



# KENTUCKY PEST NEWS

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**ANNOUNCEMENT  
TOBACCO**

- **Banrot fungicides not labeled for tobacco transplants**
  - **Tobacco insect control options**
- WHEAT**
- **Changes in cereal leaf beetle thresholds**

**CORN**

- **Bt hybrids may reduce fusarium ear rot and fumonisin contamination**
- SHADE TREES AND ORNAMENTALS**
- **Canker Diseases of Woody Plants**
- PESTICIDE NEWS AND VIEWS**
- **Total release aerosol insecticide bombs**
- DIAGNOSTIC LAB - HIGHLIGHTS**

**TOBACCO**

production systems.

**BANROT FUNGICIDE IS NOT LABELED FOR TOBACCO TRANSPLANTS**

**By William Nesmith**

Several County Extension Agents and dealers have requested an update on the labeling status of the fungicide Banrot for use in tobacco transplant production. The label for this fungicide is held by The Scotts Co and the current label does not cover use on tobacco or tobacco transplants. Their representatives provided the following status report. A petition to label Banrot for use in tobacco transplant production has been submitted to EPA, but it is unlikely that a ruling will be made on this petition in time to support use for the 1999 crop season.

On a related question, some are asking if this product can be detected in the transplants. The answer is yes. Detection assays are available. Furthermore, one of the two active ingredients is systemic and tolerances have not been established for either active ingredient in tobacco.

As of this date, only two fungicides are labeled for use in tobacco transplant production systems - Ferbam and Dithane. The antibiotic Streptomycin is also labeled for plant beds, but the label does not cover use in greenhouses. The labels for Ridomil Gold and Ultra Flourish prohibit use in transplant

**TOBACCO INSECT CONTROL OPTIONS**

**By Lee Townsend**

Low, moderate, high, and very high insect management options are available to tobacco farmers in 1999. Up front cost is about the only difference, because all will require about the same level of field monitoring to keep from getting caught by surprise by pest activity. There is no program that will prevent damage from all of our key pests - flea beetles, aphids, budworms, and hornworms.

The **low input program** is based upon an Orthene / Acephate transplant water treatment and one or two foliar sprays later in the season, if needed. The transplant water application will provide very good tobacco flea beetle control for 3 to 4 weeks after transplant, as well as providing very satisfactory cutworm control. This has been a mild winter and tobacco flea beetle survival should be excellent. Expect them at damaging levels on the earliest set fields.

The **moderate input program** also begins with the systemic transplant water insecticide. It is followed by a foliar spray of Orthene / Acephate or Golden Leaf Tobacco Spray / Thiodan. There is no specific time to target this spray without field monitoring. If tobacco aphids are the major threat each year,

then the critical time is 4 to 6 weeks after transplant. Distinct aphid colonies are usually present then. Ideally, the application should be made when 20% of the plants are infested. If tobacco budworms are the most important pest, then early button stage is a critical time to check for pest activity. Serious infestations last year in the Mammoth Cave area hit the early-set fields. Applications should go on when there are an average of 5 or more budworms per 50 plants.

The **high input program** is built around a tray drench or transplant water application of Admire. This approach fits areas where the tobacco aphid is a consistent problem. Admire also provides very good early flea beetle control but is not active against cutworms. It will be effective against aphids for about 90 days so no additional will be needed for that insect. Admire has no effect on hornworms or budworms so field monitoring and use of a foliar spray, as needed, completes the program.

The very **high input program** adds Orthene in the transplant water or a preplant incorporated soil insecticide such as Lorsban. The only gain from having both Admire and Orthene would be some cutworm control. Use of Lorsban would provide wireworm cutworm control. Both of these insects tend to be very sporadic pests and preventive control is rarely justified. As with the other options, worm control must be based on rescue applications.

Realistically, preventive flea beetle control should be a good investment. Preventive aphid control should pay where they are a chronic problem. The common fly in all of these ointments is the worm complex, especially budworms. There is no substitute for regular field monitoring and properly timed applications based on treatment guidelines.

## WHEAT

### CHANGES IN CEREAL LEAF BEETLE THRESHOLDS

By Doug Johnson

Our treatment guidelines for cereal leaf beetle have been based upon numbers of larvae and/or adults per stem. Introduced below are guidelines based upon egg and larval counts. Recent research in Virginia and North Carolina has resulted in more sensitive scouting procedures that take into account advances in varieties and intensive wheat

management practices. Although some of the circumstances under which wheat is grown in those two states are different from Kentucky, I believe that these particular recommendations fit into our management program. This recommended scouting and insecticide management outline is a major departure from our previous recommendations.

You should note these changes in your copies of :  
ENT- 47: Insecticide Recommendations for Small Grains

ENTFACT-107: Cereal Leaf Beetle in Kentucky Wheat

ID- 125: A Comprehensive Guide to Wheat Management in Kentucky (Section 8)

IPM - 4: Kentucky Integrated Pest Management Manual for Field Crops: Small Grains

The sections on insect descriptions and biology in these publications are still appropriate, only the scouting and thresholds have changed. The following changes will be incorporated into the above listed publications as they come up for review and reprinting. (Note: FGS = Feekes Growth Stage)

**HIGH MANAGEMENT STRATEGY** (High Yield Potential)

### EGG AND LARVAL COUNTS

When to Scout: Begin scouting at FGS 7 (two nodes present) This will generally be in very late March or early April but will vary some with the season.

How to Scout: Samples of 10 tillers should be examined at each of 10 randomly selected sites (100 stems per field). The sites should be representative of the field as a whole. Check all the leaves and stems for cereal leaf beetle eggs and larvae (grubs).

Record: Count and record the number of eggs and larvae found on each tiller. Calculate the total number of eggs and larvae found.

Threshold for egg/larval Counts: Treat if you find any combination of 25 or more eggs and/or larva total per 100 tillers. (An average 1 per every four tillers or 0.25 per tiller).

Scouting Frequency: Under the high management system, you want to catch the cereal leaf beetle population at a time when most of the eggs have been laid. If your counts indicate that more than 50% of the CLB are in the egg stage, then sample

again in 5 to 7 days, and continue to do so until the majority of your sample is larvae as apposed to eggs. . Once more that 50% of what you find are larvae stage (as apposed to eggs) then one scouting trip should be enough. If your numbers are border line, then you should sample again. If the threshold is exceeded and you make an application then there will be no further need to sample.

### **LOW TO MODERATE MANAGEMENT STRATEGY LARVAL AND ADULT COUNTS--**

This sampling procedure has not changed. However, the THRESHOLD HAS CHANGED.

If you are unable to complete the egg/larval sampling scheme, then you should examine the crop for larval / adult damage when the flag leaf is present. This procedure will prevent most yield reduction; however, it is not as sensitive as the egg/larval method recommended for the high management strategy.

When to Scout: Begin by at least FGS 8 (Flag) and continue through FGS 10.5 (flowering).

How to Scout: Examine 10 head-bearing stems at a minimum of one location for each 10 acres of field size. Look carefully at the top three leaves (Flag, F1 and F2) on each head-bearing stem, for CLB larvae and/or adults.

Record: The number of larvae and/or adults on ten stems.

Threshold: Treat if you find an average of ½ larva and/or adult per head bearing stem. (Or one larva and/or adult for every two head bearing stems.)

### **INSECTICIDE MANAGEMENT--**

The optimum time to apply insecticides (if the threshold is reached) is from after the appearance of the flag leaf (FGS 8) until the head emerges (FGS 10.1)

Do not apply insecticides if the threshold is not reached. Many wheat pests are held in check by natural enemies. When you apply an insecticide, these natural enemies will be killed.

Do not put an insecticide in with nitrogen application. This occurs too early. You will not get optimum control.

Consider if other insect pests are present when choosing an insecticide. Depending up the pest pressure you may choose one insecticide over another.

## **CORN**

### **Bt HYBRIDS MAY REDUCE FUSARIUM EAR ROT AND FUMONISIN CONTAMINATION**

**By Paul Vincelli, Extension Plant Pathologist, Ric Bessin, Extension Entomologist**

#### **Background Information**

Interest in Fusarium ear rot and fumonisin contamination of corn has grown considerably in recent years. Fusarium ear rot occurs regularly in the region, and the fungi that cause Fusarium ear rot can also contaminate corn with fumonisins. Fumonisin are mycotoxins discovered about a decade ago which cause fatal diseases of horses (equine leukoencephalomalacia) and swine (pulmonary edema). Fumonisin also have been shown to cause cancer in laboratory rats, and have been associated with esophageal cancer in humans when consumed at high concentration. More information on fumonisins and *F. moniliforme* is available in the UK Extension publication, "Mycotoxins in Corn Produced by *Fusarium* Fungi. ID-121".

Activity of the European corn borer (ECB) can increase symptoms of Fusarium kernel rot in several ways. Kernel damage caused by second-generation ECB creates infection sites for the development of Fusarium kernel rot. The ECB can carry spores of *Fusarium moniliforme* and introduced them into maize ears. ECB infestations can also increase the frequency of symptomless infection by *F. moniliforme*.

Corn hybrids that express the *cry* gene (called "Bt corn") for resistance to ECB, corn earworm, and other, related insect pests are becoming common. The *cry* gene was originally obtained from a common soil bacterium, *Bacillus thuringiensis*, and represents one of the first widespread commercial uses of genetically engineered crops in the U. S. The toxin produced by the "Bt hybrids" may or may not be found in the kernels, depending on the specific Bt insert used. If found at adequate doses in the kernels, it protects against feeding damage by the ECB.

## Recent Research Results

In a series of field studies, Dr. Gary Munkvold and colleagues at Iowa State University compared hybrids with and without the Bt-toxin gene. Several of their findings are important, and are described below.

1. *When compared to non-engineered counterparts, genetically engineered corn hybrids which express the Bt toxin in their kernels consistently had less damage from ECB, and less damage from Fusarium kernel rot.* This resulted in better grain quality from reduced mold damage. Note that this conclusion only applies to those hybrids that express the Bt-toxin in the kernel tissue, like YieldGard™ hybrids. When the researchers evaluated hybrids that express the Bt-toxin only in green tissue and pollen and not in kernels (like hybrids with the KnockOut™ gene), these hybrids did not consistently differ from their non-engineered counterparts. The research suggested that these hybrids may sometimes experience less Fusarium ear rot than non-engineered hybrids, possibly by preventing a buildup of second-generation ECB populations in the field. However, this effect was not consistent in their studies. The research clearly showed that, for consistent, significant reductions of Fusarium ear rot, the Bt-toxin must be expressed in the kernels.

2. *When compared to their non-engineered counterparts, some of the genetically engineered corn hybrids which express the Bt toxin in their kernels had less fumonisin contamination.* This was attributed to reduced insect feeding on the kernels. In some Bt hybrids, the reduction in fumonisin contamination was great enough to substantially reduce the toxicity of the kernels to sensitive animals like horses. The greatest reduction in fumonisin contamination was observed when plots were manually infested with ECB larvae. Based on this, the authors concluded that reductions in fumonisin contamination in Bt hybrids would be more likely to occur in years with high 2nd-generation ECB populations. It is also important to note that certain Bt hybrids which did produce the Bt toxin in kernels—but did so at relatively low levels—did not exhibit reduced fumonisin contamination. Thus, most—but not all—Bt hybrids can be expected to have less fumonisin than their non-engineered counterpart.

## Summary

In recent research conducted at Iowa State University, corn hybrids that express the Bt-toxin *in kernels* consistently suffered less ECB injury to kernels and less Fusarium ear rot damage. Many of

these hybrids also exhibited less fumonisin contamination than non-Bt hybrids. The safety of corn for consumption by humans and animals may be enhanced by genetic engineering for insect resistance.

Thanks to Gary Munkvold for reviewing the article.

## SHADE TREES AND ORNAMENTALS

### CANKER DISEASES OF WOODY PLANTS

By John Hartman

Cankers are localized dead areas of twigs, branches, limbs, trunks, and even roots of woody plants. They are often caused by invasion of bark or cambial tissues by fungi or bacteria which then kill phloem, cambium, and the outermost xylem. The bark in an infected area may shrink, crack, and expose the wood beneath. Infection occurs through wounds such as mechanical injuries, leaf and fruit scars, branch stubs, and cold-injured or sun-scalded tissues. Many fungi and bacteria that cause cankers normally inhabit the surface of the tree, or possibly exist inside the tree as latent pathogens, and only cause disease when the tree is under stress. However, some fungi and bacteria aggressively attack trees and cause cankers. Cankers not involving pathogenic microbes can also be caused by mechanical injuries such as hail, heat, or cold.

Perennial cankers. Target-spot cankers caused by fungi such as *Nectria* or *Eutypella* on hardwoods are roughly circular or elongate with much callus at the canker edges. Wounds and branch stubs are invaded by the fungus during the tree's dormant period. The plant forms callus around the infection site during the growing season, but the fungus invades more tissue the following dormant period. This back-and-forth struggle between the tree and the pathogen creates concentric ridges of callus tissue. Although infection spread is relatively slow and target cankers seldom kill the tree, they do weaken the tree structure and detract from its appearance.

Annual cankers. Weak parasites such as the fungus *Fusarium* normally don't cause disease problems unless the tree is under environmental stress and low in vigor. Infection occurs during the dormant season, but during the growing season host callus tissue walls off the canker and prevents further spread. Although annual cankers do not persist, continued stress makes it likely that more cankers will form and it opens the possibility of invasion by

other diseases.

Diffuse cankers. Fungi such as *Cytospora*, *Botryosphaeria*, *Hypoxylon*, *Phytophthora*, or *Cryphonectria* (chestnut blight) and bacteria such as *Erwinia* (fire blight) produce cankers with little callus at the margins. Because the pathogens invade so rapidly, the tree tissue at the canker margin is killed and branches or whole trees are girdled and killed sometimes in one season. Some diffuse cankers are favored when the tree is under stress, but most are not. Canker blights are diffuse cankers in which the disease develops rapidly and kills collateral branch and foliage tissue by way of girdling and canker-rots are diffuse cankers that cause significant internal wood decay.

Canker disease management. Woody plants in the nursery and landscape should be inspected for cankers. Look for a) localized areas of roughened or cracked bark, especially around wounds and branch stubs, b) ridges of callus formation, c) small red, dark brown, or black pimple-like fungal fruiting bodies in the center of or around the edges of the cankers.

Promote tree vigor with mulching, soil aeration, judicious fertilization, and watering so that the tree's natural resistance to disease can be expressed and wound healing can begin promptly and develop rapidly. In the nursery and landscape, a) prune trees and shrubs only during dry weather and not in late summer or fall when canker fungi may be active, b) prune out cankered twigs and branches being careful to avoid damage to the branch collar, c) prevent drought or flooding, d) control weeds and other competitors, but avoid herbicide injury, e) prevent mechanical injury, f) protect trees from defoliating insects and diseases, and g) remove trees weakened by cankers.

## **DIAGNOSTIC LAB HIGHLIGHTS**

**By Julie Beale**

Most samples in the Diagnostic lab recently have been from landscapes. We have seen a combination of infectious diseases and abiotic problems. Samples have included spruces showing decline and defoliation from transplant shock, girdling twine left around the base at planting, and spider mite infestation; white pine decline from adverse soil conditions; *Botryosphaeria* canker on apple; and black knot on ornamental plum.

## **PESTICIDE NEWS AND VIEWS**

## **HAVE YOU SEEN THE KY PEST NEWS NEWSLETTER ON THE INTERNET?**

**By Rod Hillard**

Over 5,000 people have visited since May 1998 and over 50% of those folks have visited eight times or more. Some benefits of the electronic version include:

**Access to past issues.** Issues from 1997, 1998, and 1999 are available for viewing. Since the Ky Pest News is seasonal, it may be advantageous to check previous years articles for the same time period. Even though some information may be outdated, it can still be used for background information.

• **Printed version.** A PDF version is available for all 1998 and 1999 newsletters. This can be to print a photo image of the newsletter.

• **Links to other pertinent information.** Just "click" on the highlighted area to go to any address that is accessible on the web.

• **Links to related sites including:**

Departments of Agronomy, Entomology, and Plant Pathology  
Kentucky Pesticide Applicator Training  
Kentucky Blue Mold Warning System

When you visit, bookmark the address so it'll be easy to return. Beware of pirated versions. There is at least one website with unauthorized, edited versions of Ky Pest News.

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## **INSECT SPRAY LIKELY CAUSE OF LEXINGTON HOUSE FIRE**

Total release insecticide aerosol bombs pose some real dangers when label directions are not read and followed. Fumes from one appear to have triggered a fire that heavily damaged a Lexington home this week. Labels of these over-the-counter products warn homeowners to turn off heaters or pilot lights because the fumes can be flammable. The fume concentration in the house apparently reached that level after the bomb was activated. Fortunately, no one was home at the time; unfortunately, the house and contents were a total loss. Use every opportunity to urge careful use of these products. While popular, it is rare that they are the answer to pest problems. (Lex. Herald Leader, 2/14/99)

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Lee Townsend, Extension Entomologist

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