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SHADE TREES & ORNAMENTALS

Horned Oak Gall/Gouty Oak Gall – No Good Control Recommendations

By Dan Potter and Lee Townsend

Most galls pose little threat to tree health but horned oak and gouty oak gall infestations can be a significant problem on pin oaks - disfiguring them, weighing down the branches, and eventually even killing the trees. While several control approaches have been evaluated and others are in progress, there is no specific recommendation at present.

One confounding factor is the nearly 3-year life cycle of the tiny wasp that causes these galls; most of that time is spent in woody galls ranging from small and inconspicuous to mature galls the size of golf balls. It is very difficult to spray tall trees, and one would have to do this 3 years in a row, just before buds show green tips in spring in an attempt to break the life cycle. So far, there has been little success getting systemic (e.g, soil-applied or trunk injected) insecticides to translocate into the woody galls. When feasible, pruning out soft and alive (greenish-brown) galls from lightly-infested trees may be worthwhile. Dried up brown galls are already "spent" and pose no threat.

Eastern Tent Caterpillar Development

By Lee Townsend

According to the degree day accumulation and observations in Fayette County as of April 19, most all eastern tent caterpillars should be 0.75 inch to 1.5 inch range on their way to 2.25 inches long. Caterpillar growth has been slow during the recent cool period but should accelerate as temperatures move into the high 70°F range late this week. Tents are in the baseball to soft-ball size range and easily visible. Small tents on the ends of branches are being abandoned as the caterpillars begin to accumulate in larger masses at major branch angles along the trunk.

Now is the time for horse farm managers to check fence row trees near pregnant mares to assess ETC populations. Nest removal and destruction is an effective means of control for small numbers of tents at accessible locations on small trees. If appropriate spray equipment is available, insecticide applications can be made to moderately or heavily infested trees. Some insecticides are available for trunk injection by certified arborists in cases where infestations are out of the reach of pressure sprayers.

TOBACCO

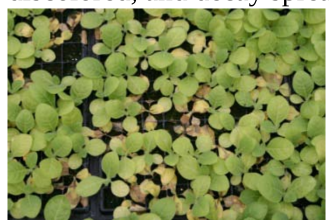
Managing Target Spot and Rhizoctonia Damping-Off in the Float System

By Kenny Seebold

We've seen a fair bit of rainy and cool weather since spring sprang upon us a month ago. In fact, the average daily temperature across much of the state has been slightly below normal, and our rainfall is slightly above average. Generally overcast conditions over the past week have been favorable for diseases like collar rot (discussed in last week's article), Rhizoctonia damping-off, and target spot. To date, we've seen just a few cases of collar rot and damping-off, and we can expect to see a bit of target spot to show up once plants begin to grow as warm weather moves in. This week's article will focus on both damping-off and target spot, along with management options for these problems.

<u>Damping-off</u>

The float-system provides a favorable ennvironment for *Rhizoctonia solani* the causal agent of damping-off (or soreshin) to grow and infect tobacco seedlings. We see two strains of R. solani in the float system – one which causes only damping-off, and another which can cause both damping-off and target spot. Damping-off usually occurs early in the development of the tobacco seedling and first appears as a water-soaked lesion at the base of the plant. Later, the lesion will take on a sunken, brown appearance and will eventually girdle the plant. Girdled seedlings collapse and eventually die (Fig. 1). In many cases, the entire stem of affected plants will be discolored, and decay spreads into the leaves (Fig. 2). Leaves in contact with the surface of Styrofoam trays or peat-based media can become infected and will first develop water-soaked lesions that enlarge over time, often spreading to the stems on young seedlings (Fig. 3). Seedlings with mild infections of *R. solani* that are later transplanted may contribute to large-scale outbreaks of soreshin in the field, and may also be more susceptible to black shank and Fusarium wilt.



High humidity and float-bed temperatures above 68 °F are optimal for growth of *R. solani*. A common inhabitant of agricultural soils, *R. solani* can survive on organic matter and will colonize growth media used in tobacco transplant production. Primary infections occur when actively growing hyphae, or fungal threads, come in contact with roots or stems. Hyphae then form infection cushions that produce enzymes that will degrade plant tissues. Infections can spread from plant to plant, and organic matter (plant debris) can serve as a bridge between infected and healthy seedlings. Survival structures called sclerotia are formed after the food source has been exhausted.

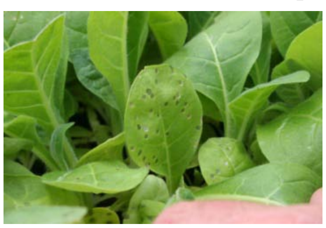
Infested soil or Styrofoam trays are the most common sources of *R. solani* in transplant production. Dormant hyphae associated with organic debris and sclerotia are the principal resting structures of *R. solani*. These can be found easily on the surfaces of infested trays and in cracks and crevices in older Styrofoam trays. Infested trays thus become a source of inoculum in subsequent years if not sanitized properly or replaced.

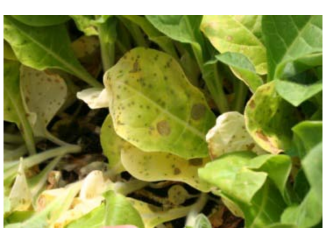
Good sanitation is the best way to manage soreshin in the float system. The first step is to limit the amount of fungal inoculum in the transplant system. New trays will all but eliminate the risk of carrying over inoculum from previous transplant cycles, but this option can be expensive and may create issues with disposal of old trays. Used trays should be sanitized properly (see Kentucky Pest News No. 1187 for more information) to reduce carryover of inoculum.

Proper ventilation, which minimizes leaf and stem wetness, and maintenance of fertility are important considerations as well. While Rhizoctonia damping-off can't be controlled completely with fungicides, we get reasonable suppression with the mancozeb-based fungicides Dithane DF Manzate Pro-Stick, and Penncozeb. These products are applied at a rate of 0.5 lb/100 gallons of finished spray solution (or 1 level teaspoon per gallon) once plants have reached the size of a dime. Use 3-5 gallons of the fungicide solution per 1000 square feet, applied as a fine spray (to ensure good coverage) on younger plants; and increase spray volume to 6-12 gallons on older plants. Begin applications before symptoms develop, or immediately after the first symptoms are observed at the latest, and continue on a 5-7 day schedule until plants are ready to go to the field.

<u>Target Spot</u>

Target spot is caused by the sexual stage of *R. solani* known as *Thanatephorus cucumeris*. Target spot begins in localized areas, or foci, and commonly occurs after the plant canopy has fully formed. Small, water-soaked lesions appear on leaves and will expand rapidly under conditions of warm temperatures (> 75 °F) and high humidity (Figures 4 & 5). Lesions normally have a transparent-light green appearance and may be surrounded by a chlorotic (yellow) halo. Dead leaves will turn brown and adhere to the float tray. Web-like strands (mycelia) of fungal growth may be present on leaves, stems, and growth media when humidity is high. The target spot pathogen will damp-off of younger transplants as well. Seedlings with target spot that are transplanted can contribute to epidemics in the field later in the season.





Inoculum carried over in infested trays is the most common way for the *T. cucumeris* to enter the float system, although inoculum may move in on air from sources outside the transplant facility. Basidospores generated by *T. cucumeris* are released under favorable conditions and contribute to spread of the disease within the float system.

As with soreshin, sanitation and good growing practices are the best defense against target spot. Research suggests that plants that are nitrogen-deficient show increased susceptibility to target spot. Severe outbreaks of target spot have occurred in cases where nitrogen has dropped below 50 ppm, a common scenario in outdoor float beds that have received significant rainfall resulting in dilution of fertilizer levels. Maintaining nitrogen within the recommended range of 75-125 ppm will help suppress, but not eliminate, this disease. Reasonable control of target spot can be obtained with mancozeb fungicides, as described for damping-off.

VEGETABLES

Thrips on Onions

By Ric Bessin

Thrips can be some of the more difficult to control insect pests of vegetable. They can damage vegetables in several ways, first while in vegetative and flowering buds they feed with their with piercing-sucking and rasping mouthparts damaging cells before they divide and grow resulting in scarred or distorted growth. Feeding on ripening tomat fruits can result in a condition called 'gold flecking.' They are also vectors of two common tospoviruses in Kentucky, Tomato Spotted Wilt and Impatiens Necrotic Spot.

Thrips are serious pests of onions throughout the United States. Thrips are tiny winged pests, only about 1/20 of an inch in size. While both the onion thrips (*Thrips tabaci*) and western flower thrips (*Frankliniella occidentalis*) can attack onions, generally, the onion thrips is more common and serious. Thrips damage to onions results in both loss of yield and reduction in storage quality with bulb onions. Thrips are most damaging during the early bulb development stage. Infested plants may have leaves that are scarred (stippled appearance) and do not elongate properly resulting in twisted or crinkled leaves. With green onions, leaf scarring reduces marketability.

In Kentucky, development from egg to adult is estimated to take as little as 20 days, with 6 to 8 generations per year. The female inserts eggs into plant tissue with the nymphs emerging 4 to 10 days later. The nymphs feed for 5 to 7 days before pupating in the soil. In less than a week the adults emerge from the soil. Thrips overwinter in grasses, clover and alfalfa fields and continue to feed and develop during warm periods. In our state, these pests are favored by a mild, dry winter followed by a hot, dry spring. These weather patterns may allow for higher survivorship during the winter and early spring buildup. Infestations are greatest in hot, dry weather.
Thrips prefer to feed on the newest leaves, usually concealed in the leaf sheaths. As the leaf expands, the damage enlarges. Feeding results in leaves with a whitish or tan appearance.

Growers should check for thrips as bulbs begin to form. Looks for scarring of the leaves, as well as leaves that expand poorly. Tap leaves over a piece of paper to aid in spotting the thrips and examine the base of the leaves and leaf sheaths. Onion varieties vary in susceptibility to thrips injury, with some white and yellow varieties more tolerant. Thresholds vary from 10 to 25 per plant for susceptible varieties to as many as 45 per plant for more tolerant varieties. Where insecticides are needed, treat during early bulb stage. Direct ground-applied sprays toward the center of plants and use spray volumes of 30 or more gallons per acre. Wetting agents aid in control. Pesticide resistance is becoming very common with onion thrips in some regions of the U.S, check ID-36, *2008-09 Vegetable Production Guide*, for a listing of recommended insecticides for onions and other vegetables.

SOYBEAN

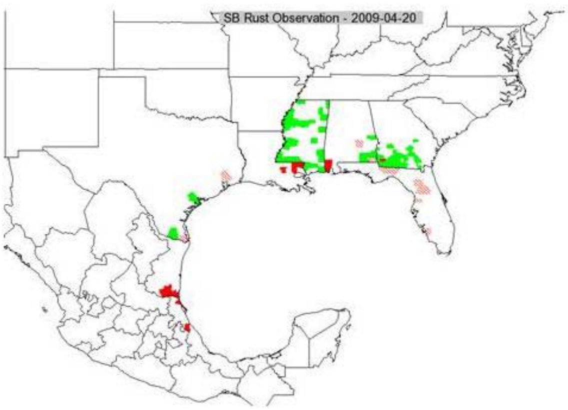
Soybean Rust Update

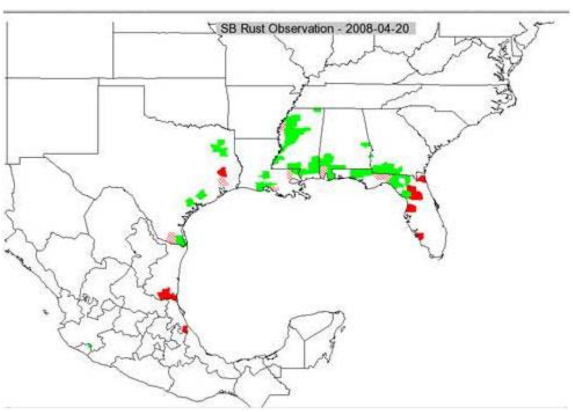
By Don Hershman

Soybean rust was first found in the continental United States in the fall of 2004. The initial find was accompanied by great fanfare, as well as great fear and trepidation. Fortunately, the disease has caused very little (mostly no) yield damage in the U. S. during 2005-2008. With this knowledge, it would be very easy for someone to believe that soybean rust will never be a serious problem in the Soybean Belt and totally disconnect from information on the disease. This could be a big mistake. Yes, we are very pleased that soybean rust has not turned out to be the perennial killer we feared it could be. Still, most scientists believe that the “book” on soybean rust in the U.S. is still be written, and that it is way premature to write the disease off as being inconsequential. Twenty years from now, we might look back and see that soybean rust was a “flash in the pan” disease: all hype with little substance. On the other hand, it is just as likely, yea, more likely, that soybean rust will be a significant production factor at least a time or two over the next 20 years. The fact is we simply don’t know how the soybean rust situation will play out in the U.S. So, we keeping watching and monitoring the disease; we cannot drop our collective guard. There is too much at stake, and soybean rust is not a normal disease. By that I mean there is no disease with such a destructive potential on a regional basis as soybean rust.

Below is the current distribution of soybean rust as of April 20, 2009 compared with the same date for 2008. The main difference is the overwinter survival of the disease in Georgia, Alabama, and Louisiana. This is the first time that soybean rust has successfully overwintered in these states without some sort of break in detection. Consult the state commentaries on .sbrusa.net for specifics, but generally, the disease can currently be found at very low levels in kudzu. Conditions have been wet in these areas, but it is my understanding that there is yet to be any evidence of disease increase in kudzu, and nothing has been found in soybean.

The overwinter survival of soybean rust in AL, GA and LA may have very little or no impact on what transpires during the rest of the season. Or it could have a tremendous impact. The determining factor will be the weather conditions over the next two months. I am not predicting doom and gloom. Far from it! But the situation does merit watching, especially since the active areas have lots of kudzu that ***could*** serve as a springboard for disease movement into soybean. Last year on this date, the disease could be found in Texas, but they have very little kudzu and soybean acres are limited. So the potential disease situation at this point in the season is significantly different between 2009 and 2008.





WHEAT

Fungicidal Control of Fusarium Head Blight (Head Scab) and Deoxynivalenol (DON) in Wheat

By Don Hershman

Background Information. Fusarium head blight (FHB) of wheat, and deoxynivalenol (DON) accumulation in harvested grain, are periodically very serious problems in Kentucky. There was minimal FHB or DON in 2006-2008 in Kentucky, but each year brings new possibilities. Thus, it is imperative that you be on guard for FHB/DON in 2009.

Since this time last year, several new fungicides have received Section 3 labels from EPA and can now be used to suppress both FHB and DON. Caramba (BASF), Prosaro and Proline (Bayer), and several tebuconazole products (e.g., Folicur, Bayer) can now be legally applied at early crop anthesis (flowering) for disease suppression. Previously, various propiconazole products (e.g., Tilt – Syngenta) were labeled for FHB control. The Regional Wheat Disease Committee, NCERA 208, has reviewed existing efficacy data and has concluded that Caramba, Prosaro and Proline provide “good” control of FHB and DON. Tebuconazole fungicides were given a “fair” rating, and propiconazole products were given a “poor” rating. Note: none of the products provide excellent control of either FHB or DON. Thus, it is still possible to take a serious yield and quality hit if FHB pressure is high this season. Fungicides are certainly not the silver bullet for FHB management. In fact, they do work best when applied to wheat varieties that have at least some resistance to FHB.

Excellent fungicide coverage on wheat heads is crucial to achieve the greatest possible FHB/DON suppression. This is no small challenge since most spray systems used in wheat were developed to deliver pesticides to foliage (horizontal structures). In order to maximize coverage on heads (vertical targets), significant changes may need to be made to the sprayer boom system. Also, discipline must be exercised to ensure that proper sprayer pressure and volumes are used.

Be sure to precisely follow all fungicide label instructions and restrictions.

Making Appropriate Fungicide Spray Decisions. One desire we all have is for fungicides to be used only when needed. Regular field scouting for foliar fungal diseases has been successfully used by growers for many years to determine if and when to spray fungicides in wheat. However, this is not possible with FHB since once symptoms are present it is TOO LATE to spray. Below are some general guidelines to help you determine if you should spray fungicides for FHB/DON suppression.

During period leading up to, during and immediately after head emergence:

- Soil moisture has been good for the past month (relates to spore production, dispersal of *Fusarium graminearum* spores, and crop infection).

- Crop has good yield potential (relates to economics and crop density, which increases canopy humidity and may increase spore production, facilitate spore dispersal, and encourage crop infection).

- Temperatures 68-86 F (relates to spore production and crop infection).

- Humidity is high (80% day or night) and/or free water (such as dew) is present on the heads during this period (relates to spore production, dispersal, and crop infection).

If most or all of the above conditions exist when the crop is just beginning to flower, consider spraying as soon as possible.

New Web-Based FHB Prediction Tool. In addition to the above general guidelines, an exciting new tool can also be used to help determine the FHB risk and need to spray. This tool is a web-based, disease forecasting model made available by Penn State University, The Ohio State University, Kansas State University, and the U.S. Wheat and Barley Scab Initiative. This forecasting model, utilizes real-time weather data from numerous National Weather Service stations within each state. Go to .wheatscab.psu.edu/ and click on "Risk map tool".

You will be asked if you are growing winter or spring wheat. At this point you will come to a U.S. map and are asked to click on the state of interest. The FHB Risk Management Tool page will have a map that shows where the weather data are being retrieved. To the upper left corner of the page is a calendar section labeled "Assessment Date". This section needs a bit of explaining. You will note right away that the tool will only let you click on the current date and the preceding 7 days. So, if you estimate your crop will begin to flower (the beginning of FHB susceptibility) on May 7, but it is only May 3, the best you will be able to do is to determine if the weather on May 3 (or the previous 7 days) is favorable for FHB. My advice is to begin determining the FHB risk using this model 1-2 weeks out from crop flowering. Keep checking your wheat and keep checking the model every 1-2 days. By the time your crop reaches early flowering, you should have a good feel for the FHB risk in your area. If the forecast model says the FHB risk is high (medium if you are not a risk taker), and the forecast matches your local weather and crop reality, then you might consider spraying as soon as possible. The FHB Risk Management Tool also includes a commentary section that will give you a text risk assessment based on the opinion of the local state Extension Specialist (that's me for KY).

Once you actually see it and play around with it, what I have said above will make much more sense. The model does have several practical limitations in predicting final FHB levels; these are clearly discussed within the Prediction Center website. Perhaps the greatest limitation of the model is that it does not account for weather conditions during flowering and grain fill. Specifically, disease-favorable weather occurring during late flowering and grain fill can greatly impact final FHB/DON levels. The bottom line is that final FHB/DON levels may not always be reflected by the model's risk output. The authors of the model discuss this limitation under "Reality Check" in the "Model Details" section of the Prediction Center.

We all hope that FHB is non-existent this spring. However, if this is not the case, wheat producers now have an additional tool to use to minimize FHB and DON development this spring.

FRUIT CROPS

Estimating Risks of Fire Blight Infection

By John Hartman

Fire blight of apple and pear, caused by the bacterium, *Erwinia amylovora*, kills blossoms, fruit spurs, shoots, limbs and, sometimes, whole trees. Fire blight disease in Kentucky is difficult to control. It is unpredictable; epidemics can strike quickly in young orchards where it has never been a problem and yet, in some years, mature orchards with a long history of fire blight may show little disease. Fire blight control is also difficult because the best available antibiotic, streptomycin, works well only when used just before blossom infections occur. An important concept in fire blight management is that infection of the flowers provides a large quantity of inoculum for continued spread of fire blight in the shoots and branches. Preventing fire blight infections during bloom with timely applications of the antibiotic should be the goal.

Can fire blight be predicted? To relate fire blight infection biology to weather conditions, disease models have been developed. Maryblyt (developed by Dr. Paul Steiner, University of Maryland and Gary Lightner, USDA/AFRS, Kearnysville, WV) and Cougarblight (developed by Dr. Timothy Smith, Washington State University) are computer-assisted disease models for predicting fire blight. These models use measurements of temperature and wetness in the orchard to predict infection of open apple or pear flowers by *E. amylovora*.

Both models pre-suppose that fire blight primary infection is a four step process:

- *Erwinia amylovora* bacteria, emerging around last year's fire blight cankers, must be moved to the open flowers by rain-splash or by foraging bees.
- The bacteria must grow and develop a colony on the flower large enough to cause an infection.
- Gentle rain or other wetness is needed to wash the bacteria to the base of the flowers and into the open nectaries so *E. amylovora* can get into the plant.
- Once inside the flower, suitable temperatures will allow the bacteria to continue growing as a parasite and to move within the blossom spur and eventually the tree's twigs and branches.

To predict whether or not a threat from fire blight exists one must know how much bacterial growth might occur on the stigmas of apple and pear flowers. This growth is temperature dependent, so prediction of infection risk requires knowing the temperature while flowers are open (Figures 1, 2, & 3) using degree hour data or average daily temperatures and relating it to rate of bacterial growth at similar temperatures in the laboratory. These calculations, based on recorded temperatures, are done by the computer or they can be done using specially prepared charts. Temperatures determine both the number of days the flower may be infected and degree of bacterial colony growth. Wetness is the potential trigger of infection, as water moves the bacteria into the nectaries.

Typically, while flowers are open, 2-4 days of warm weather, followed by a rain or heavy dew provides conditions needed for infection. Using the disease models, risk potential in the near future may be evaluated with forecasted temperatures. Thus, managing primary infections of the tree via the flowers can be aided substantially through the use of Maryblyt or Cougarblight. By knowing daily high and low temperatures, rainfall, and tree development stage the computer or the grower calculates when fire blight infections have occurred or when they are likely to occur.

When blossom blight occurs, early symptoms often show ooze droplets or browning of blossom pedicels. The infection of a single flower in a cluster usually kills the entire spur (Figure 4). As the disease progresses bacteria invade the supporting twig, causing a canker that girdles it, resulting in the loss of other nearby spurs. From the bacteria that build up from these primary infections, infection of new, elongating shoots occurs. The resulting shoot blight, or twig blight, is the most visible and damaging phase of fire blight (Figure 5).

Early shoot blight symptoms show a slight wilt of the shoot tip, sometimes with ooze droplets visible on the stem. This is soon followed by leaf and shoot browning and death which proceeds down the shoot.

Will disease predictive systems work? During the past week, apples have been in bloom throughout Kentucky. Warm weather occurred on Friday and Saturday, April 17&18. Then rain moved in on Sunday and Monday. Was it warm enough for long enough for fire blight to pose a significant threat? Using the Cougarblight model on Mesonet and National Weather Service data from 44 Kentucky locations indicates that in 27 of the locations, fire blight infection risk was high or fairly high and growers would have wanted to apply streptomycin. However, in the other 17 locations, fire blight infection risk was low or marginal and sprays may not have been needed.

Some Kentucky growers have used the disease models to determine whether or not to spray. Several years ago, the Maryblyt system was used to calculate the need for fire blight applications by participating Kentucky apple growers. In years with low disease pressure, growers saved one or more streptomycin sprays, with no decrease in tree health, by following these recommendations.

Figure legends:

Figure 1. Apple blossom at the pink stage, not susceptible to fire blight infection.

Figure 2. Apple blossom open and susceptible to infection.

Figure 3. Apple blossom at petal-fall stage and no longer susceptible to infection.

Figure 4. Apple blossom/fruit spur killed by fire blight.

Figure 5. Apple orchard with numerous dead shoots killed by fire blight.

HOUSEHOLD INSECTS

Rice Weevils – Common Stored Seed Insect

By Lee Townsend

Several specimens of the rice weevil, a common pest of stored whole grains and seeds, have been sent in for identification during the past 3 weeks. Usually, infestations are discovered when these 1/8-inch long dark beetles with distinct snouts are found. The adult is a wanderer but the legless, grub-like larvae feed and develop inside grain kernels. Following about a one month life cycle, adults leave through small round exit holes in the grain and repeat the cycle.

Rice weevils live for several months and can wander far from their development site. They can be found throughout the year but are most commonly seen during the winter or early spring. They are a nuisance but do not bite or sting. However, they can find and infest other seeds and grains.

The key to eliminating rice weevils is to find and destroy the infested products that are their breeding sites. These are most likely to be whole wheat, oats, rye, buckwheat, barley, corn, or rice; even seeds in beanbag chairs can be infested. Forgotten bags of bird seed and dried arrangements with seeds (especially decorative corn) also can be sources of the weevils.

Breeding sites must be found and eliminated to end the infestation. Spraying to kill adults will not solve the problem. All life stages can be killed by extreme heat (120°F for one hour) or cold (0°F for a week). This may be a practical way to end infestations where the stored commodity must be kept. Otherwise, infested materials should be discarded. Vacuuming the area with a crevice tool can help to capture hiding weevils.

INSECT TRAP COUNT
April 10-17

Location	Princeton, KY	Lexington, KY
Black cutworm	10	23
Armyworm	103	103
Corn earworm	0	0
European corn borer	0	0
Southwestern corn borer	0	0
Fall armyworm	0	0

Graphs of insect trap counts for the 2008 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
For information on trap counts in southern Illinois visit the Hines Report at – http://www.ipm.uiuc.edu/pubs/hines_report/index.html

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