

## **KENTUCKY PEST NEWS**

ENTOMOLOGY · PLANT PATHOLOGY · WEED SCIENCE

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### VEGETABLES

- Late Blight Found on Tomatoes
- The 'Bugs' of Summer are Back

### SMALL GRAINS

- Reglone Approved as a Desiccant in Canola

### SHADE TREES

- Anthracnose Disease Affecting White Oaks
- Ash Flower Gall Mite
- Jumping Oak Gall and Browning White Oaks

### SHRUBS

- Camellia Scale Woes

### FLOWERS

- Rose Chafer: An Occasional Pest

### LAWN & TURF

- Powdery Mildew on Kentucky Bluegrass

### HOUSEHOLD

- Mosquito Options for Household

### DIAGNOSTIC LAB HIGHLIGHTS

### INSECT TRAP COUNT

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## VEGETABLES

### **Late Blight Found on Tomatoes**

By Kenny Seebold

On May 27, we confirmed a case of late blight on tomatoes from a home garden in the northern Kentucky area. Since that first report, we have found additional cases in Fayette and Clark Counties, and it's likely that there are more. In most years, we expect to see very little of this disease and only then at the end of the summer. This marks this second year in a row that this devastating disease of tomato has appeared earlier-than-expected. The weather conditions that we face for the coming week, fortunately, do not favor development and spread of late blight. Still, it's likely that the disease has become established in some areas, and we need to be on guard. Taking preventive action is key, and this means being on a regular fungicide schedule (discussed later in this article). The following is a brief description of late blight and some controls that may be applied.

*The Disease.* Late blight is caused by *Phytophthora infestans*, a fungus-like organism, and is a fast-moving and highly destructive disease of tomatoes and potatoes under cool and wet conditions. Late

blight epidemics in the late 1840's were responsible for the Irish potato famine and subsequent migration of millions of people to the United States. All plant parts are affected, including fruit and tubers. Total losses are common in gardens and fields if control measures are not put in place. Late blight can easily enter greenhouses and high tunnels as well.

*Symptoms.* Early symptoms of late blight are large water-soaked blotches on foliage that will enlarge and form green-to-brown lesions. Sporulation may be evident on the undersides of lesions under moist conditions; this sporulation will be gray to white in color. Necrotic leaf tissue will blacken and shrivel, giving affected plants a blighted appearance. The pathogen will also attack petioles and stems, killing the plant in some cases. Tomato fruit affected by late blight develop as darkened spots that enlarge over time, and fungal growth may be seen in rotted tissue. Infected fruit are invaded by secondary organisms and develop soft rot. Potato tubers can become infected from spores washed from leaves into the soil and will decay.

*Control – Commercial Growers.* Preventive application of fungicides is necessary to prevent losses to late blight. Protectant fungicides such as chlorothalonil (Bravo and generics), maneb, and mancozeb (Dithane, Penncozeb, or Manzate), and fixed coppers can help when disease pressure is low; however, when inoculum levels increase or if disease is found in fields, stronger products are recommended. Late-blight-specific fungicides are summarized below (as published by Dr. Meg McGrath, Cornell University):

***Curzate 60DF (Group 27).*** 3.2-5 ounces per acre (3.2 ounces for potatoes). 5 oz on 5-day interval when late blight present. 30 oz/A seasonal max. 3 d PHI. EPA Reg No. 352-592. Active ingredient is Cymoxanil. 12 h REI. Must be tank-mixed with a protectant fungicide.

***Forum (Group 40).*** 6 fluid ounces. 30 fl oz/A seasonal max. 2 consecutive spray max. 4 d PHI. EPA Reg No. 241-427. Dimethomorph. 12 h REI. Must be applied with another fungicide.

***Gavel (Group 22).*** 1.5-2 pounds. 16 lb or 8 application seasonal max. 5 d PHI tomato; 3 d PHI for potato (14 d in some states). Latron surfactant recommended. EPA Reg No. 62719-441. Zoxamide + mancozeb. 48 h REI.

***Omega 500F (Group 29).*** 5.5 fl oz for potatoes only. 3.5 pts/A seasonal max. 14 d PHI. EPA Reg No. 71512-1-100. Fluazinam. 48 h REI.

***Presidio (Group 43).*** 3-4 fl oz for tomatoes only. 12 fl oz/A seasonal max. 2 consecutive spray max. EPA Reg No. 59639-140. Flupicolide. 12 h REI. 2 d PHI

***Previcur Flex (Group 28).*** 0.7-1.5 pint (1.2 pints max for potatoes). 7.5 pts/A seasonal max for tomatoes; 6 pts/A for potatoes. 5 d PHI for tomato; 14 d PHI for potato. EPA Reg No. 264-678. Propamocarb hydrochloride. 12 h REI.

***Ranman (Group 21).*** 1.4–2.75 fluid ounces (2.1-2.75 for tomato). 16.5 fl oz or 6 application seasonal max for tomatoes; 27.5 fl oz or 10 applications for potatoes. 0 d PHI for tomatoes; 7 d for potatoes. EPA Reg No. 71512-3-279. Cyazofamid. 12 h REI.

***Revus (Group 40).*** 5.5 to 8 fluid ounces. 2 consecutive spray max. 32 fl oz/A seasonal max. 1 d PHI for tomato; 14 d PHI for potato. EPA Reg No. 100-1254. Mandipropamid. 12 h REI.

Strobilurins, such as azoxystrobin (Quadris), pyraclostrobin (Cabrio/Headline), and fenamidone (Reason) have not performed as well as the products listed above in university trials. Ridomil Gold Bravo and Ridomil Gold Copper are not recommended due to widespread resistance in pathogen populations to Ridomil. Consult ID-36 (KY Production Guide for Commercial Vegetables) for specific use rates. Keep in mind that some of these products may be difficult to find in local dealerships and may have to be special-ordered. Of the materials listed above, Previcur Flex, Forum, Curzate, or Gavel may be the easiest to obtain in Kentucky, and are effective against late blight when used as directed.

Growers need to scout plantings regularly for late blight and other diseases. Preventive fungicide applications are recommended at this point for all Kentucky tomato and potato growers to help combat late blight, and also early blight and Septoria (tomato). Growers should not wait to see symptoms of late blight before treating. A good protectant program aimed at late-blight prevention will also aid against other foliar fungal diseases. During favorable conditions, sprays need to be made every 5-7 days, and every 7-10 days during drier weather.

If late blight is found, growers should immediately destroy plants in the affected area plus bordering plants (as these are likely infected). Plants can be sprayed with an herbicide, or removed and disked under. Do not handle plants when they are wet, as this may spread disease; perform this operation when conditions are sunny and dry if possible. At the end of the season, promptly destroy crop residues. Do not leave cull piles out in the open, as the pathogen can spread or potentially survive in this residue. Bury this material if at all possible.

*Control – Homeowners.* The general management practices listed above apply also to the homeowner. Regular scouting of plantings, and prompt removal of infected plants is an important consideration. In

home gardens, regular application of fungicides is less common than in commercial fields. Few fungicides are available to home gardeners; however, products containing chlorothalonil, maneb/mancozeb, or fixed copper are the tools of choice. These should be applied regularly, and the user should refer to the product label for rates, PHI, and safety precautions. These products, as mentioned earlier, will not function well if pressure is high or if disease is present before spray programs are started.

Control – Organic Producers. Control measures for organic producers are similar to those recommended for home gardeners. OMRI-approved fungicides such as fixed-copper (depends on the product) can be used in a preventive program. Other OMRI-approved products include: Sporatec, Sonata, Serenade Max, Oxidate, and Companion. As with the protectants recommended for home gardeners, these products do not perform well under high disease pressure or if disease is present prior to treatment. Consult product labels for rates, PHI, and safety precautions.

### **The ‘Bugs’ of Summer are Back** By Ric Bessin

I know it is still spring, but the insect pests that we usually associate with summer have returned, and with some of them they have returned in high numbers this year. A graduate student in our department, Logan Minter, has been monitoring for cucumber beetles and squash bugs and has been observing both this spring, weeks before we have historically noticed them. Previous monitoring for squash bug indicated that the end of the first week in June is when they first had been observed, this year it was two weeks earlier. Cucumber beetle has been active for a full month already.

We have also been observing high numbers of European corn borer moths with the overwintering generation flight. The first generation of larvae can be a problem with early planted field corn or sweet corn. Typically pepper plants don't have much fruit during this flight and do not need to be protected from European corn borer, but if they have developing fruits, then controls may be needed.

An EPA funded project being conducted in commercial apple orchards this spring has observed a very high codling moth flight in two of the orchards this past week. I have considered 10 or more moths per trap to be a heavy flight of codling moth, but this past week two of the orchard had trap averages in the 20's and 30's. In such situation with a very large moth flight, growers need to record degree days and treat according to those totals, but they should consider shortening the interval for the subsequent treatment to 10 days rather than 14 days.

## **SMALL GRAINS**

### **Reglone Approved as a Desiccant in Canola** By James Martin

The EPA approved a Federal supplemental label for using Reglone (active ingredient diquat) as a desiccant and harvest aid for canola. During the past two growing seasons the Kentucky Department of Agriculture received approval for a Section 18 to use Reglone in canola. Because of the recent decision from EPA, another Section 18 is no longer needed.

The recommended rate for Reglone as a preharvest desiccant in canola is 1.5 to 2 pt/A. Consult the Federal label for the use of a nonionic surfactant. A Pre Harvest Interval (PHI) of 7 days is required. In order to avoid excessive pod shatter and / or seed loss, it is recommended to harvest no later than 10 days after application.

## **SHADE TREES**

### **Anthracnose Disease Affecting White Oaks** By John Hartman

Anthracnose disease symptoms are visible on landscape and forest white oaks in some parts of Kentucky. Other oaks are also susceptible to anthracnose, but white oaks seem to be most affected this year. During the past week, several examples of this disease have passed through the

U.K. Plant Disease Diagnostic Laboratory, especially from central and eastern Kentucky. Anthracnose is caused by the fungus *Apiognomonia quercina*, with a spore-producing stage called *Discula*.

**Symptoms.** Anthracnose often begins in the area along the leaf vein (Figure 1) and spreads from there. Brown, dead patches on leaves are the most typical symptom being seen on white oaks now. Sometimes the dead areas cover nearly the entire leaf (Figure 2). From a distance, seriously affected trees appear to be brown throughout (Figure 3). Oak anthracnose can also cause twig cankers (Figure 4) that can girdle the twig and cause the distal part of the twig to die. Anthracnose symptoms often appear about two weeks following infection, thus the disease being seen now may have begun with infections that occurred during the cooler and wetter weather of early May. Trees often refoliate during the same season after a severe outbreak of anthracnose.

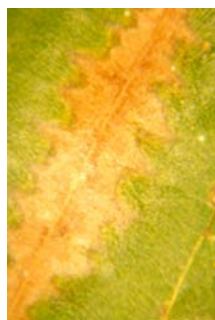


Figure 1. Anthracnose lesion on the vein of an oak leaf.



Figure 2. White oak leaves nearly dead from anthracnose disease. Jumping oak galls can be found as little dark spots within the anthracnose-caused dead areas on leaves (Billy Thomas photo).



Figure 3. White oak tree, in center of photo, showing browning of foliage caused by oak anthracnose (Billy Thomas photo).

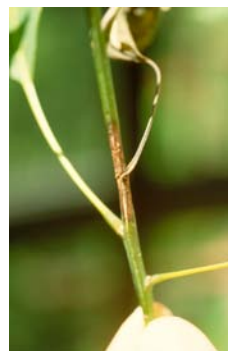


Figure 4. Oak twig canker caused by anthracnose.

Coincidentally, on many of the affected white oaks, an insect pest, jumping oak gall, caused by a gall wasp, is also being found on anthracnose-affected leaves. It is not known if there is any connection between the insect pest and anthracnose, but our Plant Disease Diagnosticians have found the causal fungus actually producing spores on the surface of the galls.

**Anthracnose disease management.** In most growing seasons, oak anthracnose is not severe or widespread enough to warrant control measures.

- For severely affected trees this year, provide good growing conditions so that the trees can refoliate if leaf loss has been severe. This might involve providing additional irrigation during dry periods and providing a little fertilizer if the situation warrants. Fertilization of trees is best done in late fall or winter.
- For trees that become diseased with anthracnose every year, tree owners will want to rake up and destroy all fallen leaves which may be a source of inoculum.
- For chemical control of anthracnose in a nursery situation, fungicides would need to be applied at budbreak. It is not normally feasible to apply fungicides to large trees in the landscape or woodland, so their use is not recommended in these sites.

## Ash Flower Gall Mite

By Lee Townsend



Figure 5. Mite-induced ash flower galls (J. Renaker photo).

Female ash flower gall mites leave their wintering sites under bud scales or bark in the spring and move to developing male ash flowers. Their feeding stimulates formations of galls that make the flowers look like miniature grape clusters; these hard galls darken in late summer and stay on trees over the winter. Infestations do not affect tree health, only appearance.

Unfortunately, there do not appear to be any effective enemies of the mite to provide natural control. If practical, galls can be clipped and destroyed. Application of dormant oil during the winter or an insecticide spray when the first blossoms appear may reduce gall incidence.

## Jumping Oak Gall and Browning White Oaks

By Lee Townsend



Figure 6. Light green developing galls, small dark spots are scars from fallen galls, larger dark areas are reactions to gall attachment.

Jumping oak galls, made by tiny non-stinging wasps, are causing white oak leaves to turn brown and drop off in some areas. The brown to black spots on leaves are discolorations that a gall creates on the upper leaf surface.

The tiny button-shaped gall can be seen on the lower surface of the leaf. The more galls on a leaf, the larger the brown area.

Established, vigorously growing trees usually can tolerate moderate leaf loss without significant harm; however, trees under stress may be adversely affected. There is nothing practical to do for forest and wood lot trees. Most should be able to cope with the infestation. White oaks in the landscape

may benefit from fertilizer next spring and watering if under drought stress this summer. It also is important to avoid injury or stress to trees.

Insecticide applications are not recommended for gall wasp control in home landscapes. The main reason is that research generally has shown that insecticide treatments are more damaging to beneficial insects that are natural enemies of the wasps than they are in preventing gall formation. Even if insecticides were available, powerful sprayers are necessary to treat large trees thoroughly. The best strategy is to promote tree health and reduce stress.

Gall development begins when female wasps place eggs in expanding leaves in the spring. Chemicals from the insect cause leaf tissue to develop around the grub-like wasp larva, providing it with protection and food. When the wasp larva matures, the gall drops to the ground, leaving a small scar where it was attached. Larval movement in the gall causes it to jump like a jumping bean. The pupa may end up in a soil crack or under leaf litter and remains there until spring. The adult wasp emerges to begin the cycle again.

Some jumping oak galls are present every year but are not noticed. The occasional outbreaks that cause significant visual effects may last for 2 consecutive years before natural enemies reduce wasp numbers to low levels.

## SHRUBS

### Camellia Scale Woes

By Lee Townsend



Figure 7. Camellia scale egg sacs on underside of holly leaf.

Cottony egg sacs of the camellia scale have been a common sight on holly so far this spring. This soft scale reportedly also attacks Taxus, camellia, rhododendron, Japanese maple, English ivy, and mulberry. These sacs contain large numbers of eggs that are hatching now. This is important to know because the small crawler stage is susceptible to control by

applications of insecticidal soap or other insecticides labeled for crawler control.



Figure 8. Camellia scale eggs ready to hatch.

Camellia scales are sap feeders that can cause foliage to turn yellow and die back. They secrete large volumes of sticky honey dew; this material accumulates on foliage and stems and soon becomes covered with

sooty mold. A female can produce over 1,000 eggs so numbers can increase dramatically.

## FLOWERS

### Rose Chafer: An Occasional Pest

By Lee Townsend



Figure 9. Rose chafer beetle.

Rose chafers occasionally arrive in the Insect ID Lab. These distinctive straw-colored insects with spiny orange-red legs are similar in some ways to the more familiar

Japanese beetle. The adults feed in clusters on flowers, especially roses and peonies but also will attack a variety of other plants. Feeding damage is skeletonization of the leaves similar to that of the Japanese beetle. Individual beetles live for about 4 weeks and can be very damaging where they are abundant. Rose chafer larvae are white grubs that feed on plant roots in sandy, well-drained soils.

## LAWN & TURF

### Powdery Mildew on Kentucky Bluegrass

By Paul Vincelli

The only turfgrass species in Kentucky that consistently suffers damage from powdery mildew diseases is Kentucky bluegrass. Powdery mildew infections are very easy to recognize: leaf blades

appear as though they have a coating of talcum powder (Figure 10). This powdery appearance is due largely to the presence of abundant microscopic fungal spores on the leaf surface. As the disease progresses, infected leaf blades turn yellow and then straw-colored as they die. This results in thinning of the sward.



Figure 10. Powdery mildew on Kentucky bluegrass.

Damage is very evident in certain swards, especially those with too much shade for this grass species. High nitrogen also favors the disease, but shade is typically the major factor resulting in powdery mildew damage on Kentucky bluegrass. Therefore, the best solutions are to alleviate shadiness (through selective pruning, etc.) or to renovate with shade-tolerant turf species, ground covers, or ornamentals. Effective fungicides are available for use primarily by professional applicators

(<http://www.ca.uky.edu/agc/pubs/ppa/ppa1/ppa1.pdf>) but these are a “band-aid” solution, rather than a permanent fix.

## HOUSEHOLD

### Mosquito Options for Household

By Mike Potter

With the abundance of warmth and moisture, mosquito season is in full swing throughout the Commonwealth. Mosquitoes are a perennial nuisance for which there is no easy answer. As summer continues, there will be lots of information (both good and bad) about what works and what doesn't. The following measures can afford some relief.

*Eliminate Breeding Sites* – Mosquitoes need quiet, non-flowing water for their development and periodic summer storms provide just such conditions. Eliminating large sources of standing water may require community-wide effort. Nonetheless, homeowners can take steps to prevent mosquitoes from breeding on their property:

1. Dispose of old tires, buckets, aluminum cans, plastic sheeting or other refuse that can hold water. Empty accumulated water from trashcans, boats, wheelbarrows, pet dishes, and flowerpot bottoms, and if possible turn them over when not in use.
2. Clean debris from rain gutters and unclog obstructed down spouts. Clogged or damaged rain gutters are one of the most overlooked mosquito breeding sites around homes.
3. Change water in birdbaths and wading pools at least weekly, and keep swimming pools clean, chlorinated or covered when not in use. Ornamental pools can be aerated or stocked with mosquito-eating fish. Aeration and water movement helps because mosquitoes prefer quiet, non-flowing water for egg laying and development.
4. Fill or drain ditches, swampy areas, and other soil depressions and remove, drain or fill tree holes and stumps with mortar to prevent water accumulation. Eliminate standing water and seepage around animal watering troughs, cisterns, and septic tanks. Be sure cistern screens are intact and access covers fit tightly.

*Larval Control* - Use of a mosquito larvicide can be beneficial when it is impractical to eliminate a breeding site. Larvicides are insecticides used to control immature mosquitoes before they have a chance to develop into biting adults. Most larvicides sold to homeowners contain either the ingredient methoprene, or the bacterium *Bacillus thuringiensis israelensis* (Bti). Neither active ingredient is harmful to fish, waterfowl, pets or humans when used according to label directions. Many products and formulations containing methoprene (Altosid®) and Bti (Bactimos®, Vectobac®) are used by mosquito abatement agencies and other professionals. Homeowners can purchase the methoprene-based larvicide, PreStrike™ in

hardware stores. PreStrike is formulated as a granule and comes in a shaker bottle. Various products containing the mosquito-specific bacterium, Bti, are also sold to homeowners. Mosquito Dunks® and Quick Kill® Mosquito Granules, for example, can be found at hardware and discount stores.

*Adult Control* - Adult mosquitoes prefer to rest in moist, shady areas such as dense vegetation during the daytime. Consequently, homeowners should remove tall weeds and overgrown vegetation from their yards. To further reduce intolerable levels of biting adult mosquitoes, residual insecticides can be applied to shrubs, hedges and other shaded areas, such as under decks and along foundations. Research by University of Kentucky entomologists indicates that such treatments effectively suppress nuisance, biting mosquitoes for about a month. Residual mosquito sprays are often best applied by professional pest control firms. Homeowners opting to try this themselves should use lawn and garden insecticides containing permethrin (e.g., Ortho Mosquito B Gone, Spectracide Mosquito Stop), cyfluthrin (Bayer Advanced Powerforce Mosquito Killer), bifenthrin (e.g., Ortho Home Defense Max), or lambda cyhalothrin (Spectracide Triazicide). For homeowners, a hose-end sprayer is usually most effective for making such applications.

*Exclusion* - Mosquitoes can be kept out of homes by securely screening windows, doors and porches. The occasional mosquito found indoors can be eliminated with a fly swatter. Aerosol-type insecticides labeled for mosquitoes, gnats, and other flying insects seldom provide much relief at the dosages applied by householders.

*Topically-Applied Repellents* - Repellents will help prevent bites when spending time outdoors. Traditionally, the most effective mosquito repellents contained the active ingredient diethyl toluamide (DEET) ranging from 5% to 40%. Higher percentages of DEET in the ingredients provide longer protection. Low -percentage formulations (10% or less) are suitable for shorter periods outdoors (e.g., a few hours), and are recommended for use with young children. Recently, two additional mosquito repellent ingredients were registered by the U.S. Environmental Protection Agency and

recommended as alternatives to DEET by the Centers for Disease Control and Prevention. Picaridin (7% *Cutter Advanced*) and Lemon eucalyptus oil (30% *Repel Lemon Eucalyptus*) provide relief for about 2 to 4 hrs, particularly when insect biting activity is not too severe. Unlike DEET-based repellents, Picaridin is essentially odorless and Lemon eucalyptus oil has a lemon scent. For many people, the new products will also have a more pleasing feel on the skin. With a little hunting, both repellents can be found on store shelves. Always read and follow directions on the container.

*Other Control Possibilities* - Many consumer products claim to attract, repel, capture or kill mosquitoes. Most of these devices do not appreciably reduce mosquito abundance or incidence of bites, or else their claims are unproven. Electrocuting devices or "bug zappers" using ultraviolet light as an attractant are generally ineffective in reducing outdoor populations of mosquitoes and their biting activity. Studies indicate that mosquitoes make up only a tiny percentage of the insects captured in such traps. The majority are moths, beetles and other harmless night flying insects. Other types of mosquito traps utilize carbon dioxide, warmth, light, and various chemicals (e.g. octenol) as attractants and claim to capture tremendous numbers of adult mosquitoes. Such devices can be quite expensive. Performance claims to the contrary, such traps seldom have been shown to reduce populations of biting mosquitoes on one's property, or the frequency of bites. In some situations, they could even attract more mosquitoes into the area they were meant to protect.

Advertisements for portable electronic devices using high frequency, ultrasonic sound routinely appear in magazines, claiming to keep mosquitoes and other pests at bay. Some supposedly repel mosquitoes by mimicking the wing beat frequency of a hungry dragonfly. Scientific studies have repeatedly shown these devices to be of negligible benefit in deterring mosquitoes and reducing bites. Save your money, as these devices seldom if ever provide any appreciable measure of protection.

Citronella oil does have mosquito-repelling properties and the scented candles can provide some protection. For maximum effect, use multiple

candles placed close (within a few feet) of where people are sitting. A single candle located at the center or edge of a picnic blanket probably will not provide much benefit other than atmosphere. Mosquito-repellent plants, garlic, and other oft-advertised botanical products generally are ineffective.

Bats and certain types of birds (e.g. purple martins) are often cited as effective natural agents for managing outdoor mosquitoes. Conservation groups and nature magazines often suggest building bat and birdhouses on one's property to promote nesting and to protect against mosquitoes. Although insectivorous bats and birds do eat mosquitoes, they make up only a very small portion of their natural diet. Much like the mechanical "bug zappers," bats and birds capture all manner of other flying insects also. Efforts to colonize and conserve these animals should not be done with the primary intent of diminishing biting mosquitoes.

When it comes to managing mosquitoes, a good rule of thumb is if the approach or device sounds too good to be true — it probably is.

## **DIAGNOSTIC LAB HIGHLIGHTS**

By Julie Beale and Paul Bach

Recent agronomic samples in the PDDL have included phosphorus deficiency on corn; Rhizoctonia root rot, Pythium root rot, target spot and nitrogen deficiency on tobacco.

On fruit, vegetable and herb samples, we have diagnosed Phytophthora root and crown rot on strawberry and blueberry; fire blight, cedar-apple rust and frog-eye leaf spot on apple; brown rot on cherry; leaf curl on peach; black root rot and Rhizoctonia root rot on bean; fertilizer burn in the whorl of sweet corn; Botrytis gray mold, leaf mold (*Fulvia*), Sclerotinia stem rot, late blight, Septoria leaf spot and blossom end rot on tomato; Rhizoctonia root/stem rot on basil; and rust on mint.

On ornamentals and turf, we have seen rust on hollyhock; leaf & flower gall on azalea; cedar-apple rust on juniper; Entomosporium leaf spot on photinia; Phomopsis twig blight on kerria;

Phytophthora root rot on taxus; black knot on ornamental plum; fire blight and frogeye leaf spot on crabapple; fire blight on pear; anthracnose, jumping oak gall and iron deficiency on oak; and Pythium blight and root rot on bentgrass.

### INSECT TRAP COUNTS

May 21-28

Location	Princeton, KY	Lexington, KY
Black cutworm	48	10
Armyworm	7	310
Corn earworm	13	3
European corn borer	0	3
Southwestern corn borer	2	0
Fall armyworm	0	0

Graphs of insect trap counts for the 2010 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://ces.ca.uky.edu/fulton/InsectTraps>