transplant until the crop is topped. Infestations begin when the darker, winged aphids land on plants. They will probe the plant with their mouthparts and deposit a few live young (nymphs) if they like what they taste. These nymphs will mature in about a week and begin producing their own offspring. Aphid populations can build rapidly. During that time, sap feeding by aphids can cause significant yield and quality reductions. An insecticide application is recommended if 20% or more of the plants in a field are infested. An infested plant has a colony (50+ wingless aphids).

Be sure to check the Worker Protection Standards section of the label to determine re-entry intervals required following any pesticide application.

VEGETABLES

Late Blight Reported on Tomatoes

By Kenny Seebold

At the moment, the Northeast is experiencing a major outbreak of late blight, and store-bought transplants have been identified as the original source of inoculum. Apparently, plants produced by an unnamed company were distributed to a number of "big box" stores and were infected with the late blight pathogen, *Phytophthora infestans*. The end result is that they are seeing an unprecedented distribution of late blight across many states in the Northeast.

We recently found two cases of late blight on tomato in Kentucky – from Laurel and Larue counties. It is too early to tell if our late blight case originated from the same source(s) responsible for the cases in the Northeast, or if natural movement of inoculum occurred from these areas. We do know, though, that we have experienced multiple spells of weather recently that would have been ideal for late blight and we've got more rain in the forecast for next week.

The following comes from a recent article published by Dr. Meg McGrath of Cornell University (http://www.growingproduce.com/news/avg/?storyid=2111), and provides an excellent description of the disease: "Classic symptoms are large (at least nickel sized) olive green to brown spots on leaves with slightly fuzzy white fungal growth on the underside when conditions have been humid (early morning or after rain). Sometimes the lesion border is yellow or has a water-soaked appearance. Leaf lesions begin as tiny, irregularly-shaped brown spots. Brown to blackish lesions also develop on upper stems. Firm, brown spots develop on tomato fruit. Photographs are posted on the Web at: www.hort.cornell.edu/department/Facilities/lihrec/vegpath/photos/lateblight_tomato.htm and vegetablemdonline.ppath.cornell.edu/factsheets/Pot

ato_LateBlt.htm. Home gardeners can learn more about the situation by going to Http://blogs.cornell.edu/hort/?s=late+blight+disease ."

At this point, we need to make sure that tomatoes and potatoes are protected by regular fungicide sprays (products for late blight can be found in ID-36). For most, this will mean weekly sprays; spray intervals should be shortened to 4-5 days during rainy periods. Not only will we get protection from late blight, but also other diseases; tomatoes in particular are being hammered by bacterial spot in many parts of the state. Make sure that copper fungicides are a part of every spray that goes out on tomatoes – you'll get protection against bacterial spot and speck, and some suppression of late blight.

As you read Dr. McGrath's article, you will see a number of fungicides that are labeled for control of late blight, and most (if not all) are listed in ID-36. One of the biggest issues that we will run across is finding these products. Because we don't have a lot of trouble historically with late blight, and because our overall acreage of tomatoes and potatoes is small, our ag dealers don't stock many of these fungicides. What I can tell you is that, of the products commonly available to commercial growers in KY, we will have the best success with preventive sprays of either chlorothalonil (Bravo and related generics) or mancozeb (Dithane, Penncozeb, or Manzate). These protectants will function well unless we hit long periods of late blight-favorable weather, or if the disease is active in a field. In these cases, we'll need something stronger. Commonly available fungicides like Quadris, Pristine, or Cabrio are mediocre performers against late blight. Ridomil Gold products may or may not work, depending on the strain of the late blight fungus that is active – many are resistant to Ridomil. Some of the better products, in my experience, include Previcur Flex, Gavel, Presidio, Ranman, Revus, and Tanos. Of these, Previcur Flex, Gavel, and Tanos may be the easiest to find in KY. With any of these late blight-specific fungicides, resistance management is critical; always tank-mix with a protectant product and follow label guidance (number of sprays per season, rates).

Homeowners have fewer choices available to them. Essentially, they can use chlorothalonil, mancozeb, or copper products to protect against late blight. Once disease is found, or if conditions are very favorable for disease, these products do not function as well as the late blight-specific materials available to commercial growers. The best course of action for homeowners is to maintain a regular fungicide schedule, and to be prepared to destroy any symptomatic plants immediately.

For the present, our fungicide programs on tomatoes and potatoes can rely mainly on chlorothalonil and mancozeb (be mindful of the 5 day PHI on tomatoes / 14 day PHI on potatoes). Only go with stronger materials if late blight is found, or if conditions favor disease and active late blight is known to be present in your area. I can't over-emphasize the need for a regular fungicide program. Since late blight is such a fast-moving and devastating disease under favorable conditions, our growers shouldn't wait until they see symptoms before applying fungicides. If you have any questions, or if you find late blight in your area, please let me know. I will do my best to keep you up to speed on this situation.

FRUIT CROPS

Monitor for Grape Root Borer

By Ric Bessin

Grape root borer is potentially the most destructive insect attacking grapes in Kentucky. Larvae of this insect tunnel into the larger roots and crown of vines below the soil surface. Symptoms of Grape root borer attack include poor vine growth and fruit set, even loss of some vines. Because damage is restricted to below ground, problems often go unnoticed until vine decline is observed. Damage caused by larval feeding can range from just a few feeding sites to complete root system destruction. Multiple Grape root borer in a single vine can result in complete root girdling. Grape root borer is not common with new grape plantings, but problems often begin to develop after several years of grape production. Grape root borer is one pest of grapes that is often ignored until it becomes a serious

problem affecting the vineyard. Moths active usually begins in early July.

Figure 9. Mating grape root borer moths.

Injury by Grape root borer is often most severe in low, poorly drained areas of the vineyard. In mid-summer, growers should examine around the bases of vines out to a distance of 18 inches for empty pupal skins of grape root borer. In Kentucky, a control action for GRB is recommended if more than 5 percent of the vines are found to have GRB pupal cases emerging from the soil.

SHADE TREES & ORNAMENTALS

Verticillium Wilt is Active in Catalpa and Smoke Tree

By John Hartman

During recent weeks, Verticillium wilt has been diagnosed in the plant disease diagnostic laboratory on smoke tree and catalpa. Verticillium wilt of woody plants is caused by the fungus *Verticillium dahliae*, or in some cases by *V. albo-atrum*. The fungus is capable of causing a serious vascular wilt of a wide range of woody plants. Several of our common landscape trees such as ash, katsura tree, magnolia, maple, redbud, and tuliptree are susceptible to Verticillium wilt.

Figure 10. Catalpa tree with Verticillium wilt. Note foliage on right side branches has thinned out while foliage on left side of tree is still healthy.

Symptoms. By invading the xylem tissues of the tree, Verticillium disrupts the movement of water from the roots to the leaves. As a consequence, leaves wilt and branches die back. This often occurs one branch at a time or on one side of the tree (Figure 10) over a period of several years, but sometimes in only a matter of months or a year. Sometimes, branches simply fail to leaf out in the spring - the result of infection the previous year. Verticillium wilt may also cause marginal browning and leaf scorch, abnormally large seed crops, small leaves, stunting, poor annual growth, and sparse foliage. However, some or all of these symptoms may also be caused by girdling roots, construction injury, bacterial leaf scorch and drought. The catalpa specimen observed last week was at first thought to be bacterial leaf scorch but scorch could not be confirmed with a specialized laboratory test (polymerase chain reaction) and a site visit revealed patterns more suggestive of Verticillium wilt (Figures 11 & 12).

Figure 11. Catalpa leaves with marginal leaf scorch. These symptoms could be mistaken for bacterial leaf scorch disease. In this case, it is Verticillium wilt.

Figure 12. Verticillium wilt causing basal leaf scorch of Catalpa. This symptom is not typical of bacterial leaf scorch.

In the landscape and nursery, one should try to observe additional diagnostic symptoms. Usually, there is staining of xylem and cambial tissue, visible as streaks if you cut into the wood (Figure 13). The color of this staining will vary for different trees often being greenish black in maple (Figure 14), yellowish green in smoke tree, dark brown in redbud, and brown in ash and catalpa. Be aware that often young twigs and branches and some tree species simply don't show the streaks of stained xylem tissue under the bark and that other fungi and other factors can cause

Figure 13. Smoke tree leaf scorch and xylem staining evident in cut branch at right.

staining. For a positive laboratory diagnosis of Verticillium wilt, stained vascular tissue is essential.

Figure 14. Small maple tree showing xylem staining symptom in the trunk. Note that staining does not completely encircle the xylem and could lead to one-sided wilt symptoms. (P. Bachi photo)

Disease biology. The Verticillium fungus survives as resistant, dormant microsclerotia for many years in soil, making effective crop rotation in the nursery or landscape difficult. The fungus infects plant roots through wounds, or in some cases, direct penetration of susceptible root tissue. In the nursery, the Verticillium fungus could also be transmitted from plant to plant by grafting and budding. 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 is returned to the soil as tiny resistant fungal microsclerotia. Microsclerotia 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. It is possible that much of the Verticillium observed in Kentucky now relates back to stresses imposed by the drought last summer.

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, hackberry, hawthorn, hickory, 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 plant health care includes good site selection, proper transplanting, good water management, a prudent fertility program, and pruning out dead branches. Be aware that while pruning out infected branches is a useful general horticultural practice for maintaining plant vigor and aesthetics, it does not eliminate Verticillium from the plant since infections originate and spread from the roots.
- Fungicides are not effective for control of this disease.

LANDSCAPE

Millipedes and Wood Cockroaches – Common Invaders in July
By Lee Townsend

Millipedes are long, many segmented creatures that use their two pairs of legs per body segment to move along with deliberate speed. There are several species in Kentucky with a variety of shapes and colors.

Millipedes can be very abundant in forest litter, grass, thatch, and in mulched areas. These places provide needed food, shelter, and dampness. Usually, millipedes stay out of sight unless abundant rainfall or some other event, such as the mating season, puts them on the move.

While harmless and in fact, helpful recyclers, millipedes generally are not welcomed with enthusiasm. They often invade crawl spaces, damp basements and first floors of houses at ground level. Common points of entry include door thresholds (especially at the base of sliding glass doors), expansion joints, and through the voids of concrete block walls. Frequent sightings of these pests indoors usually mean that there are large numbers breeding on the outside in the lawn, or beneath mulch, leaf litter or debris close to the foundation. Because of their moisture requirement, they usually do not survive indoors for more than a few days.

Wood cockroaches are typical cockroaches that are about 1 inch long. They live beneath loose bark, in wood piles, stumps, and hollow trees where they feed on decaying organic matter. These males can fly and are attracted to lights at night so they can be accidental invades of home around wooded areas. They also may be brought indoors on firewood. While they resemble the common household pest species, wood cockroaches rarely become established indoors.

Managment

1. Minimize moisture & remove hiding places - The most effective, long-term measure for reducing entry of millipedes and wood cockroaches is to minimize moisture and hiding places, especially near the foundation. Leaves, grass clippings, heavy accumulations of mulch, boards, stones, boxes, stacked firewood or similar items laying on the ground beside the foundation should be removed, since these often attract and harbor pests. Items that cannot be removed should be elevated off the ground.
2. Seal entry points - Seal cracks and openings in the outside foundation wall, and around the bottoms of doors and basement windows. Install tight-fitting door sweeps or thresholds at the base of all exterior entry doors, and apply caulk along the bottom outside edge and sides of door thresholds. Seal expansion joints where outdoor patios, sunrooms and sidewalks abut the foundation. Expansion joints and gaps should also be scaled along the bottom of basement walls on the interior to reduce entry of pests and moisture from outdoors.
3. Insecticides - Exterior applications, in the form of barrier sprays, may help to reduce inward invasion when applied outdoors, along the bottom of exterior doors, around crawl space entrances, foundation vents and utility openings, and up underneath siding. It also may be useful to treat along the ground beside the foundation in mulch and ornamental plant beds, and a few feet up the base of the foundation wall. Heavy accumulations of mulch and leaf litter should first be raked back to expose pest hiding areas. Insecticide treatment may also be warranted along the interior foundation walls of damp crawl spaces and unfinished basements. There is no benefit from treating indoors.

GENERAL PEST

Incredible Bugs of summer
By Lee Townsend

Some incredible insects appear during the summer; here are a few that you might see in the next few weeks. The dobsonfly has an ominous appearance but does not pose any threat other than a weak pinch if handled.


Figure 15. Male dobsonfly

Dobsonflies are large (3+ inch), prehistoric looking insects that appear near flowing water in mid- to late summer. A pair of very long antennae comes off the front of the boxy flat head. Males have a pair of long pointed mandibles that cross like sabers; females do not have these. Two pairs of large smoky, pliable wings interlaced with many veins cover the abdomen to complete the major features of this insect.

Dobsonflies follow an erratic fluttery path thru the air. They will pinch if handled but are not dangerous. The adults live for only a few days, long enough to mate, lay eggs, and die. Eggs are placed on overhanging branches or undersides of bridges over streams, or on stones. The eggs hatch at night after 5-6 days and drop into the water. The larvae called Ahellgrammites@ live for several years under stones in streams where they feed on insects that live in the water. They are used as bait by fishermen.

Figure 16. Eyed Elater

The false eyes on the pronotum must cause potential predators to think again before grabbing hold of the eyed elater, a 2-inch long black beetle that is speckled with white spots. Their real eyes are much smaller and are located near the base of the antennae.

Eyed elaters appear around damp areas near woods about this time of year. They belong to the click beetle family – beetles that can flip over if placed on their backs. The larvae have a wireworm form and live as predators under bark.

DIAGNOSTIC LAB HIGHLIGHTS

By Julie Beale and Paul Bachi

Recent agronomic samples in the PDDL have included gray leaf spot on corn; leaf hopper burn on alfalfa; Rhizoctonia stem/root rot on soybean; angular leaf spot, black shank, target spot, frogeye leaf spot, Fusarium wilt, phosphorus and potassium deficiencies, growth regulator injury, and transplant shock on tobacco.

On fruit and vegetable samples, we have diagnosed black rot and downy mildew on grape; red stele and common leaf spot on strawberry; scab and cedar-apple rust on apple; brown rot and scab on peach; scab on pear; powdery mildew and leaf spot (Coccomyces) on cherry; rust on bean; bacterial stalk rot on sweet corn; Microdochium blight and powdery mildew on cantaloupe; bacterial spot on pepper; common scab on potato; bacterial spot, bacterial speck, bacterial canker, early blight, late blight, Septoria leaf spot and southern blight on tomato; and Cercospora leaf spot on watermelon.

On ornamentals and turf, we have seen genetic abnormalities on chrysanthemum; Pythium root rot and Phoma canker/dieback on vinca; Botryosphaeria canker, powdery mildew and spot anthracnose on dogwood; Botryosphaeria canker and Dutch elm disease on elm; scab on crabapple; Actinopelte leaf spot and iron deficiency on oak; Verticillium wilt on smoketree; anthracnose and Pythium blight on bentgrass; fairy ring on fescue; necrotic ringspot and summer patch on bluegrass.

INSECT TRAP COUNT
July 3-10

By Patricia Lucas

Location	Princeton, KY	Lexington, KY
Black cutworm	0	18
Armyworm	0	37
Corn earworm	0	2
European corn borer	0	0
Southwestern corn borer	27	0
Fall armyworm	0	0

Graphs of insect trap counts for the 2009 season are available on the IPM web site at -http://www.uky.edu/Ag/IPM/ipm.htm.
View trap counts for Fulton County, Kentucky at - http://ces2.ca.uky.edu/fulton/InsectTraps