

KENTUCKY PEST NEWS

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BLUE MOLD REPORTED IN NORTH-CENTRAL FLORIDA

by **Kenny Seebold**

After four consecutive years of being first to report blue mold in the U.S., Kentucky will hand this honor over to another state – good news for us, but not so good for the folks in FL and GA. My colleague, Dr. Amanda Gevens, has confirmed the presence blue mold in a conventional plant bed near Gainesville, FL. There's no imminent threat to producers in KY at the moment, since we're not too far along in the transplant production cycle and recent weather patterns haven't necessarily threatened us. On the other hand, it's extremely important now to keep southern-grown transplants out of our state if at all possible. Historically, FL produced quite a few plugs that were sold in Kentucky, but the company that grew the bulk of these plants phased out tobacco transplants in 2007. Still, there may be other companies or individuals in FL and possibly GA that will raise plugs or finished plants that might make it into KY. We must all work to spread the word about this recent find of blue mold in FL and make our producers aware of the risk posed by transplants that originate in the Deep South. We also need to start thinking preventively about blue mold in transplant systems around Kentucky. As I've said, the threat from the disease is low, but the status could change quickly depending upon the extent of the epidemic in the south and the weather that we experience over the next couple of months.

Some of the worst epidemics of blue mold in Kentucky were associated with early arrival of the disease during production of transplants. This has occurred through the previously discussed movement of southern-grown seedlings into our state; however, in most years early appear-

ance of blue mold was linked to establishment of disease in FL and GA in March and April. Movement of spores from these sites into KY in May and June caused widespread outbreaks of blue mold on transplants in years when weather favored development of disease (1996-1998 and 2000-2003). So, depending upon the weather patterns that prevail in KY through June, we are faced with the likelihood of blue mold threatening tobacco transplants at some point this spring. This means that we need take as many steps as possible to prepare for arrival of inoculum (spores) of the blue mold pathogen, *Peronospora tabacina*, so that growers are not caught off-guard.

Prevention is the best defense against blue mold in float systems and conventional plant beds. Proper management of transplants during the production cycle is critical to managing blue mold and other diseases, as we've discussed in previous articles. Here are some key points to consider when developing a preventive plan to manage blue mold:

1. Practice good hygiene and sanitation in the greenhouse or outdoor beds.
2. Seed on time; quality tobacco transplants can be produced in 7-9 weeks, so gear production cycles to match anticipated setting dates.
3. Manage humidity and leaf wetness. Take steps to ensure adequate ventilation so that foliage does not stay wet for excessively long periods of time; this means proper use of fans and side-curtains, or removing / opening covers on outdoor beds (as weather permits) to allow foliage to dry quickly. Manage temperatures to minimize humidity and buildup of condensation.
4. Clip properly, following a timely schedule. Proper clipping opens up the plant canopy, permitting better light penetration and air movement (and thus faster drying).
5. Begin a preventive fungicide program as soon as plants are dime-sized. For KY producers, this means

applications of Dithane DF at 0.5 lb of product per 100 gallons of finished spray (equivalent to 1 tsp of Dithane per gallon of water). Apply 3-5 gallons per 1000 square feet as a fine spray (to ensure good coverage) on younger plants, and increase to 6-12 gallons on older plants. Ferbam, or Carbamate, cannot be used in float systems but is allowed on plants grown in conventional beds. The use rate is 2-3 lb of product per 100 gallons of water (2-3 tbsp per gallon of water).

Continue fungicide applications until plants are set in the field.

6. Destroy any un-used transplants as quickly as possible to remove potential sources of blue mold later in the season.
7. Destroy transplants if blue mold is found on seedlings. All plants in the system must be destroyed, even those that don't show symptoms because of the risk of exposure and latent disease.
8. Do not set plants that have been exposed to blue mold. These plants are often infected systemically and will not thrive in the field, and those that develop symptoms in the field will be a source of inoculum for epidemics of blue mold later in the season.
9. Grow your own plants, or purchase them from sources in KY (or states north of KY) – think “Kentucky Proud” to minimize the threat of importing blue mold from outside the Commonwealth.
10. Monitor the weather and status of blue mold regularly to help guide management decisions.

Fortunately, there are easy-to-access resources available to help us track the occurrence and movement of blue mold (and other diseases) in the tobacco producing regions of the U.S., and to assess the level of risk to tobacco around the country. The Kentucky Blue Mold Warning System is a cooperative effort developed by Dr. Bill Nesmith over 27 years ago and involves growers, county agents, and Extension tobacco specialists in Kentucky and other parts of the U.S. The status of blue mold in Kentucky and surrounding states is updated regularly during the production season and can be found at www.uky.edu/Agriculture/kpn/kyblue/kyblue.htm and in the Kentucky Pest News. Breaking information will be published on the Kentucky Blue Mold Warning System web page and through a mailing list, the KY Blue Mold Alert. Subscribe to the KY Blue Mold Alert mailing list by sending a message to: listserv@lsv.uky.edu. The message body must contain, verbatim, the line ***subscribe ky-bluem-alert***, followed by a blank line. You will receive, by return mail, a message requiring confirmation of your subscription.

The North American Plant Disease Forecast Center (NAPDFC), located at North Carolina State University, is an important source of information that is relied upon to

generate forecasts posted on the KY Blue Mold Warning System. The NAPDFC documents the presence of blue mold in locations where inoculum is produced and poses a threat to cultivated tobacco in the U.S. These locations include Cuba, Mexico, and southern Texas. During the growing season, outbreaks of blue mold across the country are confirmed by local coordinators from each of the tobacco producing states and forwarded to the NAPDFC. This information is used to track the spread of blue mold and is also used, in conjunction with weather models, to predict the future movement of the disease. Status and forecast information are summarized on the NAPDFC Blue Mold page (<http://www.ces.ncsu.edu/depts/pp/bluemold/>), which is updated on Tuesday, Thursday, and Saturday from March until the end of August.

The Kentucky Blue Mold Warning System has been successful in the past because of input at the local level. We depend on growers and agents to let us know when and where blue mold crops up in Kentucky to complement the information provided by the NAPDFC and provide the most accurate forecast possible. Growers should report outbreaks of blue mold to their local county extension agent as soon as the disease is found so that he or she can pass this information to U.K. extension specialists. We use this information to update the KY Blue Mold Warning System and to develop area-specific advisories. The faster we learn about blue mold at the local level, the quicker we can issue an alert, and the sooner our growers can begin to protect their crops from the disease. I'll hold out hope that blue mold won't be an issue in 2008, but let's be prepared to work together and spread the word if and when it shows up.

Blue Mold Status as of 25 March 2008. Active blue mold has been confirmed in western Cuba (Pinar del Rio) and north-central Florida. The threat to production areas in KY and neighboring states is low at this time.

WHEAT

EARLY FUNGICIDE APPLICATIONS OF HEADLINE TO WHEAT by Don Hershman

This year, BASF is recommending the use of a reduced rate of Headline (3 fl oz/a), applied early (tillering through early stem elongation), for disease control/yield enhancement in wheat. The idea is that the fungicide would be added to the herbicide or herbicide/insecticide mixture that most wheat producers are already putting out for weed and aphid control, respectively. BASF has issued a 2ee recommendation for this use; the target diseases are tan spot, speckled leaf blotch (*Septoria tritici*) and *Stagonospora* leaf and glume blotch.

I have received numerous queries about this recommendation. By way of background, early season fungicide sprays are being recommended in most states where wheat is produced. As a result, this has been a major topic of discussion amongst wheat pathologists this winter. The overall consensus is that this or any fungicide treatment is only profitable if a disease develops at high enough levels to reduce yields. Thus, if there is little to no disease in a crop, there will be little to no economic benefit from a fungicide application. Similarly, treatments can be applied, but if the timing is off or the rate too low, disease control may be compromised and yield and/or quality losses may still occur.

Now, assuming that one or more disease can be found in a crop, the next thing to do is to determine if what is being found justifies a fungicide spray now or at some later date. From data I have seen, the only time where an early fungicide application seems to pay off is where tan spot, leaf rust, stripe rust, or powdery mildew are found in a crop, early. Tan spot is typically most serious where wheat following wheat is a common production practice. It is often evident in other cropping systems, but I have only seen that disease reduce yields a few times in 24 years in Kentucky. This is probably because most of our wheat is planted behind corn (a non-host crop for tan spot) and our wheat residue deteriorates rather quickly (compared to Minnesota, for example). The few times I have seen tan spot reduce yields is when it came in late in the season. The argument can be made that making early fungicide applications will “nip it in the bud” and this may be true; Headline is excellent against tan spot. However, in my experience, the risk that tan spot will reduce yields in any given field in Kentucky is low. As a result, I would not base my fungicide use decisions on tan spot control unless you see compelling evidence that tan spot control is needed.

Speckled leaf blotch is not a very aggressive disease in Kentucky, but it can be found in almost every field, every year on winter-killed leaves. Frequently during early spring the disease will develop on the Flag -2 or 1 leaf, but in most years and situations, the disease will shut down (due to high temperatures) before it reaches the flag leaf. When it does make it to the flag leaf, it does not tend to be very aggressive, again, probably due to the high temperatures that we often see in mid-May through mid-June. Speckled leaf blotch moves rather slowly in the canopy, and it is not hard to control if it appears that the disease is increasing. There is limited resistance to speckled leaf blotch, but I don't believe there is much evidence to support an early application of Headline for control of this disease.

Year in and year out, Stagonospora leaf and glume blotch, is probably our most important disease. Yields are rarely devastating, but it is common to see 10-20% yield losses, as well as reduced grain quality. However, this disease is more prevalent in mid to late season due to its higher temperature requirements, compared to speckled leaf blotch. The main point is that Stagonospora leaf and glume blotch almost never starts building up steam until after the flag leaf has emerged, and usually later. I seriously doubt that applying any fungicide in the spring, through early stem elongation, will make much difference in the outcome for Stagonospora leaf and glume blotch.

In susceptible varieties, powdery mildew, leaf rust and stripe rust can be devastating, and are very difficult to control if they are allowed to get a foothold in a crop. In some cases, an early application of a fungicide is exactly what is needed to ward off damage due to these diseases. However, in each of these disease situations, the 3 fl oz/a rate of Headline is too low to provide adequate control of these diseases. My guess is that this reality is the reason why BASF has not included these diseases in this particular 2ee recommendation.

With high wheat prices anticipated for early summer, it does not take much of a return to recover the cost of an invested input. I will not argue that applying Headline to a crop early, and at a reduced rate, may result in a slight yield increase that may make the treatment perfectly acceptable. I acknowledge that controlling low levels of several diseases early may, collectively, result in slight yield increases compared to non-treated wheat. All I am attempting to do in this article is to lay out some biological realities that, on the surface at least, are not highly supportive of this treatment. However, the 2ee recommendation being described here assumes that a later fungicide application will be made for late season disease protection. In fact, a follow-up application is encouraged on the 2ee recommendation. When the two fungicide treatments are applied, there may be more benefit than would be seen from either treatment alone. To be honest, there has been very little research done with tillering to jointing applications of Headline at reduced rates. BASF summarizes the results of numerous side by side studies, but it is difficult to know what to make of the summaries. No disease information is included and the tests come from a range of states and both winter and spring wheat. There is limited data from Kentucky, so we cannot support or reject the treatment based on our experiences here. Thus, we certainly do not have all the answers. If I were farming, I would give the treatment a try on a portion of my crop and make sure I could document the yield impact of the treatment. I would also send in some representative plant samples to a qualified plant disease diagnos-

tic laboratory and ask them to make an overall assessment of the diseases present and their levels.

SHADE TREES & ORNAMENTALS

AN EXCLUSIONARY PRINCIPLE FOR THE GARDEN

by John Hartman

This is the time of year when Kentucky gardeners will begin introducing new plants into the landscape and garden. Seeds will be sown and trees, shrubs, flowers, and vegetables will be transplanted. Whether the landscape and garden introductions are in the form of seeds or transplants, they carry the risk of introducing new disease-causing pathogens as well. Astute gardeners, knowing that plant disease will not occur if the plant and the pathogen can be kept apart will want to consider using the principle of exclusion for disease control.

Normally, when exclusion for plant disease control is considered, we think of quarantines and inspections to keep new diseases from entering a state or nation. Currently, Kentucky and other states in the eastern U.S. are excluding *Phytophthora ramorum*, cause of sudden oak death, by inspections of nursery plants moving from the West Coast where the disease occurs, to the East. Similarly, through exclusion, *Ralstonia solanacearum* race 3 biovar 2, a devastating disease of potato and other crops, is prevented from entering the U.S. on geraniums or other transplants. We can only imagine what our Eastern U.S. forests or urban streets would look like if chestnut blight or Dutch elm disease had been excluded.

On a much smaller scale, although a landscape or garden plant disease may be widespread in Kentucky, it doesn't mean that every garden harbors the pathogen. In order to keep the garden free of some plant pathogens, it becomes the responsibility of the gardener to exclude diseases that might be damaging to their garden plants. This means gardeners need to undertake careful inspections of incoming plants and reject those that don't meet good health standards. Some examples might include:

- Black root rot, caused by the fungus *Thielaviopsis basicola*, may be present on roots of holly, petunia, pansy, impatiens, geranium and other transplants. The fungus is not already present in most garden soils, but once introduced, will persist in the soil for many years. The tops of the plants may not show symptoms in the nursery or garden center so in order to find the disease, the plants must be knocked out of the pots and the roots examined. Inspect plants carefully and reject those with dark root lesions or blackened root tips. Once planted

in the garden, these plants will decline and grow poorly.

- Geranium bacterial blight, caused by the bacterium *Xanthomonas campestris* pv. *pelargonii* can devastate geraniums grown in outdoor beds. This disease is sometimes introduced into the landscape via infected transplants. On leaves, look for brown spots, often with yellow margins or check for sunken cankers on the stems. If these symptoms are observed, reject the plants because once the pathogen is introduced into the landscape, that bed can become contaminated and provide a source of infection for future geranium plants grown in the same bed. Examine geranium plants carefully and exclude any that have symptoms of leaf spot or stem cankers.
- Tomato mosaic virus (TMV) can be carried on seeds and transplants. Most commercial seeds and transplants are free of this disease, however, gardeners who save seeds from one year to the next sometimes mistakenly collect seeds from virus-diseased plants. Symptoms of TMV in the garden or on transplants include deformed leaves and yellow mosaic patterns on the leaves. This disease ultimately results in poor tomato fruit production. Be wary of seeds obtained from dubious sources and transplants with mosaic symptoms; exclude them from the garden.

For a healthier, more productive garden, remember to use the principle of exclusion to reduce the chances of introducing a pathogen that causes a garden plant disease that will be regretted later in the season or in the coming years.

HOUSHOLD

IT'S TERMITE SEASON

by Mike Potter

Termite season has begun in Kentucky. During the next several weeks, you'll probably spend more time responding to termite calls than to any other insect pest. To complicate matters, the public has little understanding of termites and what should be done if their home is infested. This column will help you answer their questions.

Q: Why be concerned about termites?

A: Termites cause billions of dollars in damage each year. They primarily feed on wood, but also damage paper, books, foam board insulation, and even swimming pool liners and filtration systems. Termites can injure living trees and shrubs, but more often are a secondary invader of woody plants already in decline. While buildings may become infested at any time, termites are of particular importance when buying or selling a home since a termite inspection is normally a condition of sale. Besides the monetary impact, thousands of winged termites emerg-

ing inside one's home are an emotionally trying experience. Do not mention the thought of termites silently feasting on one's largest investment.

Q: Why are infestations often discovered during March - May?

A: Spring typically is when large numbers of winged termites, known as swarmers, emerge inside homes. In nature, termites swarm to disperse and start new colonies. Triggered by warmer temperatures and rainfall, the winged termites emerge from the colony and fly into the air. The swarmers then drop to the ground, shed their wings, pair off with a mate, and attempt to begin new colonies in the soil. Few swarmers emerging outdoors survive to start new colonies. Swarmers emerging indoors are incapable of eating wood, seldom survive, and are best removed with a vacuum cleaner. They do, however, indicate that an infestation is present.

Q: How will I know if my home is infested?

A: Discovering winged termites indoors almost always indicates an infestation warranting treatment. People often confuse winged termites with ants, which often swarm at the same time of year. Termites can be differentiated by their straight antennae, uniform waist and wings of equal size. (Ants have elbowed antennae, constricted waists, and forewings that are longer than the hind wings.) The swarmers are attracted to light and are often seen around windows and doors. Termite swarmers emerging from tree stumps, woodpiles, and other locations out in the yard are not necessarily cause for concern, and do not always mean that the house is infested. On the other hand, if winged termites are seen emerging from the base of a foundation wall or adjoining porches and patios, there's a good chance the house is infested also and treatment may be warranted.

Other signs of infestation are earthen (mud) tubes extending over foundation walls, support piers, sill plates, etc. The mud tubes are typically about the diameter of a pencil, but sometimes can be thicker. Termites construct these tubes for shelter as they travel between their underground colonies and the structure. To help determine if an infestation is active, the tubes may be broken open and checked for the presence of small, creamy-white worker termites. If a tube happens to be vacant, it does not necessarily mean that the infestation is inactive; termites often abandon sections of tube while foraging elsewhere in the structure. Termite-damaged wood is usually hollowed out along the grain, *with bits of dried mud or soil lining the feeding galleries*. Wood damaged by moisture or other types of insects (e.g., carpenter ants) will not have this appearance. Occasionally termites bore tiny holes through plaster or drywall, accompanied by bits of soil around the margin. Rippled or sunken traces behind wall

covering can also be indicative of termites tunneling underneath.

Oftentimes there will be no visible indication that the home is infested. Termites are cryptic creatures and infestations can go undetected for years, hidden behind walls, floor coverings, insulation, and other obstructions. Termite feeding and damage can even progress undetected in wood that is exposed because the outer surface is usually left intact. Confirmation of infestation often requires the keen eye of an experienced termite inspector. However, even the most experienced inspector can overlook infestation or damage which is hidden.

Q: Can I treat the house myself?

A: Ridding a home of termites requires special skills. Knowledge of building construction is needed to identify the critical areas where termites are likely to enter. Many of these potential points of entry are hidden and difficult to access. Termite control also utilizes specialized equipment such as masonry drills, pumps, large-capacity tanks, and soil treatment rods. A typical treatment may involve hundreds of gallons of a liquid pesticide, known as a termiticide, injected into the ground alongside the foundation, beneath concrete slabs, and within foundation walls. In short, termite treatment is a job for professionals. A possible exception would be if a mailbox post, sandbox or other small wooden object not attached to the house was infested. A Do-it-yourself termite baits (see bait comments below) sold at retail stores or bought over the internet will seldom eradicate an existing termite problem.

Q: How do I choose a pest control company? Why is there such variance in price?

A: These are complex questions. The company should be licensed by the Kentucky Department of Agriculture. Membership in the Kentucky Pest Control Association and/or National Pest Management Association suggest the company is an established firm with access to technical and training information needed to do the job correctly. As with any service company, references are invaluable. Consider calling at least 2-3 companies. Requesting inspections and estimates from more than one company will help verify the existence of a termite problem and allow you to compare services. Companies offer different types of treatment methods and warranties. If termites happen to return, most will retreat the affected areas at no additional charge. A smaller percentage of firms also will repair damage occurring subsequent to their treatment, although dating onset of termite damage is a hard thing to determine. In some cases, no warranty will be offered if wells, cisterns, sub-slab heating ducts, drainage systems, or inaccessible crawl spaces make it impossible to treat in accordance with industry standards.

Take your time when selecting a company. Termites damage wood slowly; the amount of damage caused by taking an additional day, week, or month to make an informed decision is insignificant. Avoid firms that try to pressure you into signing a contract immediately with Aspecials@ or scare tactics. The overall quality of a termite job depends less on the sales person than on the technician who does the work. A safe and effective treatment requires an experienced technician, not someone who was hired a few weeks ago.

Q: Which treatment methods and products are most effective?

A: Another challenging question. There are two general categories of termite treatment, liquids and baits. Soil-applied liquid termiticides have been around for decades. Their purpose is to provide a long-lasting chemical barrier that excludes termites in the ground from entering buildings. In most cases, termites in the structure die off as well since they cannot return to the soil. Most former products were *repellent* rather than lethal to termites foraging in the soil. Newer materials such as Termidor⁷ (fipronil), Premise⁷ (imidacloprid) and Phantom⁷ (chlorfenapyr) are *non-repellent*, and termites tunneling into the treatment zone are killed. Overall, the non-repellent products are proving to be much more reliable in their ability to resolve problems in the first attempt. All registered termiticides (both repellent and non-repellent) can be effective, however, and homeowners should not base their purchasing decision on product alone.

The other broad treatment category is baiting. Termite baits consist of paper, cardboard, or other Atermite-friendly@ food, combined with a slow-acting substance lethal to termites. The baits are installed below ground out in the yard in cylindrical plastic stations. Others are sometimes placed indoors over active termite mud tubes. Foraging termites consume the bait and share it with their nest mates, resulting in a gradual decline in termite numbers. On some properties, baits may constitute the only form of treatment; on others, they may be combined with liquid applications to areas where termites are observed. Several baiting systems are available, including Sentricon®, Exterra™, FirstLine®, Advance™, and Subterfuge®.

Termite baiting is a *very* complex subject. A detailed discussion of the considerations in having your home treated with baits versus liquids is provided in entomology extension publications, *Entfact-639: Termite Baits: A Guide for Homeowners*. (All four of our termite-related Entfacts are posted on the entomology department website). No matter which method or product is selected, it's important to have an experienced technician, backed by a responsible pest control firm.

Q: Does the entire house need to be treated... or can they "spot treat@ areas where I see termites?

A: Subterranean termite colonies may contain hundreds of thousands of individuals foraging in many different directions. For the homeowner, localized or Aspot@ treatments are generally a gamble except in cases of re-treatment. Most reputable pest control firms will not warranty spot treatments, since it's likely that termites will eventually find other points of entry into the structure.

Some companies may offer to do a so-called "perimeter" treatment using one of the non-repellent liquid termiticides (e.g., Termidor or Premise). Typically this will involve a thorough application around the entire outside foundation wall of the building, and spot-treating any infested or high-risk interior areas. If the homeowner is considering such a treatment, they should inquire whether it will be accompanied by a service agreement in case termites return. (Service renewal agreements usually state that if termites return, the company will return and retreat the affected areas at no additional charge provided the renewal agreement is maintained.) Purchasing any treatment approach is a bit of a gamble, unless the offer is accompanied by an ongoing service agreement.

Q: How long will the treatment last?

A: All liquid termiticides are supposed to control termites for at least five years when applied according to label directions. The *actual* length of control on a given structure will depend on such factors as thoroughness of the application, environmental conditions, and density of termites in the area. Should termites persist a year after treatment, it is usually because they have exploited an untreated gap in the chemical barrier.

Q: Will the chemicals harm my family or pets?

A: Termiticides are tested extensively for adverse effects on health. Before a product can be used, numerous studies are conducted by the manufacturer and independently evaluated by the U.S. Environmental Protection Agency. Based on the current body of knowledge, registered termiticides pose no significant hazard to humans, pets or the environment when applied according to label directions. Despite the negligible health risk from a properly performed termite treatment, people with lingering concerns should consult their physician. Most of the newer liquid products have essentially no odor. Clients who are still apprehensive may want to consider having their home treated with baits.

Q: Have I been Acheated@ if termites continue to infest my house after treatment?

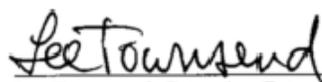
A: Not necessarily. Unlike other services such as plumbing or electrical work, termite control involves living crea-

tures. The best treatments performed by knowledgeable firms may fail at times, when termites find their way through tiny, untreated gaps in the soil. While the *intent* is to establish a continuous, impenetrable chemical barrier, this is all but impossible to achieve in actual practice. In the case of baits, it may take several months for termites to initially find the bait stations in the soil, and several months more to achieve control. The key is to hire a reputable pest control firm employing experienced, conscientious technicians. Companies will return and retreat affected area(s) at no additional charge provided the service agreement is purchased and maintained.

DIAGNOSTIC LAB-HIGHLIGHTS

by Julie Beale and Paul Bachi

We continue to receive plant samples with non-infectious problems such as winter drying on broadleaf and needled evergreens (e.g., holly, rhododendron, arborvitae) and nutritional/cultural problems on greenhouse ornamentals. A few disease problems we have seen in the past two weeks include yellow patch (*Rhizoctonia*) on fescue; damping off (*Pythium*) on lettuce; black root rot on boxwood; and bacterial leaf spot on English ivy.



Lee Townsend, Extension Entomologist

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