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CORN

Harvesting and Storing Kentucky's 2009 Corn Crop

By Sam McNeill, Extension Agricultural Engineer and Paul Vincelli

USDA's mid-September crop report[1] predicted record level corn yields for Kentucky of 155 bushels per acre. Coupled with increased acreage, the state's production could top 175 million bushels, which is also a record. However, a potential 'fly in the ointment' with this year's crop is the delayed harvest coupled with damp weather which has led to stalk, ear and kernel rots. As noted in previous news stories, potential problems with field fungi (Diplodia, Gibberella, Fusarium, etc.) have lead to concerns about subsequent storage. While not all fungi produce mycotoxins, mold-damaged kernels are more susceptible to those that do. So it is best to err on the side of caution and check corn lots with field mold for mycotoxins before feeding to livestock.

When harvesting mold-damaged corn, adjust combines to minimize mechanical damage so that sound kernels are protected and to maximize cleaning, so that lightweight kernels are removed. Harvest, handle and store damaged corn separately when feasible and market early to reduce demands on storage management.

Grain moistures above 18-20% favor the growth of field fungi and the longer corn remains in the field the greater the chance of mycotoxin production. Thus, damaged corn should not be allowed to dry in the field to avoid drying costs. Corn with light damage should be dried to 15% within 24 hours after harvest and cooled to 40 degrees as soon as weather permits, in order to control mold growth during storage. This will create a storage environment within the grain mass that is below 65% humidity, which is dry enough to control mold growth and development (see values in the equilibrium moisture table). Corn with heavy to moderate damage should be dried to 13 to 14%, respectively, cooled as quickly as possible and moved before March.

The table on the next page presents the equilibrium moisture contents for shelled yellow corn at different temperature and relative humidity conditions. Example: Corn that is 40 degrees and 13.7% moisture will create a relative humidity of

[1] http://www.nass.usda.gov/Statistics_by_State/Kentucky/Publications/Agri-News/sep128.pdf

55% within the grain mass, which is safe for storage.

Temperature °F	Relative Humidity, %				
	45	55	65	75	85
	Corn Moisture, %				
40	12.2	13.7	15.3	17.2	19.6
50	11.6	13.1	14.7	16.5	18.9
60	11.1	12.5	14.1	15.9	18.3
70	10.6	12.0	13.6	15.4	17.7

If mycotoxin problems are suspected, check with crop insurance providers to see if adjustments may be needed and how to account for the areas that are impacted. Insurance adjustments generally need to be made on standing corn at or before harvest.

The following publications provide more information on vomitoxin, aflatoxin and grain testing labs:
http://www.ca.uky.edu/agc/pubs/id/id121/id121.pdf
http://www.ca.uky.edu/agc/pubs/id/id59/id59.pdf
http://www.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-MISC-1.pdf

SOYBEAN

Cercospora Leaf Blight More Extensive than Usual

By Don Hershman

Considering the cool, wet, and late year we have just experienced, it should not come as a surprise to anyone that certain late-season soybean fungal diseases are more extensive than usual. In a more typical year, crops that mature in late summer, especially early maturing varieties planted early, tend to experience the most intense foliar, stem and pod fungal disease pressure. This is because those crops are filling pods and maturing at a time when conditions tend to favor disease development (hot and wet). Normally, doublecrop and other late-planted crops are less susceptible to late-season fungal diseases because they mature in September-mid-October when conditions tend to be dry. Not this year!

Every year we have copious amounts of pod and stem blight and anthracnose (Figure 1). However, these diseases usually come in late and tend to be superficial. As a result, they often look more damaging than they really are, as long as affected crops are harvested in a timely manner. If crop harvest is significantly delayed, however, the diseases can impact seed quality (especially pod and stem blight). Just looking around, I do not get the sense that either anthracnose or pod and stem blight are especially problematic despite the season. But a wet October will delay harvest in many fields and this could result in a range of problems, including reduced grain/seed quality.

Figure 1. Typical symptoms of late-season pod and stem blight and anthracnose.

Figure 2. Cercospora leaf blight (CLB).

The disease that seems to have been impacted the most this season is Cercospora leaf blight (CLB). CLB, caused by the fungus *Cercospora kikuchii*, is usually first noticed by producers when the upper leaves in the canopy begin to turn yellow, often with a bronze tint (Figure 2). A close inspection of affected leaves reveals very small, dark lesions that are frequently on or near major leaf veins and on petioles (Figure 3). "Bronzing" is the result of a multitude of lesions that have coalesced. When symptoms are severe, the upper surface of affected leaves has a puckered, leathery appearance (Figure 4). Severely affected leaves are

Figure 3. CLB close-up.

Figure 4. Advanced CLB, just prior to defoliation.

blighted and eventually drop off the plant. Blighting of upper canopy leaves was rapid in some fields this year due to the unusually wet late-season conditions. Some producers suggested that the visual impact was akin to frost injury or "sunburn".

Figure 5. Pod purpling and purple seed strain (Ohio State University photo).

Pods are also commonly infected and both pods and seed can have purplish discoloration (Figure 5). The purplish discoloration of seed is known as "purple seed stain". Extensive purple seed stain can reduce grain marketability, and planting severely infected seed can result in stand reductions in subsequent soybean crops

The pathogen produces a light-activated plant toxin called cercosporin. Cercosporin is red, which accounts for the tendency of diseased tissue to develop a purplish discoloration. The toxin causes plant cells to rupture and die. This is what causes most the symptoms we see.

The impact of CLB is highly variable and can range from no significant impact to substantial yield and grain/seed quality reductions. The foliar phase of the disease contributes the most to yield loss when the disease is extensive. The time of disease onset relative to crop growth stage, and the speed with which the disease develops, are the key factors that determine crop impact. If blighting occurs while pods are filling, then significant yield loss can be anticipated. However, if pod fill is mostly complete prior to the onset of blighting, than damage will be minimal.

In most years, in most fields, CLB is a minor problem. Past experience and observations suggest that most commercially available soybean varieties have at least some resistance to CLB in spite of limited breeding efforts targeting the disease. However, no varieties are immune. Fungicides can reduce CLB, but no fungicides are highly effective. In general, strobilurin fungicides do a slightly better job than triazoles or thiophanate-methyl. Also, single applications applied at the R5 (beginning seed) growth stage tend to perform better than applications made at the R3 (beginning pod) stage. Of course, multiple applications perform better than single applications, but even then, results are marginal.

FRUIT CROPS

Reducing Overwintering Apple Scab Inoculum

By John Hartman

The 2009 Kentucky growing season, cooler and wetter than normal, was exceptionally favorable for apple scab disease (Figure 6), caused by the fungus *Venturia inaequalis*. Some apple orchards were left unprotected during wet periods suitable for infection when fungicides could not be applied due to wet conditions or when fungicides were washed off the foliage by rain. Thus, despite well-intentioned disease control efforts (Figure 7), some apple orchards had significant scab on leaves and fruit (Figure 8) by season's end. Scab left on leaves this autumn will overwinter and produce primary inoculum of the fungus to start next year's disease cycle.

Growers with scab in the orchard now will want to assess the damage and take actions that will reduce scab disease pressure for next year. The scab fungus overwinters in infected fallen leaves left from the previous season. In Kentucky commercial orchards, most of the spores that can start an apple scab epidemic come from within the orchard, however, unsprayed apple and flowering crabapple trees growing nearby can also be a source of inoculum. Because scab spores don't travel very far, the risk of scab infection early in the season can be greatly decreased by reducing or eliminating any old infections in apple leaves on the orchard floor.

Research done in many apple growing regions has shown that either flail-mower chopping of fallen leaves or application of urea will significantly reduce apple scab spore production the next year. Doing both leaf chopping and urea application will reduce scab inoculum even more. After a moist 2009 growing season, Kentucky apple growers

could benefit from reducing scab inoculum harbored in apple leaf litter. Leaf shredding and urea applications are relatively inexpensive and reliable sanitation methods that will decrease the risk of apple scab in 2010.

Chopping and shredding leaves. Shredding all leaves on the orchard floor after they have fallen in November is thought to reduce the number of scab spores by more than 50%. Scab spore reduction is less if the flail mower cannot reach into the strip between the trees. The smaller the leaf pieces that are left behind, the more easily they will become decomposed and the more likely they will be consumed by earthworms. Even leaf shredding done in March or April can have some beneficial effect. In springtime, the scab fungus has begun to grow and prepare to release spores into the air at about the apple green tip stage. If shredding is done in early spring, some of the leaves and leaf pieces will be overturned and the spores formed on overturned leaves won't be easily released into the air.

Urea treatments. A 5% solution of urea (46-0-0 spray urea or greenhouse grade) in water (40 lb urea per 100 gallons of water) may be applied to apple trees in the coming weeks just before leaves begin to fall. This should be done as late as possible, within a week of leaf fall, so that translocation of urea into the tree can be avoided, but early enough to have most of the leaves still on the tree. Urea inhibits the development of apple scab fruiting bodies on the fallen leaves and also hastens leaf decomposition. Trees sprayed with urea will tend to defoliate more quickly than unsprayed trees. Urea can also be applied to the leaves on the ground, after all the leaves have dropped. For good coverage, apply about 100 gallons per acre. An air blast sprayer with only the lower nozzles turned on can be used, but field boom-type sprayers will likely provide better coverage. The ground spray can also be done in the spring, two to four weeks before bud break. Feed grade urea can be substituted for urea fertilizer; it is more expensive, but will dissolve more easily in the spray tank. Be aware that urea treatments can supply about 20 lb actual nitrogen per acre, so seasonal fertilizer rates will need to be adjusted appropriately. Leaf chopping and urea application combined will reduce scab inoculum more than either alone.

Reducing scab inoculum now will make apple scab disease easier to manage next spring and summer. Reduced disease pressure next year will make it more difficult for the fungus to develop resistance to fungicides.

Figure 6. Apple leaves heavily infected causing leaf scab and yellowing symptoms.

Figure 7. Apple orchard air blast sprayer used for applying fungicides for scab control.

Figure 8. Immature fruit and leaf with apple scab disease symptoms.

PESTS OF HUMANS

Fall Floaters

By Lee Townsend

Floating threads or pieces of white cottony material can fill the air in the fall. Woolly aphids or spiders may be riding along on them. For example, the wooly alder aphid is common on silver maple and alder. These sap feeders produce large amounts of honey dew, which may cover the foliage and branches of infested trees. Parts of the plant may become black from the sooty mold that grows on the honeydew. Heavy infestations can cause the ground under silver maple to be littered with the white, waxy threads

Ballooning of spiders also can produce "floaters" in the air. "Ballooning" is a means of aerial dispersal that can be used by several spider species. These floating silk strands (often 2 feet or greater in length), sometimes called "gossamers" are an ethereal sight on a sunny fall afternoon but they can cause concern at a time when anything out of the ordinary is seen in the air.

Ballooning spiders will move to the tops of vegetation or other high spots, stand on their "tiptoes", and release silk from the spinnerets at the end of their abdomen. When long enough, the silk will be captured by a breeze and the spider will be lifted into the air for a flight that can reach several hundred feet in the air and carry the 8-legged aeronaut several miles. Large numbers of spiders can be afloat at the same time, filling the air with silken strands that waft and twist gently in the breeze. They can catch on tree limbs, fences, or any other objects.

Ballooning activity occurs on warm days following cold nights. This sudden rise in temperature creates updrafts that provide ideal conditions for liftoff. This pattern has occurred over the Commonwealth and floating strands can be seen most anywhere.

Several families of spiders that are common in Kentucky are known to use silk to disperse. Some of the more common groups are wolf spiders, line weaving spiders, dwarf spiders, jumping spiders, and crab spiders. This mode of transport can be used by young spiderlings or adult males and females. It may be possible to find the spider on the silk.

Mites in Hay

By Lee Townsend

Straw itch mites have been the suspected culprits in two incidents of dermatitis this fall following exposure to baled hay. They are very small (about 6 to 9/1,000 inch long), even for a mite. While the odds of seeing them are essentially zero, the memory of an encounter can last a long time. The diagnosis is based upon the circumstances of the incident and human reaction. Usually, these are rare incidents but the potential for encounters increases following cool summers with above normal rainfall, such as the one that just ended. Suspected mite encounters also were reported in 2004.

Itch mite bites are painless at the time but become noticeable in a few hours. Proteins, injected as the mites feed on their normal arthropod hosts, can cause mild to severe skin reactions. Itching typically is noticed from 2 to 12 hours after exposure, by then the mites are gone. Skin reactions can include lesions and small, solid, raise areas that may have white tops. They most often occur on the back, abdomen, and around the waist. These disappear in a few days, with or without therapy. Oral antihistamines and topical anti-itch creams have been reported to be useful in alleviating the discomfort caused by the bites. In most cases the bites clear in one to two weeks. Persons with prolonged discomfort should see a physician.

These tiny mites can live in pasture grasses where they live as external parasites attached to the myriad of small creatures that live there. Their numbers are greatest in years where weather conditions, especially above-normal rainfall, favor a wide range of insects. That means more food for the mites and large populations. Human encounters result from handling hay, sitting on infested bales, or even just spending time in tall, unmowed grassy areas. People handling square bale hay can unknowingly pick get bitten by the mites. Also, people picking up a few bales to mulch gardens or yards, or making decorative Halloween displays can find themselves

itch mite victims. There is no way to evaluate bales for the presence or absence of mites and no good control alternatives for mites in infested bales.

People working with hay / straw may gain some protection by using a repellent, such as deet, and by a thorough washing with soap and water immediately after possible exposure. There is no evidence that the bites transmit disease, and there is no indication of person-to-person transmission of the mite.

DIAGNOSTIC LAB HIGHLIGHTS

By Julie Beale and Paul Bachi

Recent agronomic samples in the PDDL have included Cercospora leaf blight, purple seed stain, downy mildew and Asian soybean rust on soybean; and hollow stalk on tobacco.

On fruit and vegetable samples, we have diagnosed Phytophthora fruit rot on fig; anthracnose and common [bacterial] blight on bean; late blight and Septoria leaf spot on tomato; Rhizoctonia root rot and southern blight on beet; Cercosporella leaf spot and Rhizoctonia root rot on mustard; and Phytophthora root rot on turnip.

On ornamentals and turf, we have seen Pythium root rot on poinsettia; rust and powdery mildew on goldenrod; black root rot on holly; Phloeospora leaf spot on mulberry; Dutch elm disease on elm; powdery mildew on tuliptree and crape myrtle; anthracnose, bacterial leaf scorch, Phyllosticta leaf spot and Verticillium wilt on maple; Actinopelte leaf spot and bacterial leaf scorch on oak; Rhizosphaera needlecast on spruce; and rust on bluegrass.

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