TOBACCO

USE AN INTEGRATED APPROACH TO MANAGE DISEASES IN THE TOBACCO FLOAT BED
by Kenny Seebold

The introduction of the float system revolutionized the way we produce tobacco transplants in Kentucky and other tobacco-growing areas around the United States. The float system offers a number of advantages over the traditional plant bed but also creates ideal conditions for some important diseases of tobacco transplants. High moisture in this virtually hydroponic system favors infection by a number of plant pathogens, as does the dense plant population.

Prevention is the most important part of disease management in tobacco float beds, or any other production system for that matter. We put more emphasis on prevention in the float system, though, because of the disease-conducive environment and the relative lack of fungicide tools that we can use to prevent disease or slow disease spread once it begins. Here are some considerations in developing a preventive disease management strategy:

Avoid the introduction of plant pathogens into the float system. Water from ponds or creeks can harbor fungi like *Pythium* or the black shank pathogen that can wreak havoc in the float system. Keep soil out of float bays – this can also cause certain plant pathogens to be introduced into the system.

Seed into new trays, or if using old trays, make sure that they have been properly sanitized. New trays will not harbor plant pathogens, but re-used trays pose more of a risk. There is no guaranteed, foolproof way to sanitize used trays; however, we do have methods that will significantly reduce survival of plant pathogens on trays. The first step is to wash used trays thoroughly in soapy water to remove soil and plant debris. Follow by a soak in a 10% bleach solution for 2-3 minutes, followed by a good rinse. Alternatively, trays can be dipped in the bleach solution and then covered with a plastic tarp overnight. Rinse thoroughly to remove bleach residue. The solution must be replaced regularly (every couple of hours) to maintain effective levels of chlorine. Steaming trays at 165-175 °F for 30 minutes will significantly reduce pathogens inside trays, but take care with temperature and steaming time to avoid damage to trays. As I mentioned earlier, new trays will all but eliminate carrying diseases over between crops of transplants.

Dispose of unused or diseased plants properly. Bury or burn the plants, or place them in cull piles that are at least 100 yards from float beds or tobacco fields.

Keep your transplants as stress-free as possible. Avoid temperature extremes and keep fertilizer levels within recommended ranges. Plants that are under- or over-fertilized are more susceptible to diseases in general.

Maintain good air movement through the use of side vents and fans, and keep water levels high enough for float trays to clear the side boards of the bays. Good airflow promotes rapid drying of foliage, creating less favorable conditions for diseases.
When clipping plants, avoid the buildup of leaf matter in float trays. Some pathogens can use leaf debris as a food base to become established and then spread in the float system.

Use fungicides preventively for best effect. Refer to the fact sheet, PPAFS-AG-T-8, for recommended chemicals and their use rates. The link to this publication is www.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/ppfsagt8.pdf.

Disease-free transplants pay dividends down the road because they are more vigorous and less prone to attack by pathogens in the field. Use a management strategy that integrates cultural practices and chemicals to get the best possible control diseases in the float system and produce the best transplants that you can.

CORN

NORTHERN CORN LEAF BLIGHT CARRYOVER FROM 2004 EPIDEMICS
by Paul Vincelli

Northern leaf blight (NLB) was severe in many locations in Kentucky in 2004. Weather across the state in 2004 was generally cool, wet, and cloudy, which favored disease development. There also are some corn hybrids on the market which are susceptible or have only low levels of resistance. Although these hybrids may generally escape significant damage in most years in Kentucky, the combination of sustained use of susceptible hybrids coupled with disease-favorable weather can lead to damaging levels of disease.

Many fields where corn was severely damaged in 2004 are likely going back to corn this season. If these are fields in conservation tillage, I expect there to be some risk of inoculum survival in these fields, even if they were rotated last season. The weather in 2005 was generally drier than normal, reducing natural decomposition of corn residues from 2004, which may increase the survival potential of the fungus that causes NLB. Thus, a review of the disease seems appropriate at this stage.

Some Biology of NLB
Symptoms of NLB are elliptical, grayish-green or tan lesions 1 to 6 inches long with smooth margins. The large ones are typical for a susceptible hybrid growing under cool, cloudy, wet conditions. During damp weather, greenish-black fungal sporulation is produced in lesions. Older leaves are affected first. Severely affected leaves can be killed when lesions coalesce.

The fungus that causes NLB is called Setosphaeria turcica (but it is also known as Exserohilum turcicum and Helminthosporium turcicum). Setosphaeria turcica survives in undecomposed corn residue. Spores are spread by air currents. Severe yield loss can occur when upper leaves become blighted during early grain fill. Strains of the fungus also infect sorghum, johnsongrass, and sudangrass, although strains that attack these plants do not attack corn.

Factors That Can Favor NLB Development
1. Cool, wet, cloudy weather, as mentioned above.
2. Reduced tillage, since the fungus survives in undecomposed leaves of diseased corn.
3. Continuous corn, which favors a buildup of inoculum by repeatedly planting a host.
4. Substantial late-season growth of volunteer corn after harvest. If a corn crop was harvested early enough to allow some late-season growth of volunteer plants from spilled kernels, these plants can serve as a food base for further increase of inoculum in the field, setting the stage for higher disease pressure next year.
5. Late-planted crops can be exposed at a relatively young age to spore clouds coming from earlier-planted crops, resulting in more yield loss than in an earlier crop.
6. Irrigation, since this provides the humidity and leaf wetness that favors the disease.

Management
Producers should consider the level of susceptibility to NLB for hybrids being planted into fields under conservation tillage that had significant NLB damage in 2004 (or 2005, although in most fields 2005 was too hot and dry for NLB).

There are two types of resistance to NLB
1. complete resistance (more or less), sometimes also called race-specific resistance or single-gene resistance;
2. partial resistance, sometimes called multiple-gene resistance. In hybrids with partial resistance, fewer lesions form and they are smaller and with less sporulation than on a susceptible hybrid.

In hybrids with (nearly) complete resistance, lesions form which are yellow and limited in size, and sporulation by the fungus is very limited. These are hybrids with one or more Ht genes. For example, on hybrids carrying an Ht1, Ht2, or Ht3 resistance gene, long, yellow to tan lesions with wavy margins and no sporulation are observed on leaves affected by NLB. These lesions are a resistance reaction and can be easily confused with Stewart's wilt. The HtN gene results in lesions that are necrotic, but these lesions are smaller and much delayed compared to lesions on susceptible hybrids. One caution about hybrids with the Ht1 gene is this: generally in the region we
have a mix of race 0 and race 1 of _Setosphaeria turcica_. Race 0 is controlled completely by any of the _Ht_ genes, but race 1 causes aggressive disease on hybrids with the _Ht1_ gene only.

Corn hybrids marketed today commonly have partial resistance. In that case, NLB can still develop on the hybrid but it usually does so more slowly than on a fully susceptible variety.

Under many circumstances, a moderate to high level of partial resistance would be sufficient to control the disease. However, under high to very high disease pressure, a hybrid with an effective gene for complete resistance would often outyield a partially resistant hybrid.

**SOYBEAN**

**SOYBEAN RUST: OVERWINTERING STATUS REPORT**  
by Don Hershman

One of the key aspects of managing soybean rust in the United States is to know where the disease is at all times. Keeping track of where soybean rust has successfully overwintered is a major piece of the “puzzle”. Specifically, we know that soybean rust will die back to the deep southern United States each winter; however, where the soybean rust fungus survives the winter, and to what extent, will vary each year and will play a major role in determining the overall soybean rust risk the following spring and summer.

The soybean rust fungus, _Phakopsora pachyrhizi_, survives the winter primarily on the perennial vine, kudzu. Generally, kudzu foliage is killed back in areas where winter temperatures reach 28°F or lower for an extended period of time (i.e., overnight). I say generally since scientists in Alabama, Florida, and Georgia have found out this winter that low levels of rust-infected kudzu leaves can survive in protected areas well north of the so-called “kudzu kill line”. These situations occur most frequently in urban areas next to buildings, under highway bridges, in culvert pipes, or on trees. There is some question as to how important these rogue kudzu finds are to overall soybean rust disease potential. My guess is they will play a minor role, overall. Locally, however, they could play an important role in spreading soybean rust to nearby soybean or kudzu earlier than would have otherwise occurred. At the very least, involved kudzu patches will almost certainly be re-infected earlier in the spring than would have otherwise taken place.

The USDA provided funds to Land Grant Universities in Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas to monitor various locations for soybean rust during the 2005-06 winter. As of March 6, 2006, there are many more known infected sites than there were at this same date in 2005. Last year at this date, there was only one known rust-positive site in Florida (Pasco County – kudzu). Presently, there are multiple infected sites in Alabama, Florida, and Georgia, and a single infected site in south Texas. The positive sites in Georgia, which involved low levels of infected kudzu leaves, were eliminated by hand-picking and destroying infected leaves. The infected site in Texas involved soybean and has been harvested. These attempts to eliminate soybean rust may help to reduce disease potential, but for every positive site destroyed there may be many others that exist, but have not been found. The implication of all this is that soybean rust is likely to spread into new areas (kudzu and soybean) earlier and to a greater extent than occurred last year. Development and spread of the disease, however, will be greatly impacted by weather patterns. If moisture is not limiting, the risk of soybean rust spread increases.

In the deep Southern U.S., kudzu is now beginning to put on new growth and soybean will soon be planted. For all practical purposes, we are now at the beginning of the 2006 growing season and things will begin to slowly change from south to north from this point on. I encourage you to keep track of soybean rust sightings and development by periodically monitoring the USDA soybean rust public website (www.sbrusa.net). In addition, I will be regularly updating the Kentucky Soybean Promotion Board-sponsored KY Soybean Rust Hotline (800-321-6771) beginning in April. In the meantime, I will be sending out copies of soybean rust reports from other states, along with my interpretation of what it means to Kentucky soybean producers, via the UK College of Agriculture Soybean Rust E-mail list. To sign up for this list, go to the UK Soybean Rust Website (www.uky.edu/soybeanrust) and click on “get e-mail updates”. Please note: this is a very active list and I send out a lot of updates. I am telling you this now so you are not surprised when you receive two and sometimes three updates per day.

**FRUIT CROPS**

**NEW INSECTICIDE FOR RASPBERRY CROWN BORER**  
by Ric Bessin

Raspberry crown borer is the most devastating pest of blackberry and raspberry in Kentucky. While not as obvious as Japanese beetle or green June beetle attacking the fruit, raspberry crown borer attacks the roots and crown of the plants and can result in killed or weakened canes. Raspberry crown borer symptoms include canes prema-
turedly dying, spindly cane growth, and reduced leaf size. If you suspect raspberry crown borer, look for sawdust-like frass pushed out of the base of infested canes near the soil, swelling at the base of the canes, or tunnels in the canes that are noticed while pruning. This is a common pest of blackberries and raspberries throughout the state that can severely reduce the productivity of a planting. This insect has a two year life cycle.

Capture 2EC has been approved for use as a soil drench to control raspberry crown borer on cane berries. Guthion Solupak is also registered for crown borer control on raspberries and blackberries. Capture 2EC has shorter PHI and REI restrictions that Guthion. These are applied in September or October, or at bud swell in the spring, as a drench to the lower cane and soil around the base of the plants. Applications in the fall may be more effective than in the spring. This application prevents new infestations and will not control second-year larvae. For this reason, applications for several seasons may be needed to achieve control.

**SHADE TREES & ORNAMENTALS**

**HOW WILL THE DROUGHT OF 2005 AFFECT LANDSCAPE PLANT DISEASES?**

*by John Hartman*

Much of the bluegrass and eastern parts of Kentucky suffered dry weather during 2005. Rainfall in most Kentucky locations was below normal every month except January and August. August would have been more deficient except for the rainy aftermath of Hurricanes Dennis and Katrina. Indeed, the Bluegrass region suffered moderate to severe drought for most of the summer and eastern Kentucky was in a state of severe drought by summer’s end. Even now, in late winter, Bluegrass and eastern regions are in a state of mild drought.

**Woody plants.** Wilt and leaf scorch symptoms are often associated with dry weather. In addition, drought-stressed plants close their stomata which reduces their rate of photosynthesis. Reduction in photosynthesis may not kill a tree or shrub, but it means fewer carbohydrates are made and stored for future use. In the landscape, seedlings and recently transplanted trees and shrubs were at greatest risk because they lacked extensive root systems.

With drought, there are some fungal diseases of landscape trees and shrubs that often do not show symptoms until the following season, after the drought has passed. The role of water stress in encouraging opportunistic plant pathogens is unclear. It is possible that the stress condition interferes with the plant’s defense against such pathogens, or possibly, the reduced carbohydrate reserve allows the plant little energy to fight invasion by pathogens.

Expect certain fungi such as *Hypoxylon*, primarily an oak pathogen, and *Armillaria*, which attacks many woody plants, to appear in 2006 because of the 2005 drought stress. In addition expect symptoms of diseases caused by other fungi such as *Thyronectria* (honey locust canker); *Cytospora* or *Valsla*, (cankers on prunus, poplar, willow, maple, spruce and other conifers); *Diplodia*, (pine tip blight); and *Botryosphaeria* and *Nectria* (cankers of many woody plants such as rhododendrons, crabapples, dogwoods, maples, and others) to appear the season following the dry weather.

In searching for water, some woody plants could have sacrificed surface roots to the drought while relying more heavily on roots that were deeper in the soil. If excessive rains return, partial flooding could render these deeper roots more prone to root rot diseases, thus leaving the woody plants with few functional roots. Thus, expect additional woody plant death when the drought breaks.

One possible benefit of the drought could be the reduction in foliar diseases this year. There could be less carry-over inoculum from shade tree anthracnose diseases, crabapple scab or rose black spot, for example. The benefit could be short-lived, however if spring weather is wet and rapidly repeating cycles of these diseases occur. Looking ahead even farther, the rust infections of cedar that should have occurred, but didn’t, during the dry 2005 summer might result in fewer cedar galls in the spring of 2007 and less rust on crabapples and hawthorns that same summer.

**Herbaceous ornamentals.** Perennial flowers and ground covers, like their woody counterparts could have reduced energy reserves due to the drought. This could make them more susceptible to cankers and to root, corm, or bulb rot diseases. There is not much research on the role of stress on diseases of herbaceous ornamentals, so it is difficult to know how the drought will affect these plants. A few diseases such as *Volutella* blight of *Pachysandra*, are known to be more severe on stressed plants, but most likely the disease would have appeared during the drought. For foliar diseases, the situation is similar to that of woody plants - reduced primary inoculum might result in less disease, at first.

**Tree fruits.** Tree fruits in the landscape and orchard are subject to many of the same diseases as shade trees. Fungi such as *Nectria*, *Cytospora* and *Botryosphaeria* cause cankers of tree fruits suffering from drought stress. The effects are likely to be the same as for landscape trees. As
Small fruits. Blueberries and brambles in the garden are especially susceptible to fungal cankers, and grapes also can become cankered. They are likely to react to drought in a similar way as woody landscape plants. Reduced foliar diseases could also be expected for these crops, at first. Strawberries that were not watered probably died last summer from lack of water or from the black root rot complex which is usually more severe on drought-stressed crops. On the other hand, if they did survive, this season could bring a reduced threat from leaf spot and anthracnose diseases, at least at first.

HOUSEHOLD

TERMITES IN NEW ORLEANS MULCH A NON-ISSUE
by Mike Potter

Recent questions have been raised about buying wood mulch that might be infested with Formosan subterranean termites from New Orleans. A rumor has been spreading over the internet that after hurricanes Katrina and Rita, termite-infested wood is being chipped into mulch and being shipped to retail outlets throughout the country. The rumor further warns that if you buy this cheap mulch, the termites will eat your house down and there is no effective solution — NONSENSE.

It is extremely unlikely that this will be a problem in Kentucky or other states for the following reasons:

1. In October 2005, the Louisiana Department of Agriculture and Forestry imposed a quarantine to prevent the accidental spread of Formosan termites to other areas. All wood debris in parishes affected by the hurricanes must be discarded in approved landfills within the quarantine area. This regulation is being strictly enforced and no mulch is being permitted to leave the area.

2. Even if wood mulch were to leave the area, it is highly unlikely that Formosan subterranean termites would survive the chipping, shredding, packaging, and shipment process, bagged or otherwise.

3. Kentucky is generally thought to be too far north to sustain colonies of this particular termite which is adapted to more southern locales. Winter temperatures at locations north of Memphis, TN (35° N latitude) are thought to be too low for permanent establishment of Formosan subterranean termites.

4. Although the Formosan termite is a serious pest of structures, contrary to the misinformation being disseminated, effective treatments are available in the exceedingly unlikely event that an infestation were discovered.

The bottom line is that termite-infested mulch from New Orleans should not be a significant concern in Kentucky or other states. Another take-home message — don’t believe everything you read on the internet.

For additional information see: http://www.snopes.com/inboxer/household/termites.asp

DIAGNOSTIC LAB-HIGHLIGHTS
by Sara Long, Paul Bachi and Julie Beale

Recently diagnosed samples on fruits and vegetables have included: black rot on apple and fertilizer burn on tomato.

On ornamentals we diagnosed, Pythium damping off on begonia; Rhizoctonia root rot on geranium and impatiens; Phytophthora root rot on serviceberry, spruce, and taxus; oedema on English ivy; Ascochyta leaf spot on pansy; Thronectria canker on honeylocust; Phomopsis tip blight on juniper; and crown gall on willow.

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.