

KENTUCKY PEST NEWS

ENTOMOLOGY • PLANT PATHOLOGY • WEED SCIENCE

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GREEN JUNE BEETLES and JAPANESE BEETLES cruising over lawns and feeding on fruits and vegetables; BURROWING SOD WEBWORM in lawns; CORN ROOTWORM BEETLE emergence; TWO SPOTTED SPIDER MITES on crops and in home gardens, EUROPEAN RED MITES in fruit trees.

TOBACCO

EFFECTIVE MANAGEMENT OF TARGET SPOT by Kenny Seebold

Target spot is fast becoming a serious problem on burley and dark tobacco around the southeastern U.S. First found in the early 1980's on flue cured tobacco in North Carolina, target spot now occurs in nearly every tobacco-producing state. Losses tend to be low in most years, but can exceed 50% on certain farms or several farms in a region when the environment favors disease.

The causal agent of target spot is the fungus *Thanatephorus cucumeris* (*Rhizoctonia solani*). Target spot begins as small, water-soaked spots that expand to large lesions with a zonate (concentric rings) appearance. Lesions can expand rapidly when humidity is high, and will have a translucent, greenish appearance. As lesions age, they become tan-brown and brittle, and may cover large portions of the leaf. Brittle tissues tend to fall away, leaving holes in affected leaves and reducing yield. Leaf quality is also affected. Target spot is favored by high humidity and temperatures between 68-86 °F. Spores produced on plant debris or hosts in and around the tobacco field contribute to early disease development; however, secondary spread of target spot is a result of spores produced on

infected tobacco (or tobacco tissues that have dropped to the ground). High levels of disease early in the season tend to result in heavy losses later in the season. Under favorable conditions, spores of *T. cucumeris* are distributed within tobacco fields by air movement.

Management of target spot can be difficult in areas with a history of problems with the disease. Deep-turning fields will bury crop residue that may carry the pathogen between seasons. Controlling target spot in transplant production may reduce losses later in the season by preventing the introduction of diseased plants into a field. Planting in areas with good air movement will discourage long periods of leaf wetness and high humidity in the plant canopy, as will increasing plant spacing. We know that target spot is aggravated by poor nitrogen fertility, so adequate (not excessive!) N in soil is an important consideration. Burley varieties tend to be susceptible to target spot; however, different varieties may develop more serious symptoms than others. In 2005 researchers in Virginia found that, in general, varieties like KY 14 × L8, NC BH 129, and NC 2000 developed less target spot than NC 5, NC7, and KT 204. Keep in mind, though, that disease in the less susceptible varieties was still fairly high, and that these data represent only a few tests conducted in one year. Additional tests carried out over several environments and seasons are needed to better understand the susceptibilities of different burley varieties to target spot.

Until recently, a fungicide option to manage target spot was not available to producers of burley and dark tobacco. Fungicides registered for use on tobacco prior to 2006 did not list target spot on their labels and gave, at best, mediocre control of the disease. The recent labeling of Quadris 2.08SC, however, has provided tobacco pro-

ducers with an effective tool that can be used along with cultural practices to reduce losses to target spot. In tests conducted over several years around the southeastern U.S., Quadris has been shown to reduce target spot on burley tobacco by as much as 75% compared to untreated tobacco, and control has been greater in some cases. The application rate 6-12 fl oz/A; higher rates are more effective where disease pressure is high or on older (and larger) tobacco. Quadris can be applied from transplanting up to the day of harvest, but only 4 applications can be made per season, and no more than two consecutive applications are permitted. Quadris is a locally systemic fungicide, so good coverage is necessary to achieve good control of disease. Over-the-top applications are feasible when tobacco is small, but directed applications made with drop extensions will be required for tobacco over 30" tall. Remember to increase spray volume and rate as the tobacco increases to mature size so as to get good coverage of leaf surfaces.

In many cases, late-season losses are caused by target spot that begins early in the season. Getting a handle on the disease when it first appears will go a long way towards reducing severity (and lost yield) at harvest. Waiting until disease is fairly severe before taking action will lead to greater losses AND it will be more difficult to get good coverage on tobacco once it reaches the topping stage and beyond. Early application of Quadris is the key to success, and may be more important than the number of treatments made during a season. Research conducted in 2005 and 2006 suggests that where target spot has been severe in the past, the first application of Quadris should be made before the crop covers the row middles. The reason is that once this stage is reached, the environment in the lower part of the canopy becomes increasingly favorable to target spot. Relatively small numbers of target spot lesions on lower leaves can produce a tremendous quantity of spores in the humid lower canopy, and disease can "explode" during periods of overcast or rainy weather after topping if left unchecked. Quadris was tested in the field for control of target spot in 2006. In this test, we found that one application of Quadris made at 8 fl oz/A 5 weeks after transplanting or two applications made at 5 and 7 weeks after transplanting were as effective in reducing target spot as three applications beginning 5 weeks after transplanting and continuing on a 14-day schedule up to topping. All Quadris treatments gave good control of disease, and performed better than a "standard" treatment of Dithane tank-mixed with Forum (flowable formulation of dimethomorph, the active ingredient in Acrobat) applied three times. In cases where the first application of Quadris is made later in the season to manage target spot, growers can still expect reasonable control of disease. However, as mentioned earlier, good coverage becomes more difficult to achieve as the crop increases in size, plus the risk of rapid (and potentially

uncontrollable) disease development exists. Trials for target spot management in Kentucky have shown that spray programs that feature Quadris generally yield better in terms of weight and quality than untreated tobacco or tobacco treated solely with Dithane DF + Acrobat or Actigard.

Target spot is not a problem in every field where burley or dark tobacco is grown. However, if target spot has been severe in a field in the past, there's a good chance that it will cause problems again. An integrated management program that balances crop rotation, wider plant spacing, and a fungicide program that features 1-2 applications of Quadris beginning early in the season will provide good control of target spot, as well as diseases like blue mold and frog-eye.

CORN

QUESTIONS ON FUNGICIDES IN A DRY GROWING SEASON

by Paul Vincelli

According to rainfall maps at the UK Ag Weather Center, counties west of I-65 received substantial rainfall during the past week, as did other parts of the state. Corn fields approaching and at tasseling benefited greatly from this rainfall, as silking is the most sensitive stage of corn to drought. Although it is not apparent how much yield loss may have already taken place in some fields, information from UK Extension agronomists (http://www.uky.edu/Ag/CornSoy/Newsletters/cornsoy7_6.pdf) suggests that last week's rains came at a critical time for many corn fields in western Kentucky.

Questions continue to arise as to whether to treat corn fields with foliar fungicide, with most attention being focused on Headline and Quilt fungicides (both contain an active ingredient in the *strobilurin* family of fungicides). While these products are excellent for controlling gray leaf spot and northern leaf blight, the dry weather prevalent for much of the season has kept disease levels very low.

As outlined in a previous newsletter article, a number of factors can come into play in determining whether a foliar fungicide will be economical (see figure 1). If there is no disease activity in the crop at tasseling, it seems to me (based on the research I've done and seen and published information from other states) that the threat to grain fill from these diseases is low, especially if the hybrid has some partial resistance. Is there no risk from these diseases? I wish I could provide that kind of assurance, but no one can predict the weather for the next eight weeks. However, if you are not seeing disease at tasseling, it is

likely to not be a major factor affecting yield.

But would a fungicide application improve yield even if diseases are not active? In soybeans, there is evidence that certain strobilurin fungicides change the plant's physiology in a way that sometimes enhances yield, even when diseases are not present at a level sufficient to affect yield. It is not clear exactly why this happens in soybeans, but it has been documented in carefully conducted field research. In corn, the research base to date is much more mixed. Most of the studies I've seen (including a number conducted in Kentucky) show no statistically significant improvement in yield from foliar fungicides applied to corn in trials when disease activity is minimal through grain fill. This past week I obtained data from a neighboring state showing some field trials where a yield increase was observed from strobilurin fungicides when disease activity was low. However, these studies represent less than half of the total number of studies I've reviewed. Furthermore, only a few trials showed yield increases that would more than pay for the cost of the application at \$4.00/bu corn prices, a fraction of the total number of trials I've reviewed. In those case where these yield increases occurred, there was no common denominator that would allow one to predict whether a field would benefit by a fungicide application in the absence of disease. Finally, it should be noted that the use of Headline and Quilt fungicides for general yield-enhancement, even though disease activity is below yield-threatening levels, probably increases the risk that fungicide resistance might eventually develop.

There are many questions remaining to be answered about foliar fungicides in corn. However, my best assessment is that routine spraying of corn fields doesn't look advantageous for this year, but certainly some fields might benefit, depending on how many of the risk factors identified in figure 1 are present.

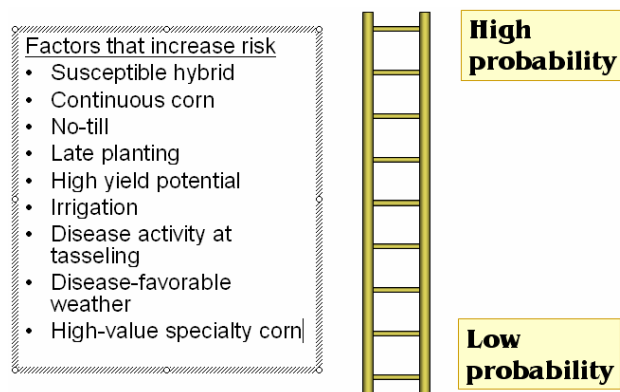


Figure 1. Climbing the "Probability Ladder": Factors that increase the probability of an economic return from a fungicide application on corn

If I were a producer planning to spray, I would try to arrange to leave one or more untreated strips. An unreplicated, untreated strip is not a valid experiment, but at least it would give the producer a crude indication as to whether s/he might have gotten some benefit from the application. Even crude information is better than no information, and no information is what the producer will have if s/he treats the entire field and leaves nothing untreated.

SOYBEANS

SOYBEAN INSECT STATUS: RAIN SHOULD HELP

by Doug Johnson

Recent rain fall across Kentucky may not have broken our drought, but it will aid in soybean pest insect suppression. The two pests most closely associated with drought are spider mites and grasshoppers. Rainfall and humidity play an important roll in the natural control of both of these pests.

► **Spider mite** outbreaks on soybeans are almost exclusively associated with drought conditions. The rains over the last week to ten days will have lowered the risk of an outbreak of this pest. Nevertheless, producers, consultants, agents, etc. need to be wary of this pest. The rain that Kentucky received has not been general and many locations in our soybean production area may still be very hot and dry. If your area received rain, and especially if it is associated with high humidity, then your risk of mite outbreak is reduced. However, if your production is in an area that missed the rain, then you are still at greater risk of mite infestation, even if the areas around you did receive rain.

► **Grasshopper** populations are evident and will remain so through the summer. Most are juveniles (no wings) and thus are still in the early stages of their life cycle. These pests are also associated with drought but not quite as closely as spider mites. Grasshopper populations are favored by drought because the naturally occurring diseases that generally control them do not work as well in drought conditions. Additionally, drought slows the development of soybeans so that new leaves do not deploy as rapidly as under good growing conditions. Again, if you have received rain then your risk of damage is reduced. However, one needs to watch for grasshopper populations as we enter the generally dryer months of July and August. Once you begin to see hoppers that have wings be aware that those populations will be highly mobile.

► **Soybean Aphid** numbers remain low across the state. On the other hand, we have observed colonies forming on plants in the sentential plots in Princeton (Caldwell Co.). The “100 leaf” sample (used primarily for soybean rust detection) contained leaves with up to forty-five aphids per leaflet. This is no outbreak, and is still a rare occurrence, but colony formation has been relatively rare in Kentucky over the last several years.

LAWN & TURF

HOW TO GET THE MOST OUT OF A FUNGICIDE SPRAY FOR FAIRY RING by Paul Vincelli

Certain soilborne fungi produce “fairy rings” in turfgrasses. These fungi grow in the soil, feeding off of dead organic matter in the soil and producing rings or arcs of symptomatic turf and/or mushrooms. The symptoms produced are of three general types:

1. Type I: Rings or arcs of necrotic (dead) turf; localized dry spot (hydrophobic soil or thatch) is often associated with these.
2. Type II: Rings or arcs of stimulated turf growth; localized dry spot may be associated with these.
3. Type III: Rings or arcs of mushrooms only.

For fairy rings in lawns and landscapes, my recommendation is to rely on cultural practices to reduce symptoms. Such practices include proper fertilization and irrigation, reduction of thatch, the use of soil surfactants, and aeration to improve penetration of water.

For putting greens and croquet courts, where very high standards of playability are held, fungicide applications may play a part in fairy ring management. Labeled fungicides include Endorse, Heritage, Insignia, and Prostar. (Zerotol is also labeled but I am unaware of data showing this product to be effective against fairy ring, and its track record in research against other diseases is so poor that I can't justify including it in the following discussion in the absence of data showing efficacy.)

Recent Research

Recently a team of excellent turfgrass pathologists from several states, led by Dr. Mike Fidanza of The Pennsylvania State University, conducted tests of fungicidal control of fairy ring. They tested the four fungicides listed above at their labeled rates applied with and without the soil surfactant Revolution at 6 fl oz/1000 sq ft. In two of their tests, these treatments were applied in 2 and in 4 gal spray volume/1000 sq ft. All treatments were applied twice at approximately a 4-week interval.

One of the findings from their study was that each of the fungicides sometimes failed to provide any suppression of fairy ring symptoms when the product was applied alone in a volume of 2 gal/1000 sq ft. We had a similar result in a UK test using Prostar several years ago.

However, the results of the trial were not completely gloomy. The researchers found consistently that a tank-mix of each fungicide with Revolution soil surfactant resulted in significantly reduced fairy ring symptoms 4-6 weeks after the second application. They also found that increasing the spray volume from 2 to 4 gal/1000 sq ft typically improved disease control. In a number of instances, the best treatment for a given fungicide was the tank-mix of that fungicide plus Revolution applied in 4 gal/1000 sq ft.

Another interesting element of their studies was how the impact of a curative application of the fungicide-Revolution tank-mix didn't necessarily show up during the same growing season the application was made. In one test, the benefit was not seen during the season of application but it was seen during the following growing season.

Interestingly, testing of Revolution by Dr. Lane Tredway at North Carolina State University suggests that the application of this product alone (no fungicide added) can help to alleviate fairy ring symptoms.

Implications

These studies suggest that, if one is planning to use a fungicide for fairy ring control, which product one chooses is less important than application in combination with an appropriate soil surfactant in sufficient volume. Recognize that numerous fungi can produce fairy rings. Some of these fungi may not be sensitive to labeled fungicides at normal use rates; others may be too deep in the soil to be affected by the fungicide.

SHADE TREES & ORNAMENTALS

CLEMATIS STEM ROT AND LEAF SPOT IS ACTIVE THIS YEAR by John Hartman

Clematis is grown throughout Kentucky as a summer perennial flower. Its large blooms can provide a colorful display and its climbing growth habit makes it suitable for trellises to form screens and shade a porch or patio. Again this year, there are reports of clematis growing in Kentucky landscapes suddenly wilting and dying due to a lower stem canker disease. The symptoms are quite dramatic and most often, it is the large-flowered varieties

that succumb to this disease. Clematis is very susceptible to stem rot and leaf spot disease, especially when warm, rainy weather favors the disease early in the season; however, this year, the disease is active despite drought conditions. This devastating disease is caused by the fungus *Ascochyta clematidina*.

In the landscape, the most destructive phase of the disease is the stem-girdling canker or stem rot which can cause entire vines to suddenly wilt and die. Cankers begin as reddish lesions, but with age, and as they girdle the stem, they may turn gray. This fungus also causes a discrete, irregularly-shaped dark brown leaf spot which can progress down the leaf petioles and into the stem, leading to stem rot. The primary infections develop from pycnidia, fruiting bodies of the fungus, which develop on the cut stumps of the vine.

Clematis leaf and stem spot is difficult to control, but several practices will aid in managing this disease.

- Thin out the vines to improve air movement and ventilation in the planting.
- Remove and destroy all diseased leaves as they occur so the disease doesn't spread to the stems. Likewise, prune out and destroy infected vines to reduce inoculum being sure to prune low enough on the vine to remove all of the infected tissue.
- Prevent the disease by applying fungicides before symptoms begin. The fungicide thiophanate-methyl (Cleary's 3336 F) is labeled for *Ascochyta* leaf blight. Formulations of wettable sulfur can also be used. Applications should be made early in the spring and special attention should be given to getting good coverage of the stumps from previous years growth which may harbor the fungus.
- Clematis hybrids and cultivars vary in their susceptibility to *Ascochyta* blight. Clematis types such as *Clematis alpina*, *Clematis macropetala* (blue, early spring), *Clematis montana* (pink), and *Clematis viticella* and some of their cultivars are reported to be resistant. These are all small-flowered varieties and less exciting to most gardeners. If the particular cultivar in the landscape consistently dies back, perhaps it is time to change to a new cultivar and perhaps a new planting site.

There are reports that clematis plants sometimes recover from this disease because the fungus generally doesn't attack the roots. Thus, new healthy shoots can appear later, perhaps even into the next year. Be sure that any new clematis plants are set in good loamy soil and mulched to help retain soil moisture.

HOUSEHOLD

MOSQUITO OPTIONS FOR HOUSEHOLDERS by Mike Potter

Despite the state-wide lack of moisture, mosquito season is in full swing throughout the Commonwealth. Mosquitoes are a perennial nuisance for which there is no easy solution. As summer continues, there will be an abundance of misinformation 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. Recent 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., 1 to 2 hrs), and are recommended for use with young children. Earlier this year, two new mosquito repellents 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. 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. Both repellents should be appearing on store shelves soon. 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 ani-

mals 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.

INSECT PESTS OF HUMANS

EARLY WEST NILE VIRUS ACTIVITY REPORT FOR 2007

by Lee Townsend

The Centers for Disease Control reports 6 US cases of WNV as of June 12, 2007 (Mississippi – 4, Iowa 1, South Dakota 1). As far as neighboring states go, infections have been detected in either birds, animals, or mosquitoes in Tennessee, Virginia, Tennessee, Indiana, and Illinois.

Here are some questions and answers from the CDC on use of mosquito repellents.

Why should I use insect repellent?

Insect repellents can help reduce exposure to mosquito bites that may carry viruses such as WNV. Using insect repellent allows you to continue to play and work outdoors with a reduced risk of mosquito bites.

When should I use mosquito repellent?

Apply repellent when you are going to be outdoors. Even if you don't notice mosquitoes there is a good chance that they are around. Many of the mosquitoes that carry West Nile virus bite between dusk and dawn. If you are outdoors around these times of the day, it is especially important to apply repellent. In many parts of the country, there are mosquitoes that also bite during the day, and some of these mosquitoes have also been found to carry West Nile virus.

Which mosquito repellents work best?

CDC recommends using products that have been shown to work in scientific trials and that contain active ingredients which have been registered with the EPA for use as insect repellents on skin or clothing. When EPA registers a repellent, they evaluate the product for efficacy and potential effects on human beings and the environment. EPA registration means that EPA does not expect a product, when used according to the instructions on the label, to cause unreasonable adverse effects to human health or the environment.

Of the active ingredients registered with the EPA, CDC believes that two have demonstrated a higher degree of efficacy in the peer-reviewed, scientific literature. Products containing these active ingredients typically provide

longer-lasting protection than others: DEET (N,N-diethyl-m-toluamide)

Picaridin (KBR 3023) .

Oil of lemon eucalyptus, a plant-based repellent, is also registered with EPA. In two recent scientific publications, when oil of lemon eucalyptus was tested against mosquitoes found in the US it provided protection similar to repellents with low concentrations of DEET.

How does the percentage of active ingredient in a product relate to the amount of protection it gives?

Typically, the more active ingredient a product contains the longer it provides protection from mosquito bites. The concentration of different active ingredients cannot be directly compared (that is, 10% concentration of one product doesn't mean it works exactly the same as 10% concentration of another product.)

DEET is an effective active ingredient found in many repellent products and in a variety of formulations.

23.8% DEET provided an average of 5 hours of protection from mosquito bites.

20% DEET provided almost 4 hours of protection

6.65% DEET provided almost 2 hours of protection

4.75% DEET were both able to provide roughly 1 and a half hour of protection.

Go to http://www.cdc.gov/ncidod/dvbid/westnile/qa/insect_repellent.htm for questions and

DIAGNOSTIC LA-HIGHLIGHTS

by Julie Beale and Paul Bachi

Tobacco samples over the past week included black shank, Rhizoctonia root rot, tomato spotted wilt virus, tobacco streak virus, and Fusarium wilt.

On fruit and vegetable samples we have diagnosed cedar/ apple rust on apple; fire blight on apple and pear; Phytophthora root rot on blackberry; stem/ root rots caused by Fusarium sp. on tomato and bean; blossom end rot on tomato and Rhizoctonia stem/ root rots on pumpkin.

On ornamentals and turf we have seen Pythium root rot on chrysanthemum; Phomopsis twig blight on juniper; black root rot on holly; powdery mildew on oak; cedar/ quince rust on ornamental pear; rose rosette virus on rose; summer patch on annual bluegrass; and take all patch on bentgrass.

INSECT TRAP COUNTS

UKREC, Princeton KY

Kentucky — Tennessee
June 22-29, 2007

► Jackson, TN

Black cutworm.....	0
True armyworm.....	10
Corn earworm.....	0
European corn borer	0
Southwestern corn borer	12
Fall armyworm	0

► Milan, TN

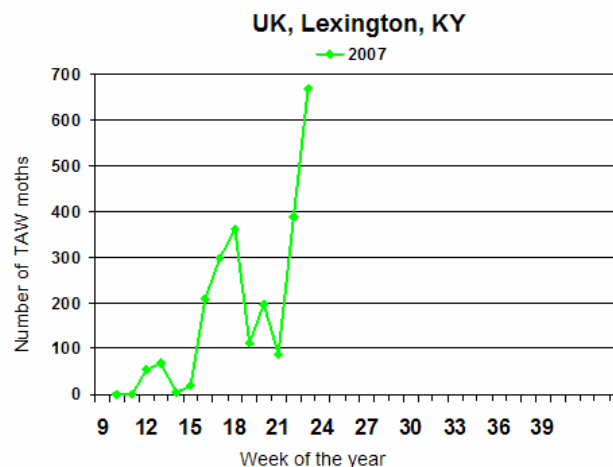
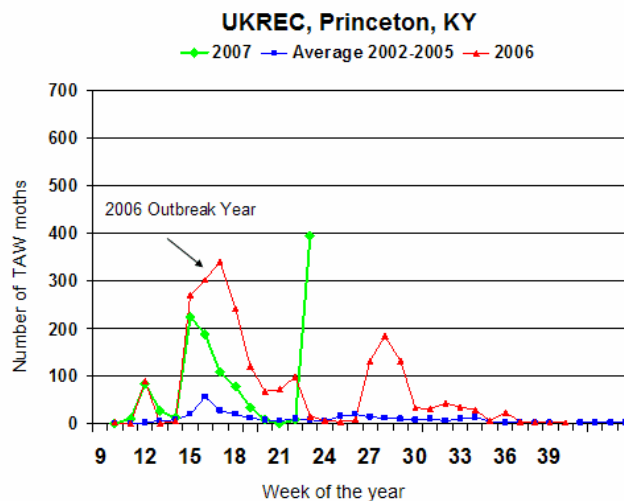
Black cutworm.....	0
True armyworm.....	0
Corn earworm.....	0
European corn borer	0
Southwestern corn borer	11
Fall armyworm	0

► Princeton, 7

Black cutworm.....	10
True armyworm.....	90
Corn earworm.....	2
European corn borer	0
Southwestern corn borer	0
Fall armyworm	0

► Lexington, KY

Black cutworm.....	74
True armyworm.....	576
Corn earworm.....	2
European corn borer	1
Southwestern corn borer	0
Fall armyworm	0



This season insect trap counts will be provided for locations in Kentucky and Tennessee.

View trap counts for past seasons and the entire 2007 season at –

<http://www.uky.edu/Ag/IPMPrinceton/Counts/2006trapsfp.htm>

View trap counts for Fulton County, Kentucky at –

<http://ces.ca.uky.edu/fulton/anr/>

For information on trap counts in southern Illinois visit the Hines Report at –

http://www.ipm.uiuc.edu/pubs/hines_report/comments.html

The Hines Report is posted weekly by Ron Hines, Senior Research Specialist, at the University of Illinois Dixon Springs Agricultural Center.