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<th>March 8, 2004</th>
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**ANNOUNCEMENT**

**2004 IPM Training School, Wednesday March 17**

The 2004 IPM Training School is scheduled for Wednesday, March 17 at the UK Research Center in Princeton. Registration will open at 8:30 AM with the meeting starting at 9:00 AM and ending at 4:00 PM.

Pest identification will be a major part of the training school. Weed, insect and disease problems of corn, soybeans, and small grains will be covered. A review of corn diseases will include the discussion of Mycotoxins. An update of pest problems in Kentucky will include the following topics: Soybean Stem Borer, Soybean Aphid, Soybean Rust, and New Technology for Corn Insect Management.

Advance registration is not needed and the meeting is open to the public free of charge.

Program has been approved for 5.5 hours of CEU’s for Certified Crop Advisers. (3.0 Pest Management, 2.0 Crop Management and .5 Soil and Water Management) It also been approved for 3 general hours and 1 specific hour for Categories 1 ag applicator, 10 demo and research, and 12 retail pesticide sales agent (dealer) for Kentucky Pesticide Applicator Training.

For additional information contact Patty Lucas at 270-365-7541 extension 218 or plucas@uky.edu

**ATTENTION SOYBEAN PRODUCERS!**

An online soybean pest survey has been developed from a Pest Management Strategic Planning meeting held in August 2003. This is a survey is intended for producers and others involved with soybean production in Kentucky, Tennessee, southern Illinois, and southern Indiana.

You can access this survey at: [http://www.sripmc.org/KY/SoybeanPMSPSurvey/](http://www.sripmc.org/KY/SoybeanPMSPSurvey/)

The purpose of this survey is to demonstrate producer input on critical pest issues relative to soybean production in this region of the county. This information will be used by the United States Department of Agriculture (USDA) and the Environmental Protection Agency (EPA) in making decisions about pesticide registration issues and prioritization for the funding of extension and land-grant/government research projects.

This survey was developed through the Kentucky Pest Management Center (KPMC). The KPMC is a grant-funded program in the UK Entomology Department. We develop Crop Profiles and Pest Management Strategic Plan documents for commodities in Kentucky and the region. These documents were designed as a method for producers and those with first-hand or hands-on knowledge to provide input on what pest management tools are most critical for the production of Kentucky commodities. More information can be found at [http://www.uky.edu/Agriculture/KPMC/KPMC.htm](http://www.uky.edu/Agriculture/KPMC/KPMC.htm).

This is your chance to collectively provide “first-hand” information to the USDA and EPA on current troublesome pests and the potential impact of emerging pests. We encourage those involved with soybean production in this region (producers, industry, and extension) to take 10 to 20 minutes out of your day to provide your input on these critical pest management issues.

**TOBACCO**

**2004 CHEMICAL OPTIONS FOR DISEASE CONTROL IN BURLEY AND DARK TOBACCO TRANSPLANT PRODUCTION**

by William Nesmith

There have been some significant changes in the chemical options for use in tobacco transplant production during the past couple of years, so please take a few minutes and update yourself. For example, the state label on Ferbam was not renewed by the manufacturer and thus the label has expired. Actigard 50 W, which has a third-party registration for use in flue-cured transplant production is not labeled in other tobacco types.

An adequate supply of healthy transplants is an important
first step to having a successful tobacco crop. Containerized transplant systems, produced mainly in the float-system in either greenhouses or outdoors, accounts for most plants set in Kentucky. Traditional ground beds are still used by a significant number of small growers, but this production accounts for only a small percentage of the total planted acreage. Furthermore, traditional beds will probably decline further with the reduced availability of methyl bromide in the United States by January 1, 2005 under the USA Clean Air Act in accordance with the international treaty to protect the ozone layer (The Montreal Protocol on Substances that Deplete the Ozone Layer).

Infectious diseases can be a limiting factor to successful transplant production in all known systems; moreover, diseased transplants can serve as important sources of pathogen introduction into the field and community. Recent studies have also demonstrated that diseased float-plants, compared to healthy float-plants, are predisposed to much more severe attacks in the field from root and stem pathogens. In one study, for example, black shank activity in a resistant variety was increased from 24% incidence to 83% when Pythium infected transplants were set into black shank infested soil. Control of Pythium root rot has become an extremely important step in tobacco production in Kentucky with the widespread use of float-plants.

Use of chemicals alone is not the key to disease control in transplant production. Instead, what is needed is a management approach that carefully incorporates cultural and chemical tools. Control of transplant diseases is achieved through rigorous sanitation measures, careful manipulation/management of the production environment to minimize leach wetness, accurate and timely fertilization, careful attention to the details of dipping, insect vector control, avoiding plant stresses, and timely and thorough application of disease controlling pesticides. Both the incidence and severity of diseases in seedling production can be greatly reduced through preventive spray programs. Even where a chemical is labeled for rescue treatments, I urge it be used in a preventative manner. Why? Because a wound remains if infection occurs, and that wound may serve as an infection site for other diseases, especially when it involves the root and lower stem. Moreover, transplants are too valuable, transplant diseases too explosive, and achieving pesticide coverage too difficult to rely on rescue approaches.

The following infectious diseases have given growers problems in the past:

- **Bacterial diseases:** angular leaf spot/wildfire and bacterial soft rot/blackleg (blackleg and bacterial soft rots have been on the increase as greenhouse systems become larger);
- **Fungal diseases:** anthracnose, target spot, blue mold, black shank, black root rot, frogeye, Fusarium wilt and root rot, Botrytis blight, Collar Rot (*Sclerotinia*), and blights, root rots, and damping-off caused by either Pythium or Rhizoctonia; and,
- **Virus diseases:** Tobacco Mosaic Virus (TMV), Tomato Mosaic Virus (ToMV), Cucumber Mosaic (CMV), Tomato Spotted Wilt/Impatiens Necrotic Spot, and the Poty-Virus Complex of etch, vein mottling, and PVY.

Unfortunately, labeled materials are not available for all diseases or for use in all transplant production systems; therefore, growers will need to read and follow labels carefully to avoid problems. Please be aware that, despite common usage in some communities, there is not labeling to support using the following chemicals in tobacco transplant systems in Kentucky: Actigard®, Acrobat MZ®, Acrobat 50 WP*, Benlate, Banrot, Bravo, Captan, Chipco, Maxim, Ridomil Gold®, Rovral, Quadris, Tilt, or Terraclor. Some of these products have labeling to directly prohibit use in transplant production systems; some of these products (those followed with *) are labeled for field use in tobacco, however. Others are not labeled on tobacco at any stage.

Below is a review of the preventive fungicide and bactericide treatments with proven efficacy labeled for use in Kentucky for control of tobacco transplant diseases as of March 1, 2004. I do not anticipate other transplant-use chemicals being labeled during this season. A few others are labeled that have NOT proven effective in our trials, and they are not included. If growers are confronted by dealers offering other products, have them provide you with both a valid Kentucky label AND with data from valid, replicated tests where that product was evaluated under strong disease pressure (where the untreated checks encounter at least 50% disease).

Materials (including "snake oils") look good when put in tests where little or no disease pressure was present, and the availability of such products and marketing efforts are on the increase. Some firms are marketing such materials using wording like "tested by universities". Remember, you can take the test and flunk, and accurately claim you were tested.

Please be aware that many of the labeled chemicals will cause stunting or other phytotoxic (phyto) reactions to the tobacco plant even when used as labeled. Some of the production systems in use are so conducive to diseases that these phytotoxicity risks appear to be acceptable when weighed against the damage the diseases can cause without controls in place. The labels specifically warn of the risks and also advise on steps that should be taken to minimize those risks. I have recently reviewed these labels and data and believe only the following materials and uses are labeled and effective for the sites and diseases mentioned.

- **MANCOZEB** (DITHANE DF or DITHANE DF RAINSHIELD) is the only effective fungicide labeled for float beds, now that the ferbam label has expired. Mancozeb is a very important preventive fungicide, but use must be delayed until the plants are large enough to tolerate it. Use it against anthracnose and blue mold, and to suppress damping off diseases caused by Rhizoctonia, Fusarium, and Alternaria. It can be used in all tobacco transplant production systems, but higher rates are needed outdoors. Apply it as a fine spray at high pressure just to the point of runoff, but be careful not to saturate the root zone on small seedlings. For float and greenhouse systems use at 0.5 lbs/100 gallons of water (one level teaspoon/gallon). Spray preventively on a 5-7 day schedule starting no earlier than when seedling leaves are about the size of a dime (which means the entire plant is at least quarter-size) and continue until transplanting to the field. Use 3 gallons of spray material per 1000 sq ft if the plants are small, but increase gradually to 6 to 12 gallons as plant size and canopy increase. As plants become larger and more tolerant of the material, you need to use sufficient water to wet the base of the stems with run-off to increase the potential for control of damping off and stem rots. Avoid contamination of the float-water and root zone during applications. In outdoor beds, use 1 lb/100 gallons of water (2-3 teaspoons/gallon), applying 5 to 5 gallons per 1000 sq ft of bed. Best results are achieved when the canvas is removed to make the applications and left off until the plants dry.

*Etridiazole (TERRAMASTER 35WP and Terramaster 4EC) is a very important tool for controlling Pythium root rot and damping off in float systems. The float system provides a near ideal environment for Pythium to develop once introduced into the system (especially as temperatures increase). There are phytotoxic issues involved and it is essential that etridiazole-containing products be uniformly distributed in the float water to achieve control and to minimize phytotoxicity. Two formulations are available Terramaster 35WP and Terramaster 4EC and they provide equal control in
our tests. The EC formulation is much easier to measure and use, but it has higher phytotoxic potential. It is much more difficult to obtain uniform distribution of the 35WP product within the system. Both are labeled for use in greenhouse and outdoor float systems, but are NOT labeled for use in any other transplant production system. In our experiments, etridiazole has provided a very high level of control of Pythium root rot, and it reduces algae levels, but it has not prevented Hyphomycetes disease or control of Phytophthora endér. There is no labeled treatment of Phytophthora root rot in Terramaster 35 WP is labeled at 2 oz/100 gallons of float bed water, but 1 oz/100 gallons gives acceptable control with less phyto potential when disease pressure is low. These applications should be made directly to the float water. Be sure to follow label directions as to making the premix-slurry and thoroughly distribute it in the water. Preventive applications should be made two to three weeks after seeding, or a week after plugging with the plug and transfer system. If additional applications are needed, make a second application no later than eight weeks after seeding.

Terramaster 4EC is labeled as preventive treatment at 0.7 fluid oz/100 gallons of float-bed water. Application should begin no sooner than three weeks after seeding. Supplemental preventative applications can be made at 0.7 fl oz/100 gallons of float-water 3 weeks after the first application, with a third and final application 2 weeks after the second. Terramaster is also labeled as a rescue (curative) treatment at higher rates of 1.4 fl oz/100 gallons of float-water. Applications at this higher rate can be used when symptoms first develop but no sooner than three weeks after seeding and with leaves at least one inch in diameter. One additional curative application can be made (if symptoms return) at 1 to 1.4 fl oz/100 gallons of float-water. There is a limit of 2.8 fl oz/100 gallons of float-water per bed (crop of plants)/season. No applications can be made later than 8 weeks after seeding.

I urge Pythium controls be used as a preventives rather than letting the fungus damage the root system and then trying to stop it. Wounded roots are prime targets for opportunistic pathogens in the field - black shank, soreshin, and Fusarium root rot. In tests where the Pythium was allowed to seriously damage the plant prior to attempting a rescue, new roots developed following treatment but the fungus remained established and alive in the base of the stem. Some regions have reported problems with premature flowering associated with Terramaster applications, but UK scientists have not been able to reproduce those effects in any of the several studies we have conducted, including rates several fold above the labeled rates. Based on data from VPI, we suspect that if plants have been grown under the environmental conditions that induce premature flowering, then Terramaster applications may enhance the effect in these predisposed crops. We have observed phyto in the form of reduced roots, white veins, and slower development in every study conducted, including at rates below the effective rates. However, the phyto we have observed in our studies is considered acceptable when compared to the serious damage Pythium is capable of producing. Some phytotoxicity symptoms, including delayed seedling development, should be expected with this product. However, it is essential that Terramaster be evenly disks through the float-bed water. The label gives good directions on how to achieve this within the bay, by mixing the product outside the treated bay then delivery of the diluted product uniformly into the bays. In our studies, we have also observed significantly higher phytotoxicity when studies were conducted in water naturally high in pH (above 7.0) than in waters naturally low in pH (less than 6.3).

* STREPTOMYCIN (AGRIMYCIN 17, AGRI-STREP, etc.) is labeled for use in outdoor plant beds. Greenhouse and float bed use is not on the label, however, nor are these sites specifically prohibited on the label. Therefore, growers may elect to use Streptomycin in these systems, but accept that product liability protection may not be provided, because the manufactures have not elected to include greenhouse and float beds on their labels even with our encouragement. The labeled rate for outdoor beds is 100 to 200 ppm (1-2 teaspoons/gallon), using 3 to 5 gallons of material per 1000 sq ft of bed. Control of angular leaf spot, wildfire, and blue mold are on the label, but most strains of blue mold are not controlled by this treatment. Streptomycin-resistant strains of the angular leaf spot pathogen are present in Kentucky, and it is not highly effective with bacterial soft rots. Sprays can begin as early as the two-leaf stage and should be repeated weekly until transplanting for control of bacterial leaf spots, such as angular leaf spot. Yellowing and stunting may occur if high rates are used. Efficacy is improved if applications are made under conditions that allow for slow drying.

* MILK (Whole or skim at 5 gals/100 gallons water or dried milk at 5 lbs/100 gallons water per 100 sq. yds. of plants) can be used to reduce the spread of Tobacco Mosaic Virus while handling transplants. Spray plants within 24 hrs of handling them. This treatment has also been used successfully prior to clipping of large plants, but it can be very messy unless the system dries well following the application. It should be combined with washing the hands at 15 minute intervals during and after each application. It can be applied at 10% dry milk (spray mixture is 4 to 5 gallons milk per 1000 square feet of material per application). This treatment is needed only if TMV susceptible varieties are being used or mixed resistant and susceptible varieties are in the same operation. Remember that the resistant reaction to TMV is a dead area on the resistant variety where the virus infected. So when mass inoculation occurs from an infected susceptible variety to the resistant, such as during clipping, serious loss can occur in the resistant variety. Be especially watchful of this problem where dark tobacco and burley are in the same house.

* BORDEAUX MIXTURE/Bluestone lime (1 lb bluestone copper sulfate + 2 lbs fresh hydrated lime mixture per 25 gallons of water) is labeled for ground beds as a drench to the soil when the plants have emerged and again 10 days later. This treatment will control algae and aid in the control of diseases caused by bacteria (wild fire, angular leaf spot, and blackleg), and assist in Pythium and blue mold control. Follow the label exactly as to mixing instructions, because Bordeaux mixture can be toxic to tobacco seedlings. Constant agitation is required during application to avoid injury and to achieve control. Do not apply this mixture to large seedlings. The main target is actually the soil rather than the tobacco plant. Most efforts to use Bluestone-lime in greenhouse float situations have resulted in unacceptable phytotoxicity. However, successfully applications have been made in overhead water systems where bacterial risks are higher, but with some phytotoxicity.  

**PREPARING FOR FLOAT BED PESTS**

by Lee Townsend

Sowbugs (or pillbugs) and slugs have been serious problems in some float systems. Pillbugs can get into trays and burrow into the media, uprooting small seedlings and may even feed some on root hairs. Slugs feed on plant leaves and can destroy a large number of seedlings in a short period of time. The moisture and protection around float beds is exactly what these creatures need to thrive. Both will be active soon so it is not too early to take steps to reduce their numbers. Sanitation or elimination of shelter and allowing as much drying as possible are important steps. Pick up and remove as many things that are lying on the ground outside float beds or greenhouses as possible. Concentrate on any items that provide shelter and keep soil moisture high. Boards, sacks, and pieces of plastic are prime problem sites.

Clipping and removing grasses and weeds alongside floats or
houses as they grow also will open up the area and make it less attractive to potential pests. A 12" inch band of bare ground, sand, or gravel may help to prevent pests from wandering close and entering the trays. Allow sunlight and air to help to keep the border areas dry. Keep the area clear until transplant production is complete. Application of slug baits along those areas now can help to reduce problems later. Sevin bait, scattered around the beds can help to reduce pillbugs.

Variegated cutworm moths fly in mid to late March, laying clusters of eggs on developing plants. The dark cutworms feed at night or on cloudy days and can destroy several trays of plants in a short time. Check plants regularly to detect early signs of feeding. Orthene can be used to control infestations of cutworms and other insects in float systems. Follow label directions closely.

CORN

FUNGICIDAL SEED TREATMENTS FOR CORN by Paul Vincelli

Corn seeds and seedlings are susceptible to several diseases that can reduce stand or severely stunt plants, resulting in reduced yields. In the absence of fungicidal seed treatments, losses from seed rots and damping off range from none, to commonly 10-15 bu/acre, to as high as 50-70 bu/acre. Losses are dependent upon many factors, but planting into cold (<50°F), wet soils increases the risk. Low-vigor seed is considerably more susceptible to seed and seedling decays. Misplacement of fertilizers or misapplication of herbicides can enhance these diseases, as well. Fungicidal seed treatment is especially important where corn is being grown without rotation.

The most common and important seed treatments for corn are metalaxyl (sold as Allegiance® and possibly other products) and mefanoxam (sold as Apron XL® and possibly other products). Use of one of these is the keystone to seed and seedling disease control in Kentucky corn. These systemic fungicides target Pythium ultimum and other Pythium species in the soil, which are the most important causes of seed and seedling disease of corn in the Commonwealth. Metalaxyl and mefanoxam are essentially the same fungicide. The active ingredient called metalaxyl is a mixture of two chemicals that are mirror-images of each other; only one of them is actually toxic to Pythium. In mefanoxam, the manufacturer has simply purified the active chemical, so that less chemical need be applied to the seed. However, the essential fungicidal activity is unchanged.

Captan is an old protectant (=contact) fungicide with fair activity against Pythium and fair to good activity against other diseases. It is typically sold in combination with either metalaxyl or mefanoxam.

Fludioxonil (sold under the trade name Maxim®) is a protectant fungicide that has been available for less than a decade. It provides generally good protection against fungi other than Pythium that might attack corn seeds and seedlings, such as Fusarium verticillioides, Fusarium graminearum, and Rhizoctonia solani. Since fludioxonil has no activity against Pythium, it is used in combination with either metalaxyl or mefanoxam. Advantages of fludioxonil over captan include lower use rates and therefore less “dust off” during handling, and low environmental and mammalian toxicity.

Two strobilurin (Q1) fungicides have recently become available for use on corn seed. Azoxystrobin, sold as Protege, is good against seedborne Fusarium but there is insufficient data on its effectiveness against other diseases. It typically is mixed with other active ingredients. Azoxystrobin, sold as Protege, is reported to enhance control of several diseases, although I have not yet seen these reports. Both of these fungicides are mixed with other active ingredients when applied to corn seed.

Understand that there is a limit to what seed-treatment fungicides or “fungicide cocktails” can do. Typically one can expect only about 10-14 days of protection. Thus, if corn is planted early into a wet soil and temperatures stay cool for an extended period of time, the seed or seedlings may succumb to fungal infections, resulting in loss of stand and yield. Also understand that there are non-infectious factors that can cause stand loss, such as wireworms, seed corn maggots, soil crusting, sidewall compaction, fertilizer placement too close to the seed, and birds feeding on the seed.

SOUTHWESTERN CORN BORER 2004 SPRING SURVEY by Ric Bessin, Doug Johnson, Clint Hardy, Mike Smith, Nathan Howard, and Michael Keen.

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 2004. A survey of southwestern corn borer damage and larval survival was conducted in Daviess and Henderson counties on March 4. These counties were selected because of the past infestation 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. An additional minimum of 50 girdled plants were examined for the presence of live SWCB larvae.

2004 SWCB Spring Survey Results

<table>
<thead>
<tr>
<th>Farm</th>
<th>Damaged plants</th>
<th>Live SWCB recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daviess Co.</td>
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<td></td>
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<td>Farm #1</td>
<td>21 / 100</td>
<td>1 / 50</td>
</tr>
<tr>
<td>Farm #2</td>
<td>15 / 100</td>
<td>0 / 50</td>
</tr>
<tr>
<td>Farm #3</td>
<td>19 / 100</td>
<td>1 / 50</td>
</tr>
<tr>
<td>Farm #4</td>
<td>4 / 100</td>
<td>2 / 50</td>
</tr>
<tr>
<td>Henderson Co.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm #1</td>
<td>11 / 100</td>
<td>1 / 50</td>
</tr>
<tr>
<td>Farm #2</td>
<td>21 / 100</td>
<td>3 / 50</td>
</tr>
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<td>Farm #3</td>
<td>25 / 100</td>
<td>0 / 50</td>
</tr>
<tr>
<td>Farm #4</td>
<td>38 / 100</td>
<td>0 / 50</td>
</tr>
</tbody>
</table>

This is the sixth year that we have conducted such a survey. In comparison to the previous winters, we had the low levels of girdled plants, and the lowest survival of overwintering larvae because of the colder winter. Lower levels of girdled stalks were to be expected, because a cool summer that produced only two SWCB generations and low overwintering survival from the winter of 2002.

Observed low levels of survival in the girdled crowns was welcome news. Of the girdled crowns sampled this spring, a large proportion had evidence of what appeared to be winter
kill, dead larvae at the base of the gallery. Relatively few crowns had larva removed by birds from the overwintering chamber. The survival was the lowest observed in the last five years. The survival of the larvae was the lowest in the past six years. This combined with the low numbers of overwintering larvae (as estimated by the incidence of girdled stalks) indicates that there are relatively few SWCB moths to begin the season as compared with the past years.

Keep in mind that overwintering survival is just one of the variables that will, in part, determine the potential for SWCB problems in 2004. Historically, the date of planting of individual fields has been a key variable contributing to the potential for late season SWCB damage. Although early season numbers seem to be very low, favorable conditions, may allow SWCB numbers to rebound by the second and third generations. Typically, fields planted after May 10 have an increased potential for this type of damage. Last year we had very low numbers of SWCB, but delayed planted made much of the crop more vulnerable to second and third generation borers.

What we can conclude:
• Thanks to the cold winter, we found low survival levels of SWCB larvae in each of the counties surveyed.
• 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.

<table>
<thead>
<tr>
<th>Year</th>
<th>Girdled stalks (%)</th>
<th>Survival/girdled stalk (%)</th>
<th>Overall Survival/stalk (%)</th>
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<td>0.38</td>
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<td>11.78</td>
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</tr>
<tr>
<td>1999</td>
<td>35.89</td>
<td>10.14</td>
<td>3.64</td>
</tr>
</tbody>
</table>

FRUIT CROPS

CULTURAL PRACTICES FOR GRAPE DISEASE CONTROL
by John Hartman

Grapes are grown for eating fresh or for wine-making in small vineyards throughout Kentucky. Grape diseases have a major impact on the success of grape culture. Kentucky grape growers face several major diseases caused by fungi, and all are favored by our wet, humid spring and summer weather. For successful disease management, growers need to know which diseases are most likely to occur on their varieties and to prepare to prevent those diseases. High yields of high-quality fruits depend on integrating cultural and chemical practices for disease management.

Black rot. Two hundred years ago, black rot disease was first recorded on grapes on this continent - in Kentucky. The fungal pathogen infects and rots fruits, generating hard, black, shriveled mummies which produce crop losses ranging from 5% to 80%. Leaves, petioles, pedicels, and shoots can also become infected. One year ago, black rot was very damaging to many vineyards due to wet spring and summer weather. Preventing early spring infections is very, very important.

Downy mildew. Downy mildew appears as leaf yellowing and browning with white fungal sporulation on the leaf underside. Poor leaf health causes reduced fruit sugar accumulation. Infected berries discolor, soften, and drop from the bunch.

Powdery mildew. The powdery mildew fungus infects all green tissues of the grapevine. The fungus produces mycelium and spores on the surface of the host tissue, giving it a gray or whitish appearance. Fruit yields are reduced by the leaf infections and by direct infection of the fruits giving them poor color and a blotchy appearance.

Cane and leaf spot and anthracnose. Phomopsis cane and leaf spot disease appears mainly on shoots and leaves causing spotting and blighting. Anthracnose, another fungal disease, also attacks shoots, stems and fruit. Anthracnose was especially serious last season during a particularly cool and rainy spring.

Bunch rot. Botrytis bunch rot and blight can spread rapidly through compact grape clusters, causing direct losses in yield. The fungus also attack the cluster at bloom causing blooms or developing fruit to dry out, fall off, or decay.

There are several cultural practices which will aid in grape disease control.
• Choose cultivars that resist diseases.
• Plant grapes in sites with good air circulation and sun exposure. Avoid sites where the soil is consistently wet.
• Use training systems that allow good air movement through the canopy.
• Begin new plantings with disease-free, virus indexed planting stock from a reputable nursery.
• When pruning dormant vines, remove and destroy diseased and dead wood.
• Destroy any fruit mummies left on the vines or on the ground.
• Cut new infections out of shoots as they appear.
• It is helpful to remove leaves from around grape clusters before bunch closing to promote good sunlight penetration and ventilation.
• Avoid excessive nitrogen fertilization.
• Control weeds in and around the planting.
• Remove wild grapes and abandoned grapevines adjacent to the vineyard.

SOYBEAN

SOYBEAN RUST UPDATE
by Don Hershman

Due to increased farm press coverage over the past year, producer interest in the rapidly developing soybean rust situation is currently very high. The main news is that although soybean rust is expected to arrive here within the next five years, it did not arrive in 2003! The disease did, however, spread throughout most of the main soybean-growing regions of Brazil, and it was also detected in Bolivia. There are also unconfirmed reports that soybean rust has crossed the equator and is now in the northern hemisphere. This would be significant as it relates to potential spread of rust into the U.S. via air currents.

Estimates are that Brazilian soybean producers lost about $1 billion due to soybean rust in 2003. Government officials in Brazil say they expect fewer losses this year due to soybean rust because the farmers are ready and waiting to spray with
fungicides. It seems that many of them were taken by surprise last season. We will see how it all plays out to the south of us over the next 3 months or so.

The big soybean rust issues that have been surfacing here are:
1) fear of importing the soybean rust pathogen in soybean shipments from Brazil and other rust-affected countries, and
2) fungicides.

**Importation of Soybean Rust:** Few scientists I have talked with, or heard speak, think that commerce will be the means by which soybean rust makes its way into the continental U.S. Having said this, everyone I have heard speak on the topic also feels it is not an impossible scenario. On the plus side, the soybean rust pathogen is not seed-borne, but it can be associated with infested trash in seed. However, crops are harvested AFTER plants drop their leaves. This should significantly reduce the risk of rust-infested leaf trash in harvested grain.

There are no formal studies that I am aware of that indicate how long rust spores could survive in a shipment of soybean grain or seed. At a recent conference in St. Louis hosted by the American Soybean Association, I heard that it takes a minimum of 60 days for a shipment of soybean to make its way into a U.S. port following harvest. Under normal circumstances, the rust fungus would not be expected to survive in trash for this length of time. A concern was raised at the meeting that rust spores might remain viable in containment longer than we think because of the high moisture level and lack of light in the hull of a cargo ship. There is a great need for research to be conducted in this area.

In the meantime, officials with the Animal and Plant Health Inspection Service (APHIS) are on high alert and are closely scrutinizing each shipment of soybean whose port of origin is a county with known infestation of soybean rust. When I searched the World Wide Web on this topic, it became clear that there is a great deal of unrest and concern by all parties involved that we do everything possible to keep rust from being imported with moving grain shipments.

Most scientists at this point are still convinced that soybean rust will naturally make its way into this country as a result of wind-blown spores from South America, or perhaps in the winds of a hurricane system originating over Africa.

**Fungicides:** It remains a fact that the only means of curbing an active case of soybean rust at present is by applying a minimum of two fungicide applications, and perhaps three, if the first spray was made before crop flowering. There are no effective cultural practices or resistant varieties to deploy at this time. I have not seen any data indicating that many farmers would be able to get away with a single fungicide application unless the disease comes in very late in the season. Most of the data I have seen shows that two sprays with a good rust fungicide will give decent results as long as the first application is made before rust gets a foothold. But even then, some yield is likely to be lost since better than 80-90% control does not appear to be possible given the current arsenal of fungicides at our disposal. Most fungicide protocols I have seen involve one application at first sighting or the beginning of flowering, whichever comes first, followed by another application around mid- to late- pod fill. Everyone with actual soybean rust experience insists that treatments are only highly effective when applied prophylactically. Apparently, once rust gets rolling in a field, no amount of fungicide will do a very good job in slowing it down. Crop defoliation can occur in as short as two weeks from the time of initial sighting if conditions are optimal for disease development. This gives you some idea how destructive soybean rust can be.

Making two fungicide applications to soybean would represent a paradigm shift for Kentucky soybean producers. Until recently, there were no foliar fungicides applied to soybean for disease control. Now, it is a hot topic and the current estimate is that 60,000 acres might be sprayed in 2004 with a mix of Quadris fungicide + Warrior insecticide. The interest in Quadris + Warrior is based on the significant yield bump that many (but not all) producers are experiencing where a single application of Quadris + Warrior mix is made between the R3 and R5 stages. The paradigm shift for soybean rust is that two applications will be needed to control soybean rust. This brings into question how sustainable multiple fungicide applications will be in Kentucky over the long haul. The cost of two applications will be $25-50$/A, depending on the material and the use rate. Higher soybean prices may be triggered by soybean rust and this may help offset the additional cost of applying fungicides.

Currently, Quadris (azoxystrobin) is the only fungicide labeled in the U.S. that is highly effective against soybean rust. Kentucky and most other soybean-producing states will be applying to EPA for a Section 18 that will allow the use of additional products should soybean rust makes its way into the U.S. in 2004. I feel we will be successful in this endeavor. If so, there will at least five additional fungicides that will be made available for use in combating soybean rust. Availability and the ability to apply the fungicides on a timely basis, however, are much less certain. In fact, one of the factors that has driven the Section 18 process is an awareness by fungicide manufacturers that no one company would be able to meet the demand for fungicide if the demand is very high. There are lingering questions that availability might continue to be a problem even if more fungicides are made available. There are a lot of soybean acres in the U.S.! Understandably, chemical manufacturers are not going to greatly ramp up the production of additional fungicide stocks until a market for the additional product exists.

A key to effective fungicide use for soybean rust control will be rapid detection and rapid follow through in applying fungicides, when needed. Regarding rapid detection, there are plans being implemented right now to train plant disease diagnosticians and plant pathologists (like me) in the art of field/laboratory identification of soybean rust. In addition, a highly specific and accurate PCR-based diagnostic test is in the final stages of development. We cannot offer training on this yet because we have nothing to show you. But once soybean rust is found in Kentucky or any neighboring state, I am certain there will be many field clinics available for you to learn how to identify soybean rust in the early stages of infection.

All in all, the soybean industry in Kentucky and throughout the county will be greatly challenged once soybean rust arrives here. It seems only prudent for you to prepare yourself now for the eventual arrival of soybean rust by becoming better educated about the disease and the challenges it will present. To this end, I have developed a simple web site to help guide you through the jungle of soybean rust information on the web. I encourage you to take some time soon and check the web site out. You will find it is a great gateway to available published resources and current facts/updates on soybean rust.

www.ca.uky.edu/agecollege/plantpathology/PPAExten/ppaesx.html
status report”. Unfortunately, I discovered after publication that the summary table prepared for that article had an error. Please note that the table, reproduced below, has been corrected (the correction is in bold). All of the phosphate fungicides were evaluated using a similar tank-mix program. My apologies for any confusion this may have caused.

### Table 1. Selected Results from 2003 Comparison of Phosphate Fungicides in a Putting Green Spray Program.

<table>
<thead>
<tr>
<th>Treatment and rate/1000 sq ft</th>
<th>Spray interval (wk)</th>
<th>Turf quality*</th>
<th>No. DSICb per plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>1</td>
<td>4.7 c</td>
<td>3.3 c</td>
</tr>
<tr>
<td>Chipco Signature 80WG 4 oz + Chipco 26GT 2SC 2 fl oz</td>
<td>2</td>
<td>7.5 a</td>
<td>5.3 a</td>
</tr>
<tr>
<td>Chipco Signature 80WG 4 oz + Daconil Ultrex 82.5WDG 1.6 oz</td>
<td>2</td>
<td>6.3 b</td>
<td>5.0 ab</td>
</tr>
<tr>
<td>Resyst 45.8S 5 fl oz + Chipco 26GT 2SC 2 fl oz</td>
<td>2</td>
<td>5.7 bc</td>
<td>4.3 bc</td>
</tr>
<tr>
<td>Chipco Signature 80WG 4 oz + Daconil Ultrex 82.5WDG 1.6 oz</td>
<td>2</td>
<td>6.0 b</td>
<td>4.7 ab</td>
</tr>
</tbody>
</table>

*1-9 scale, where 9 = excellent turf quality. Excludes dollar spot damage. Waller-Duncan k-ratio test, k = 100, P = 0.05.

*DSIC = dollar spot infection centers. Waller-Duncan k-ratio test, k = 100, P = 0.05.

Even with good cultural practices, fungicide sprays will be needed in most vineyards to manage grape diseases. For information on appropriate fungicides and their use, consult U.K. Cooperative Extension publication ID-94, Midwest Commercial Small Fruit and Grape Spray Guide 2004. To obtain the spray guide, contact your County Extension Office.

### SHADE TREES & ORNAMENTALS

**BLACK SPOT RESISTANT ROSES - AN UPDATE**

by John Hartman

In the previous issue of Kentucky Pest News a list of black spot resistant roses was presented. Since then, it was pointed out to me by a colleague that some of the roses listed in the older literature from which my list was formed may not be resistant as listed. Specifically, the cultivars 'Peace' and 'Tropicana,' although listed as resistant, frequently do not show disease resistance. The reasons these cultivars now fail to resist black spot? Explanations could include low disease pressure in the initial tests, inaccurate reporting of results, changes in the black spot fungus allowing it to overcome resistance, or very high disease pressure in locations where these cultivars now fail. Since we generally have high black spot disease pressure in Kentucky, it seems that it would be best to avoid using these two cultivars in the black spot-resistant rose garden.

### SYSTEMIC INSECTICIDES FOR TREE AND SHRUB INSECTS

by Lee Townsend

Control of sap-feeding insects, such as aphids and scales, on ornamental trees and shrubs with contact insecticides can be a challenge. Effective treatment generally requires very thorough spray coverage, a challenge even on small trees and shrubs. Systemic insecticides that are taken up by the plant and moved through the sap provide a means of managing these pests without spraying. Some applications of systemic insecticides also reduce or eliminate pesticide drift or harm to non-target or beneficial insects.

Bayer Advanced Garden Tree and Shrub Insect Control Concentrate (1.47% imidacloprid), is one such systemic tool. The concentrate is diluted with water and poured around the base of the ornamental tree or shrub. Dose rate depends upon the size of the plant. A wide range of pests - from aphids to whiteflies- is listed on the label so it is a relatively broad spectrum product. This approach provides long term protection but proper timing of the application is important and label directions are not specific. The label states that it
may take 1 week to 3 months for imidacloprid to become distributed completely in plants.

Bonide Systemic Insecticide Bullets (97% acephate) are labeled for use on ornamental trees in landscape and interior plantscape situations. These Bullets are devices that are implanted directly into the tree. The insecticide is moved by sap flow into leaf tissue. The Bullets can be used against a wide range of sucking or chewing insects and application is made when the insects appear. Small holes must be drilled into the trunk to insert the devices so they seem to fit as an alternative for a severe outbreak rather than a repeated program.

**HOUSEHOLD**

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**OVERWINTERING BUGS APPEARING IN BUILDINGS**

by Mike Potter

Many bugs are beginning to appear “mysteriously” inside homes and businesses. Most have either been ladybugs, cluster flies/face flies, yellowjacket or paper wasp (queens), stink bugs, or leaf-footed (seed) bugs.

Where Did They Come From?

These critters actually gained entry last fall through cracks and openings, and spent the winter hibernating in attics, soffits, wall voids, window/door casings, and similar protected areas. With the onset of warmer weather, the insects have again become active and are emerging from their overwintering sites. As they attempt to escape to their natural habitat outdoors, some inadvertently disperse inward into living areas, emerging from beneath baseboards, behind window and door frames, from within sash-cord openings, and around light fixtures and ventilators. Since many insects are attracted to light, they are often seen around windows and lighting fixtures.

What Can Be Done Now?

This is a temporary annoyance that will run its course as the weather continues to warm. Ladybugs, cluster/face flies, and stink/leaf-footed bugs generally do not bite, sting, or carry diseases, nor do they infest food, clothing or wood. They do not breed (reproduce) inside buildings and generally will not survive indoors more than a few days. Yellowjackets or paper wasps spotted indoors this time of year are overwintering queens attempting to get outdoors to initiate their spring nests. The emerging queens are not normally aggressive, but will sting if mishandled.

The easiest way to dispose of these overwintering insects found indoors is with a vacuum cleaner, broom or fly swatter. Insecticides are not generally recommended unless the temporary annoyance can no longer be tolerated. Aerosol-type foggers containing pyrethrins may be of some benefit in severely infested attics, but will provide no residual control of insects that have not yet emerged from cracks and other protected locations. Large numbers of lady beetles, flies or wasps accumulating in ceiling light fixtures would suggest the attic as a possible treatment area. Insect light traps supplied by pest control firms can also be installed in such areas, although they too may be of limited benefit. Aerosol sprays or foggers are not recommended for treatment of bedrooms, kitchens, or other living areas within the home. The effect of such treatment would be negligible against any insects which have not yet emerged from wall voids and other hidden locations. Flies or ladybugs spotted on walls, windows, and other exposed surfaces can just as easily be removed with a vacuum or fly swatter.

What Can Be Done To Prevent Future Problems?

It’s hard to predict whether structures experiencing problems this year will have problems next year. Since most of these pests—seek out overwinter-tering sites in late-summer/fall, cracks and other openings can be sealed as a preventive measure. Use a good quality silicone or silicone-latex caulk to seal cracks around windows, doors, siding, fascia boards, utility pipes, wires, and other openings. Repair damaged window screens and install insect screening behind attic vents (See Ensect-641, How to Pest-Proof Your Home). It may be better to wait until late spring or summer before sealing such openings; otherwise, the insects may be more inclined to move inward, into the living areas, instead of back outdoors.

While sealing and weatherstripping can help limit pest entry, the approach is time-consuming and often impractical. There are countless cracks and crevices under and around eaves, siding, vents, etc., where overwintering insects can enter. On multi-story buildings, sealing becomes especially difficult. Households or businesses that do not wish to chance a reoccurring problem with overwintering flies or lady beetles next season may want to enlist the services of a knowledgeable—pest control firm. Many companies offer strategically placed insecticide treatments to the building exterior, which helps prevent pest sightings indoors. Long-lasting, rapid-knockdown formulations of pyrethroid insecticides can be professionally applied around eaves, attic vents, windows, siding, and other likely points of entry. The key is to apply the treatments in late September or early October, before pests enter buildings to overwinter. Such treatments would be ineffective at this point (late winter), since the pests are already indoors.

People have varying levels of tolerance toward insects in their homes. Hospitals, food processing plants, and other “high-clean” establishments have zero tolerance for contaminants of any kind. Vacuuming, fly swatters and pest proofing, supplemented by client education, are the preferred methods of dealing with overwintering insects inside structures. Insecticides should be used only when the situation warrants and prescribed as indicated above.

**DIAGNOSTIC LAB HIGHLIGHTS**

by Julie Beale and Paul Bach

Recently in the Diagnostic Laboratory we have seen a number of greenhouse samples including Pythium root rot on zinnia and petunia plugs and Pythium damping-off on eucalyptus seedlings; black root rot on petunia plugs; fertilizer burn to roots of geranium and helichrysum; and powdery mildew on begonia. We have also diagnosed hail damage (old) on grape; Pythium root rot, Microdochium patch and thatch layering on bentgrass; Botryosphaeria canker on ash; black root rot on holly; and oedema on euonymus.

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NOTE: Trade names are used to simplify the information presented in this newsletter. No endorsement by the Cooperative Extension Service is intended, nor is criticism implied of similar products that are not named.