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KENTUCKY PEST NEWS

ENTOMOLOGY · PLANT PATHOLOGY · WEED SCIENCE

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CORN

Aflatoxins and Harvest

By Paul Vincelli

Aflatoxins, metabolites of the fungus *Aspergillus flavus*, are potent toxins and carcinogens in animals, and may also be human carcinogens. Although aflatoxin contamination in corn isn't common in Kentucky, I have received reports of some pre-harvest aflatoxin contamination in stressed corn crops.

High temperatures (highs above 90°F, with warm nights) and drought conditions during silking and grain fill favor aflatoxin contamination by *A. flavus*. Kernel injury caused by insects or other causes can lead to an increase in aflatoxin levels (Figure 1), though infection and contamination can occur even in undamaged kernels if conditions are highly favorable for the fungus.

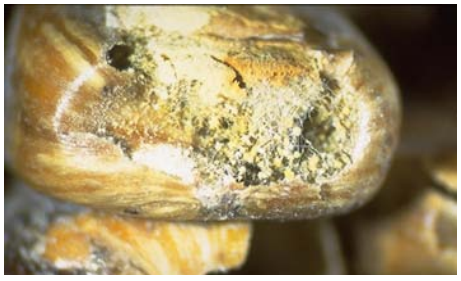

Figure 1. Sporulation of *Aspergillus flavus* in an insect-injured corn kernel.

Kernel infection by *A. flavus* doesn't occur until moisture content drops below 32%. There are various reports as to how low moisture content has to drop before growth of *A. flavus* is arrested, but contamination may continue to develop down to as low as 16% moisture.

Therefore, this may be a good growing season to harvest at 25% moisture and dry promptly. Leaving drought-stressed crops to dry in the field may allow aflatoxin contamination to continue to increase in fields where it has a "toe-hold".

More information on aflatoxins and their control is in the UK Extension Publication, *Aflatoxins in Corn*, available at http://www.ca.uky.edu/agc/pubs/id/id59/id59.pdf.

Keep an Eye Out for Diplodia Ear Rot

By Paul Vincelli

No cases of Diplodia ear rot have been diagnosed yet through the University of Kentucky Plant Diagnostic Laboratories. However, neighboring states are reporting damage.

Diplodia ear rot is distinctive because the fungal growth is generally most developed between kernels (Figure 2). Also, infections commonly (though not always) progress from the base of the ear upwards. This pattern of mold development occurs because infections first occur in the ear shank, and progress upwards into the cob and then outward into the kernels.

Figure 2. Symptoms and signs of Diplodia ear rot, on ears with differing disease severities. White fungal growth develops between kernels and may consume the entire ear.

Diplodia ear rot is favored by continuous corn, conservation tillage, and the use of highly susceptible varieties. Fields should be scouted for the disease. Fields with more than 1-2% of the ears with the disease should be considered for rotation or the use of hybrids specifically bred to have significant resistance in the next planting of corn. In field studies, practical levels of disease control have not been achieved with fungicides.

More information is available at the UK Extension publication, *Ear Rot of Corn Caused by Stenocarpella maydis (=Diplodia maydis)*, available at http://www.ca.uky.edu/agc/pubs/ppa/ppa43/ppa43.pdf.

SOYBEAN

Charcoal Rot of Soybean Expected to be Widespread

By Don Hershman

Dry, stressful conditions across much of central and west Kentucky are likely to result in widespread occurrence of the soil-borne disease, charcoal rot. Most fungal diseases of soybean are diminished when hot, dry weather prevails. Charcoal rot, however, is favored by such conditions.

The causal fungus, *Macrophomina phaseolina*, is present in all agricultural soils in Kentucky. Infection is favored by abundant soil moisture early in the season. Under such conditions, plants are infected during and shortly after emergence. In fact, 80 to100% of plants in a field can be infected within 2 to 3 weeks of planting. These infections remain largely dormant and symptomless unless high temperatures and low soil moisture coincide with plants in the reproductive stages. Charcoal rot is also more severe in weakened plants, which can result from poor soil fertility, excessive seeding rates, soil compaction, insect damage, etc. The disease then develops in the stressed soybean plants as they approach maturity.

Premature death of affected plants is a common outcome. Yield can be severely compromised by charcoal rot. However, because the disease typically occurs during drought conditions, most producers attribute low yields in dry years to lack of soil moisture and do not usually realize that charcoal rot has also taken a significant toll.

SYMPTOMS AND SURVIVAL

Leaves of diseased plants are smaller than normal and may roll during the heat of the day, wilt, and eventually die. Surface tissues of lower stems usually exhibit a light gray or silvery discoloration and stems often have a shredded appearance (Figure 3). When the surface tissue of lower stems and taproots is removed (by scraping with the thumb nail), extremely small, jet-black fungal structures called microsclerotia will be found embedded in

the diseased tissue (Figure 4). Microsclerotia are usually so numerous that they resemble charcoal dust, hence the name of the disease. Splitting the taproot often reveals dark gray to blue-black streaks within (Figure 5). Under moderate drought conditions, affected plants usually occur in patches associated with compacted areas or hills were soil is thin (Figure 6). Under severe drought conditions, large percentages of fields may show evidence of disease.

The fungus survives between seasons as microsclerotia in plant debris or in soil. Microsclerotia are very durable and cannot be eliminated from a field, but soil populations can be moderated using certain cultural practices, described below.

MANAGEMENT

Because of the widespread distribution of *M. phaseolina* in Kentucky soils, and due to the near-uniform susceptibility of soybean varieties, excellent control of charcoal rot is not possible when growing conditions favor infection and subsequent disease development. However, some success can be achieved when conditions are moderately favorable to the disease.

Rotating affected fields out of soybean (1 to 3 years) to non-host crops, such as cereals, or to crops that support reduced levels of microsclerotia in soil (compared to soybean), such as corn or grain sorghum, may help reduce charcoal rot by lowering overall soil populations of the fungus. Escape, however, is the best way to avoid serious problems with charcoal rot. If irrigation is available, irrigate fields so as to avoid water stress during the reproductive stages. Planting soybean no-till can help conserve soil moisture and encourage slightly lower soil temperatures. Avoiding excessive seeding rates and maintaining adequate soil fertility can help to maintain plant health and reduce impact due to the disease. It may also be possible to avoid charcoal rot by planting early maturity groups early in the spring. This combination may allow for the crop to miss the most stressful growing conditions in some years. According to UK grain crops specialist Dr. Jim Herbek, planting a maturity group 2 soybean in late April has the best chances of success in avoiding drought during the R1-R7 reproductive stages. However, it must be noted that early cropping systems come with additional risk for other problems, which is one reason why the combination is not more commonly used in Kentucky. Planting a late-maturity soybean late may also work in some years, but the risk of an early freeze makes this option less desirable than the former one.

When conditions are highly favorable for charcoal rot, there is often very little that could have been done to prevent serious yield loss. I encourage you to walk some of your lower-yielding fields after harvest this season and look for the tell-tale signs of charcoal rot in the remaining crop stubble. This is very easy to do as the signs of the disease (microsclerotia and streaking) are easily visible to the unaided eye. There is no corrective action that can be taken this year, but information gleaned from scouting may you make future management decisions that might lower charcoal rot risk in subsequent crops.

Figure 3. Shredded appearance of root/lower stems is common late in the season.

Figure 4. Microsclerotia embedded in infected crown tissue.

Figure 5. Interior stem streaking is often associated with charcoal rot.

Figure 6. Area of field with stunted, dying plants.

TOBACCO

Hornworms on Tobacco

By Lee Townsend

Figure 7. Tobacco hornworm.

The second brood of tobacco hornworms can be very destructive. Eggs can be laid from early August through early September with the larvae feeding through mid-September. This creates the potential for lots of feeding damage from topping time until plants are taken to the barn.

One well-timed insecticide application may reduce feeding significantly but cannot protect tobacco if a lot of egg-laying occurs over a long period of time. It is a good idea to check tobacco about a week before harvest so that a "clean up" spray can be applied if necessary. Be sure to check the harvest interval on the product you use. Cutting before this interval has passed can mean insecticide residues above the legal tolerance level.

Figure 8. Tobacco hornworm feeding damage.

FRUIT CROPS, SHADE TREES & ORNAMENTALS

Cedar-Apple and Cedar-Quince Rusts Active in Kentucky

By John Hartman

Based on conspicuous symptoms being observed in Kentucky orchards and landscapes, this has been a good year for cedar-apple rust of apples and cedar-quince rust of hawthorns. Leaves of susceptible apples are covered with orange-yellow spots and hawthorn fruits are swollen and bright orange. Cedar-apple and cedar-quince rusts, caused by the fungi *Gymnosporangium juniperi-virginianae* and *G. clavipes*, are two of three cedar rust fungi common to Kentucky. The other one is cedar-hawthorn rust. Cedar rusts are widespread this year because wet spring weather favored infection of rosaceous hosts such as apple and hawthorn from spores produced on infected eastern red cedars (junipers).

Cedar-apple rust. Rust-infected apple leaves have been quite visible for several weeks now. These leaves first became infected in spring by spores produced on gelatinous orange protrusions formed on galls in nearby cedars. Leaves are now showing bright yellow-orange spots (Figure 9) that produce spores on the underside of the leaf (Figure 10). These spores, called aeciospores, are carried by air currents to nearby cedar trees where they cause infections during moist summer weather.

Cedar-quince rust. Hawthorn fruit infection also occurred during the spring when the trees ware in flower. Like cedar-apple rust, the inoculum for these infections came from nearby rust-infected eastern red cedars. In this case, the fungus appeared in spring as a bright orange gelatinous substance on slightly swollen infected cedar twigs and branches. On hawthorn, as summer progressed, infected fruits enlarged abnormally and are now covered with small white papery tubes called aecia (Figure 11) and a dusting of orange aeciospores (Figure 12). Cedar-quince rust can also infect apple fruits, hawthorn thorns, and crabapple and hawthorn shoots, causing abnormal swelling and death of shoot tips. Like cedar-apple rust, aeciospores are carried by air currents to infect nearby cedar trees in summer.

Disease management. Cedar rust diseases need to infect two different host plants in sequence to complete the fungus life cycle. Almost two years from now, after the ongoing infection by aeciospores this summer, the cedar-apple and cedar-quince rust fungi will mature on cedar and produce more galls or swellings that will yield spores to infect nearby apple or hawthorn trees. In the meantime, infections of cedar that occurred during last year's moist summer will begin producing inoculum next spring to continue the cycle. Thus, these diseases occur almost every year in Kentucky.

- Normally, if disease control is needed, fungicides are applied to apples, hawthorns and crabapples in early spring to prevent rust infections. Cedars are not much damaged by cedar rust diseases.
- Cedar-apple rust springtime inoculum can be reduced by pruning out cedar galls or removing nearby cedar trees in winter. It is more difficult to find the cedar-quince rust infections on cedar during the dormant season, however.
- Avoid close planting of cedars and susceptible hosts like apple and hawthorn.

Figure 9. Cedar-apple rust symptoms on apple leaves (P. Bachi photo).

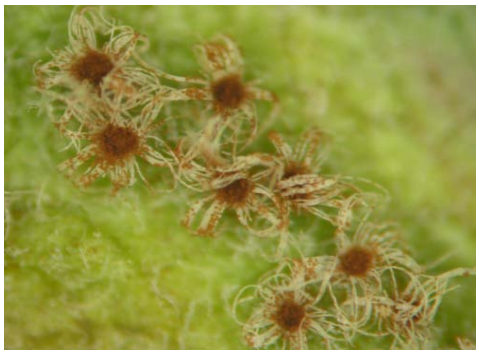

Figure 10. Cedar-apple rust aecia and aeciospores on apple leaf underside (P. Bachi photo).

Figure 11. Cedar-quince rust-infected hawthorn fruits with healthy green fruits nearby.

Figure 12. Cedar-quince rust shedding orange aeciospores on hawthorn leaf from infected fruit above.

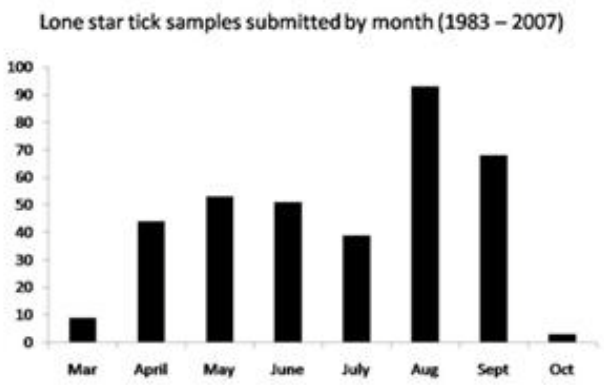

Figure 13. Lone star ticks have late burst of activity before fall.

PESTS OF HUMANS

Chiggers and Lone Star Ticks

By Lee Townsend

Chiggers and ticks can be waiting in overgrown areas where cover and small animals are abundant. The two feed in different ways but both can cause miserable itches for a week or more with little in the way of successful remedies.

Chiggers tend to attach where skin is thin, tender, or wrinkled, or where clothing is tight. They do not burrow into the dermis; instead, they insert their mouthparts into skin pores or hair follicles and release digestive fluids that liquefy the skin cells on which they feed. If undisturbed, these mites may stay attached and feed for three or four days. Chigger bites are body's reaction to this process - rash, intense itching, and misery. The fluid that oozes from the wound hardens into the cap that is a distinct a feature of chigger bite. Caps are not associated with the bites of other arthropods, such as mosquitoes. Unfortunately, chiggers are too small to be seen so it is best to assume you have been exposed to them and to take appropriate preventive action.

Lone star tick nymphs also can be encountered between now and early fall. Fortunately, the same tactics can be used to reduce chances of problems with chiggers and ticks. Frequent, careful inspections are essential for those who are in situations that expose themselves to ticks. Here are some tips: 1) Look for movement of very small, freckle-like spots on clothing and skin – they may be seed ticks. The larger nymphs and adults are much easier to see. Wearing light clothing, especially pants, will make them easier to spot. 2) Avoid overgrown areas along trail edges or woods – ticks are more likely to occur there. 3) Use repellents or clothing treatments with permethrin when in areas where ticks are known to be active.

First aid for chigger and tick bites include application of over-the-counter anti-itch medication (hydrocortisone, Calamine lotion, etc,) or physicians may recommend oral Benadryl or a prescription strength steroid cream. Avoid scratching the bites to reduce the chance for infection of the wound.

LIVESTOCK INSECTS

Cattle Grub Treatments

By Lee Townsend

Grubs damage muscle tissue along the back line of cattle and cut holes in the hide to breathe. The results of their handiwork aren't visible until

February or March but now is the time for applying the preventive treatment that will keep them under control.

Kentucky cattle should be treated for grubs between July 31 and October 15. During this period the grubs are very small and vulnerable. Animal complications can occur if treatments are applied later, when the grubs are in esophagus or spinal cord tissue.

Use care when treating for cattle grubs. Accurate animal weights allow economical and effective treatment. Over- dosing wastes money and may cause animal stress while under-dosing may result in unsatisfactory control.

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