WATCH FOR:

TOBACCO
• Quadris® fungicide not labeled for tobacco in 2005

CORN
• SWCB spring survey update

SOYBEAN
• Soybean rust fungicide use considerations: some thoughts on Brazil vs U.S. situation.

WHEAT
• Status of folicur section 18 for fusarium head blight in wheat

SHADE & FOREST TREES & ORNAMENTALS
• Phytophthora ramorum - an emerging plant pathogen.
• Lichens infesting tree trunks and branches

LIVESTOCK
• Insecticide resistance

DIAGNOSTIC LAB-HIGHLIGHTS

WATCH FOR:
Cluster flies and lady beetles active and interested in moving outside for the summer. Eastern tent caterpillar egg hatch typically begins in mid-March.

TOBACCO

QUADRIS® FUNGICIDE NOT LABELED FOR TOBACCO IN 2005
by Paul Vincelli, Extension Plant Pathologist
and Gary Palmer, Extension Tobacco Agronomist

In 2004, Quadris® fungicide had a crisis exemption for use on tobacco in Kentucky to control threatening levels of frogeye leaf spot. That exemption from the label permitted tobacco producers to use the product for a definite period of time last season.

Some tobacco producers have been asking about the label status of Quadris® fungicide for the upcoming season. At this time, there is no label for Quadris® fungicide for use on tobacco in Kentucky, nor is there any exemption from the label (as was obtained in 2004). In other words, based on the situation as it now stands, there is no legal way in which Quadris® fungicide can be applied to tobacco this season. Using any pesticide in a way inconsistent with the label, in addition to being illegal, would void any contract a producer may sign with a tobacco buying agent.

Therefore, at this time, producers should be planning their program for controlling blue mold in the field around Acrobat® 50WP, Actigard®, and/or Dithane DF®.

CORN

SWCB SPRING SURVEY UPDATE
by Ric Bessin and Doug Johnson

Southwestern corn borer spends the winter as larvae in galleries at the base of corn stalks. Stubble in cornfields can be checked during early spring for damaged plants and surviving borers. This can provide
an indication of what the first generation may be like for 2005. A survey of southwestern corn borer damage and larval survival was conducted in Caldwell and Henderson counties on March 2 and 3. These counties were selected because of the past infestation and sampling history. The purpose was to estimate the extent of SWCB damage, as evidenced by basal stalk girdling. In addition, we wanted to estimate the survival of the overwintering larvae in the crowns of these damaged plants. In each county, four non-Bt corn fields were evaluated. Within each field, 10 groups of 10 plants were examined for girdling and an additional minimum of 50 girdled plants were examined for the presence of live SWCB larvae.

2005 SWCB Spring Survey Results

<table>
<thead>
<tr>
<th>Location</th>
<th>Damaged plants</th>
<th>Live SWCB recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Caldwell Co.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm # 1</td>
<td>3 / 100</td>
<td>0 / 50</td>
</tr>
<tr>
<td>Farm # 2</td>
<td>7 / 100</td>
<td>3 / 50</td>
</tr>
<tr>
<td>Farm # 3</td>
<td>6 / 100</td>
<td>5 / 50</td>
</tr>
<tr>
<td>Farm # 4</td>
<td>14 / 100</td>
<td>0 / 50</td>
</tr>
<tr>
<td><strong>Henderson Co.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm # 1</td>
<td>8 / 100</td>
<td>2 / 50</td>
</tr>
<tr>
<td>Farm # 2</td>
<td>4 / 100</td>
<td>2 / 50</td>
</tr>
<tr>
<td>Farm # 3</td>
<td>6 / 100</td>
<td>1 / 50</td>
</tr>
<tr>
<td>Farm # 4</td>
<td>8 / 100</td>
<td>4 / 50</td>
</tr>
</tbody>
</table>

The information from Henderson and Caldwell counties indicated that there was a low incidence of stalk girdling when compared with previous years, but the survival of those few larvae was higher than what we observed last year. As in past years in Caldwell county, there was high levels of what appeared as bird predation on the larvae.

<table>
<thead>
<tr>
<th>Year</th>
<th>Girdled stalks (%)</th>
<th>Survival/girdled stalk (%)</th>
<th>Overall Survival / stalk (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>7.25</td>
<td>4.25</td>
<td>0.31</td>
</tr>
<tr>
<td>2004</td>
<td>15.56</td>
<td>2.50</td>
<td>0.39</td>
</tr>
<tr>
<td>2003</td>
<td>26.57</td>
<td>4.25</td>
<td>1.13</td>
</tr>
<tr>
<td>2002</td>
<td>11.78</td>
<td>5.31</td>
<td>0.63</td>
</tr>
<tr>
<td>2001</td>
<td>40.58</td>
<td>9.66</td>
<td>3.92</td>
</tr>
<tr>
<td>2000</td>
<td>20.73</td>
<td>26.85</td>
<td>5.57</td>
</tr>
</tbody>
</table>
So for the spring of 2005, we can conclude:

- Thanks to the cold winter, we found low survival levels of SWCB larvae in the counties surveyed, the numbers are very similar to what was observed in spring 2004.
- Birds seem to feed heavily on SWCB larvae during the winter.
- Winter conditions were not sufficient to eliminate SWCB larvae.
- We expect low first generation SWCB pressure for those areas surveyed.
- Date of planting is still important. Corn planted after May 10 could be at risk to late season SWCB activity.

SOYBEAN

SOYBEAN RUST FUNGICIDE USE CONSIDERATIONS: SOME THOUGHTS ON BRAZIL VS U.S SITUATION.
by Don Hershman

University of Kentucky Plant Disease Diagnostician, Paul Bachi, has just returned from a fact-finding and learning trip to Brazil to observe soybean rust first-hand. Paul returned with many insights and with a wealth of information regarding the Brazilian soybean rust situation. One observation that Paul made was that some of the things we are saying here about managing soybean rust with fungicides are not necessarily true for Brazil. For example, Paul learned that Brazilian soybean growers typically would not apply solo chlorothalonil or strobilurin sprays. They do, however, frequently apply solo triazoles and premixes of a strobilurin plus a triazole. Paul’s observation is confirmed by some the literature he brought back published by EMBRAPA (more or less like our USDA) and from the Matto Grosso Foundation (an extremely large grower cooperative). Literature from both groups clearly indicates a significant bias towards triazoles and/or pre-mix products, and an aversion to spaying solo strobilurins and chlorothalonil.

If you attended any of our 11 Soybean Rust Intensive Trainings, or read anything that I and many other soybean pathologists have been saying about fungicide use for rust control, you know quite well that we have made room for possible use of both chlorothalonil and solo strobilurin fungicides. Based on the Brazilian experience, this appears to be a flawed concept.

As I have reflected on this apparent contradiction, I have come to understand what may be at its root. Brazil, being close to the equator, does not experience the dramatic seasonal temperature variation that occurs in most of the U.S. Because of this, much of Brazil is not subject to the hard killing frosts (28°F and below) which are so typical in the U.S. The net effect is that in Brazil, rust-infected volunteer soybean and other infected legume hosts are not killed. This means that newly-planted soybeans in Brazil are always likely to be near a source of soybean rust from the time of emergence to maturity. This is significantly different than the U.S situation where soybean rust will die back each year (like it did this winter) to the extreme southern portion of the country. Unlike Brazil, our soybean rust epidemics will require spores of the fungus to move substantial distances, especially when one considers the soybean crop from Kentucky and northwards. The main point is that soybeans will not be generally exposed to soybean rust spores throughout the season as happens in Brazil. Doublecrop soybeans may be an exception to this general truth.

Now that I have established a very large difference between the U.S. and Brazil, let us return to the apparent fungicide use contradiction. I believe that what the Brazilians are saying by their actions is that
because their soybean crops are always near a source of soybean rust spores, they do not have any confidence that they can establish a truly “pre-infection” program. Thus, they have come to rely very heavily on the curative activity of triazoles, (solo and in mixes) and have learned through experience that by the time they see rust, the “pre-infection” strategy has already been defeated. We, on the other hand, should have significantly less difficulty establishing a truly pre-infection program since spores have to move into an area before an epidemic can be initiated. The net effect for us is that we may have better results with products (solo strobilurins and chlorothalonil) that are only effective pre-infection. Perhaps the greatest challenge facing U.S. soybean producers attempting to implement a pre-infection strategy is to not apply fungicides too early.

Time will tell if what I have said above is accurate. But at least for now, I believe we have valid reason to believe that pre-infection fungicide use strategies will work better here than they do in Brazil.

**WHEAT**

**STATUS OF FOLICUR SECTION 18 FOR FUSARIUM HEAD BLIGHT IN WHEAT**

by Don Hershman

Some of you may recall that last year the Environmental Protection Agency (EPA) granted Kentucky the use of Folicur for managing Fusarium Head Blight (FHB) and deoxynivalenol (DON) in wheat. For a variety of reasons, very little Folicur was sprayed last year (~7000 acres). Even with this small amount used, however, growers and millers were pleased with the disease suppression provided by the treatment they asked us (University of Kentucky and Kentucky Department of Agriculture) to prepare and submit another section 18 request for 2005. We did this and the application is currently pending at EPA.

**SHADE & FOREST TREES & ORNAMENTALS**

*Phytophthora ramorum* - AN EMERGING PLANT PATHOGEN.

by Patricia B. de Sá.

Sudden Oak Death, or S.O.D., was first seen in the United States in the mid-1990’s in coastal areas of Central California on tanoak trees, and a few years later on California black oak and coast live oak trees. The disease has been shown to be caused by a previously unknown species of *Phytophthora* that was recognized in 2001 to be a new species and named *Phytophthora ramorum* (Werres, de Cock & Man in’t Veld). Although it is not known where it originally came from, it is now present in North America in natural areas in California and Oregon, and has also been found on rhododendron, camellia, viburnums and andromeda in nurseries in California, Oregon, Washington and, in Canada, in British Columbia. In Europe, *P. ramorum* was initially isolated from rhododendrons and viburnums in nurseries and gardens, and later found on oak trees. *P. ramorum* has been isolated from ornamental plants in Europe in several countries: Germany; the Netherlands; the United Kingdom; Poland; Spain; France; Belgium and Sweden.

*Phytophthora* species are classified in the Chromista kingdom, Phylum Oomycota, and are sometimes referred to as water molds. They were previously classified as fungi, mostly due to their mycelial growth habit. *P. ramorum* is heterothallic, meaning that it is necessary for two mating types to be present for sexual reproduction to occur. Mating type A-1 is found in Europe and mating type A-2 is found in North America. Sexual reproduction can lead to increased genetic variability and changes in the pathogenicity and environmental fitness of the organism with unknown consequences. It is therefore, important to keep the mating types apart.

*P. ramorum* induces disease symptoms that vary according to the host and these may be seen on leaves, twigs, and shoots, as well as on branches and main stems or tree trunks. It can cause Ramorum shoot
dieback and Ramorum leaf blight on camellia, rhododendron, viburnum and andromeda and on other woody plants. On camellia, symptoms on the leaves may be either small spots or fairly large, irregularly-shaped brown lesions. Browning and necrosis of leaf tips or along the edge of the leaves, where water accumulates, can also develop. Symptoms vary with environmental conditions and cultivar and are more readily seen on the lower leaves. However, the plant may shed the infected leaves and the lower stems will have fewer leaves.

Native and horticultural varieties of rhododendrons and azaleas can become infected with *P. ramorum* and develop Ramorum shoot dieback and Ramorum leaf blight. Dark lesions may develop on any part of the stem and move upwards, downwards or into the leaves. Irregular spots and dark brown lesions that often follow the leaf midrib or petiole can develop on the leaves. Although eastern native species of rhododendrons have not been found to be infected with *P. ramorum* in nature, inoculations in the greenhouse have shown that they are susceptible.

On mature oak trees, *P. ramorum* causes bleeding cankers on the main stem, and these cankers can be dark red, brown, or black. Sap oozes out of the canker and it can vary in color from dark amber, dark red, dark brown to even black. In time, the canker girdles the tree and the tree dies. Cankers have not been found on the roots below the soil line. The name Sudden Oak Death came from the fact that people only noticed the disease when the tree crown had turned brown and the tree seemed to die a few weeks after that, although, in point of fact, infection had been occurring for some time.

*P. ramorum* has not been found in Kentucky, but it can be spread long distance by the movement of infected ornamentals and soil, and has been found on contaminated West Coast nursery stock in nurseries in 21 other states. Of concern here is that *P. ramorum* may spread to parks and native woodlands from introduced infected ornamental plants and that native Kentucky plants like rhododendrons, mountain laurels, red oaks and pin oaks can be infected by *P. ramorum*.

**LICHENS INFESTING TREE TRUNKS AND BRANCHES**

by John Hartman

Homeowners sometimes ask: Is that profuse, greenish, crusty stuff growing on my tree a disease? Is that crusty, green or gray material that covers the bark of tree trunks and branches going to harm the tree? What are those leathery things covering the tree bark? The short answers are that the grayish-green crusty things are lichens and that lichens are not tree parasites.

Lichens often appear as a perennial green or gray coating on the trunks and branches of trees. They are actually two organisms in one, being composed of a fungal body harboring green or blue-green algae, which live together in complete harmony. In the symbiotic relationship, the algae, through photosynthesis, supply carbohydrate food to the fungus and, in turn, receive protection and trapped water and mineral elements from the fungus. In this relationship, the algae and the fungus are not distinguishable except with a microscope, and the lichen persists longer than the alga or the fungus would separately.

Lichens do not parasitize trees, but merely use the bark as a medium on which to grow. In fact, lichens can be seen growing on rocks, weathered lumber, or on dead branches fallen from the tree. Some may consider lichens unsightly, but they are not generally injurious except that, when extensive, they may interfere with the gaseous exchange of the parts they cover. Because of their extreme sensitivity to sulfur dioxide air pollution, lichens seldom appear on trees in industrial cities. They rarely develop on rapidly growing trees, because new bark is constantly being formed before the lichens have an opportunity to grow over much of the surface. Because of this, lichens on certain species may indicate poor tree growth. We have noticed that in some plantings, those trees that are more vigorous have fewer lichens than those
Lichens on trees take on various forms. Some are closely appressed to the bark surface and are described as crustose. Lichens which are foliose have leaf-like lobes which extend out from the bark surface. Others have hair-like or strap-like forms and are referred to as fruticose lichens. Lichen color may include forms that are green, blue-green, yellow-green, brown, gray, or even red. Increases in lichens are sometimes associated with moist climate - perhaps the relatively moist weather of the past two summers accounts for increases in lichen questions. Lichens proliferate when more light is provided, which could explain why they are more frequently seen on dead, leafless branches.

As a rule, lichens can be eradicated by spraying the infested parts with Bordeaux mixture or any ready-made copper spray. Read the fungicide label to be sure that this use is permitted for the product chosen. However, suppression of lichens with chemical sprays should not be expected to improve tree health.

LIVESTOCK

THE HORN FLY – A PERSISTENT AND SOMETIMES RESISTANT CATTLE PEST
by Lee Townsend

Horn flies are important pests of pastured cattle. These small flies use their piercing-sucking mouthparts to take 20 or more blood meals every day. The almost incessant feeding of large populations can be a severe nuisance to cattle and can severely impact growing calves and lactating cows.

The close association between horn flies and cattle helps with control. The flies leave animals only to lay eggs or to change hosts. Consequently, most any of a variety of application methods will expose flies to insecticide residues. Alternatives include forced-use dust bags or back rubbers, insecticidal ear tags, sprays, and pour-on formulations.

The wide-spread availability of insecticide-impregnated cattle ear tags in the early 1980’s was followed relatively quickly by the appearance of pyrethroid-resistant horn flies. Several things contributed this situation. One was the rapid adoption, and heavy reliance, on this control approach. Many horn fly populations were exposed to the insecticide over a relatively short period of time. Apparently, horn flies were exposed to high levels of the insecticide from the tags early in the season, and control was very good. However, as the tags aged, the amount of insecticide released onto the animal’s coat decreased significantly. This resulted in many flies being exposed to sublethal amounts of the insecticide late in the season – and the survival of individuals who had good “coping” mechanisms.

The reproductive potential of the horn fly contributed to the rapid increased proportion of resistant flies. Females lay groups of about 15 eggs at a time (up to 200 total) in very fresh cow manure. Under ideal conditions, development from egg to adult can take as little as 10 to 14 days. This means several generations a year in most parts of the US. Consequently, selection for genetic factors that favor fly survival can occur relatively quickly. Finally, newly emerged horn flies may travel 5 to 7 miles in search of cattle. This led to a dispersal of resistant flies over an increasingly wider area.

What kind of factors contribute to insecticide resistance in horn fly populations? It is a complex process that can involve - 1) Knockdown resistance (the major factor) - a site on the nerve of the insect is not sensitive to the insecticide 2) Enzymes in the fly to break down or detoxify the insecticide 3) Behavior – resistant flies are able to detect the insecticide and move to an untreated area on the animal before picking up a lethal dose.
Resistance management recommendations from Insecticide Resistance Action Committee and the Regional Research Committee for livestock pest management. 1) Do not treat for horn flies unless or until numbers exceed 200 per animal. Cattle can tolerate up to this level before economic losses occur. 2) If feasible, keep growing calves and lactating cows separated from mature stock. Fly reduction on growing and lactating animals is more likely to provide an economic return. 3) Use periodic treatments with insecticides that have other modes of action (organophosphates, etc.) to break fly exposure to a single product group. 4) Remove ear tags in fall to reduce horn fly exposure to low concentrations of pyrethroids. 5) Use a late season application to reduce the number of horn flies that will enter the overwintering stage on the farm.

Horn fly resistance in Kentucky was studied extensively in the early 1980’s. Resistance appeared 1) as the result of pyrethroid-impregnated ear tags for two or more consecutive years, or 2) immigration of pyrethroid-resistant flies into susceptible populations.

How do you know if pyrethroid resistance is present in your horn fly population? A good indication of resistant flies is no noticeable fly reduction within two weeks of applying tags.

Check the beef (ENT 11) and dairy cattle (ENT 12) insecticide recommendations for control alternatives. Rotating products with different modes of action is a basic strategy in reducing the potential for resistance.

**DIAGNOSTIC LAB-HIGHLIGHTS**

by Julie Beale and Paul Bachi

Winter samples in the Diagnostic Laboratory have included Fusarium ear rot in corn; frogeye leaf spot (*Cercospora*) and storage molds in cured tobacco; cane borer and anthracnose on blackberry canes; fertilizer burn and/or deficiency on samples of chrysanthemum, geranium and hoya; black root rot on holly; freeze injury on oak (nursery); *Sphaeropsis* tip blight on pine; *Pythium* root rot, yellow patch, and pink snow mold on turf; *Pythium* root rot on spinach and lettuce; *Botrytis* blight on lettuce (greenhouse); and hollow heart on potato.