Number 928  
August 6, 2001

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**SOYBEANS**

**SOYBEAN DISEASE UPDATE: SDS AND FROGEYE LEAFSPOT ON THE MOVE**

by Don Hershman

Early last week we received several soybean sudden death syndrome (SDS) samples from Daviess, McCracken, McLean, Webster Counties. It is likely that new incidences will be reported this week. It is too early to be able to predict how extensive and damaging SDS will be in Kentucky this season. There were numerous reports of very early-planted crops this spring and this is known to encourage SDS. Time will tell if early planting has, in fact, “set-up” some crops for more extensive SDS than others. SDS has also been associated through the years with soybean cyst nematode (SCN) infestations. Thus, serious SDS may indicate an underlying SCN problem. Finally, SDS is frequently first evident in poorly drained and/or compacted areas of fields. This is most likely related to the soil moisture requirements necessary needed for root infection by the SDS pathogen, Fusarium solani. f.sp. glycines.

SDS is evident in plant foliage as random yellow blotches between the veins that progress within a week or so to dead tissue between the veins, with the veins remaining green. Diseased leaves on the upper part of the plant tend to roll up and may eventually fall off the plant. Many times the leaflets fall off, but the petiole remains attached to the stem. Usually, it is easy to find leaves on plants with the...
whole spectrum of SDS symptom expression. Foliar symptoms are caused by one or more plant toxins produced by the causal fungus, which is restricted to root tissue. Infrequently, virus-like foliar symptoms may precede the formation of leaf spots. This symptom may be the result toxin activity on expanding leaf cells.

SDS is primarily a root rot disease. Roots are infected in the late seedling and early vegetative stages. Roots then rot throughout the vegetative period and into flower and pod production. A milky, gray-brown stem discoloration is also diagnostic of SDS. Foliar symptoms usually become evident in the early to mid-reproductive stages. Usually roots are extensively deteriorated by the time foliar symptoms become evident. At this stage of the disease it is common to see pin-point areas of bright blue on rooted root tissue. These areas are masses of *f. solani* f.sp. glycines spores and this is another diagnostic feature of SDS.

Thus far, most of the affected plants we have seen have been at early pod formation to mid-pod fill. The amount of yield loss caused by SDS in a plant is heavily influenced by the stage of pod development when foliar symptoms become severe. If symptoms never progress past the mild stage (which is often the case), then little yield loss will be experienced. Severe yield losses are almost always associated with defoliation and pod abortion during early pod development (i.e., R3 stage or before). It is my experience that more times than not, SDS comes in too late to cause heavy yield damage. However, this is not always the case and I have seen almost total yield loss due to SDS.

The bottom line is this: If foliar symptoms are widespread and severe in a field prior to the mid-pod fill stage of development, then the likelihood that serious yield damage will occur is very high. In contrast, if the same level of disease exists in a field after mid-pod fill, then expect direct damage to be minimal. I say “direct loss” because even late SDS symptom expression will result in some indirect losses. Specifically, plants that are prematurely killed by SDS are prone to infection by pod and stem blight fungi and shattering. These situations have to do with the fact that prematurely-killed plants cannot be harvested until the rest of the field is ready to be harvested. As a result, prematurely-killed plants are left standing in fields longer than is desirable and, thus, experience problems normally associated with delayed harvest.

The key to yield loss due to SDS is timing, incidence and severity of foliar symptom expression. I have seen fields that began to express severe and widespread SDS foliar symptoms at full-pod, and some of those fields produced near-record crops. But, in most of those cases, the fields looked very, very rough and a casual observation would have not produced thoughts of record crop yields. If SDS is severe at this time, the only management decision that will have a positive impact on yield loss will be to harvest the affected field as soon as possible. This recommendation has to do with minimizing the effects of indirect losses due to SDS. More significant SDS management issues must be implemented at planting or before. I will discuss SDS avoidance strategies in a future KPN article.

Thus, the other disease situation that has recently been brought to my attention is that of frogeye leaf spot caused by the fungus, *Cercospora sojina*. Apparently, this foliar disease is severely impacting some fields in the southern tier counties, especially Simpson County.

Frogeye is evident on foliage as small, roughly circular leaf spots with a buff center and a purplish margin. A large number of leaf spot will give the foliage a blighted appearance. Over time, the centers of many of the leaf spots will drop out and the result will be a “shot-hole” symptom, which gives the affected crop a very tattered appearance. Stems, pods and seed can also be attacked by *F. sojina*, but the primary symptom is leaf spotting. The literature suggests that most soybean varieties commonly grown in the mid-south probably possess some resistance to frogeye leaf spot. This is probably why we do not see this disease more frequently. Occasionally, a highly susceptible variety is grown and, when the weather cooperates (i.e., a period of warm, wet weather which supports fungus spore production, and infection of soybean tissue), severe disease ensues.

The University of Tennessee Jackson has done an extensive amount of research on frogeye leaf spot over the years. One thing that becomes very evident to me when looking over past year’s research data, is how much frogeye soybean can take before serious yield loss becomes evident. For example, in a 1992 study, plots sprayed with two applications of the fungicide Tonsin-M were rated as having 3-4%
leaf surface area diseased and a yield of 60.8 bu/ A.
In contrast, the non-sprayed check plots had 40-50% of its leaf surface area diseased, but the yield was still a respectable 51.2 bu. That is a 9.2 bu difference, which is a very significant yield loss; nonetheless, I would have expected an even greater yield loss based on the amount of disease present in the check plots. Apparently, soybean has a tremendous capacity to compensate for loss of leaf tissue. As with SDS, I am certain that the soybean stage at the time symptoms become severe has a great influence on the amount of yield loss due to frogeye leaf spot.

In the above example, the check plots had 11-25% diseased leaves on September 4. The reports that I have received from Simpson County this year indicate that diseased plants may already be at the 50% leaf surface area diseased or even greater. Considering that we are only in the first week of August, this might indicate a greater-than-normal possibility of serious yield loss in some Kentucky soybean fields. I hope this extent of frogeye is rare.

In any event, it is much too late in heavily diseased soybean fields to do any good by treating crops with a foliar fungicide. Several fungicides are labeled for use in managing frogeye, but those fungicides are all preventative in nature. Once serious disease is evident in a field, the damage is done and the materials will have little or no economic value. Generally, two applications of most fungicides are required to give excellent control of frogeye leaf spot. However, there are data from Tennessee which indicates that a single application of Tonsin-M or Benlate during mid-pod fill can result in significant yield improvement when compared with non-sprayed plots. Logic assumes, however, that this situation would be null and void if serious disease already exists at the time a fungicide application is made. Certain doublecrop fields may be early enough in development and disease progress to benefit from a fungicide application. However, because of the reduced yield potential of most doublecrop soybean fields, there is a question if any fungicide treatment would be economical. This comment is based on the current low price of soybean, the rather high cost of treating fields, and the low probability that most fields will be impacted by frogeye leaf spot because of the "built in" resistance factor. If you do consider fungicide application an option, please note that Quadris and various formulations chlorothalonil (e.g., Bravo) are also labeled for use on soybean foliage in addition to Tonsin-M and Benlate, which were mentioned above.

SOYBEAN APHID ACTIVITY IN KENTUCKY
by Doug Johnson

The soybean aphid (Aphis glycines) was found in several north central states, as well as Kentucky, during the 2000 growing season. This pest is potentially very important to all the soybean producing areas of the US. Extension and research entomologists at the University of Kentucky have been watching the progress of this aphid and conducting research on its possible effects in our state. Additionally, we have been cooperating with a working group in the North Central states which is monitoring the spread of the pest and developing management information and guidelines. While in Kentucky we do not currently have a problem with the soybean aphid, it is present in the state and we need to continue to watch for outbreaks.

The soybean aphid is very small. Those of you that have experience checking wheat for aphids in the fall, have some notion of the size and shape of this pest. However, soybean aphid is smaller than any of the grain aphid species. It is tear drop-shaped, and pale to bright yellow with a pair of black cornicles (tail pipes) sticking out the rear of the insect. On newborn aphids only the tips of the "tail pipes" will be black. As the aphid ages, the entire structure will be distinctly black. These aphids live in colonies, so where you find one, usually you will find several. There are no other aphid species that develop colonies on soybeans in North America, so if you find a colony you almost surely have soybean aphid.

We do not know exactly what to expect from these insects because they have never been in our fields before last year. We believe that in any given planting the aphid populations will peak sometime before pod set. If the population is large enough to make any difference in yield you will not have any trouble finding them. In heavy infestations the population will be far more than 1,000 aphids per plant. Some recent research work in Michigan found several million aphids per plant on severely damaged plants.
If you would like to keep up with the information that is being generated on this aphid please view the following web page:

http://www.pmcenters.org/Northcentral/Saphid/Aphidindex.htm

This page is sponsored by the North Central states and Kentucky. Information on aphid distribution, and a good fact sheet are available for you to view. Additionally, there are some links to very good newsletters and research information. This is a brand new system so there are a few “bugs’ to work out yet. But you will get a good overall view of what is going on.

If you would like to survey some fields in your area you may download a standard survey form from this site. You will not be able to submit your information directly to the program. In order to ensure that appropriate data are submitted only one person in each state can input data. In Kentucky that is Dr. Doug Johnson (ME!) If you find aphids on soybean in your county please send me a sample. Put the aphids in alcohol and send the to:

Doug Johnson
P.O. Box 469
Princeton, KY 42445
Please include the data sheet with as much information as possible

In summary we have the following situation:

- The aphid is present in Kentucky.
- It occurs in scattered spots throughout the KY soybean growing area.
- The aphid generally has been found only in small numbers.
- The infestations are probably the result of winged adults moving into and across the state.
- The aphid is very small so it will probably only be found by the very observant or when populations reach very large numbers.
- Due to its small size the aphid will likely be misidentified. It can easily be confused with both mites and thrips. You need a hand lens or microscope for positive identification when there are just a few individuals.

If you find the aphid don’t panic. It will take very large numbers to make any difference on yields. If you find the aphid please let me know.

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**ALFALFA**

**PESTS OF FALL SEEDED ALFALFA**

by Lee Townsend

Several insects feed on fall-seeded alfalfa, and if numerous and unnoticed, may produce significant stand loss. The most common culprits are fall armyworms, grasshoppers and crickets but Mexican bean beetles and spotted cucumber beetles (southern corn rootworm beetles) can get in on the action. Regular inspection of new seedings will allow early detection of pest problems, assessment of damage, and treatment, if necessary.

Fall armyworm infestations will tend to be clumped and intense because each female can lay 100 or more eggs in a mass. The small larvae will move out from this focus as they grow and eat all of the nearby plants. Look for roughly circular areas of missing plants. Examine the soil surface for the striped larvae. If needed, spot treatments can be used to deal with the problem.

Grasshoppers and crickets can graze off small seedlings. Damage may appear at the edge of the field and progress across it. These insects will move readily so feeding should over a wide area. Mexican bean beetles and spotted cucumber beetles also may move in and feed. Their activity should be spread over the field, as well.

Evaluate injury carefully. Low rates and spot treatments with an insecticide labeled for alfalfa may be all that is needed to deal with pest activity. See ENT-17 for control recommendations.

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**FORAGE CROPS**

**GRAY LEAF SPOT ON FOXTAIL MILLET**

by Paul Vincelli

A severe case of gray leaf spot was diagnosed on German foxtail millet in Western Kentucky. This is a disease that shows up often on foxtail millet being grown under warm, humid conditions. The disease is confined to the leaves, where small, brown leaf spots develop. These leaf spots tend to be more numerous towards the leaf tip than lower parts of
the leaf blade. As the spots expand, they develop a gray center. The spores of the fungus that causes the disease are spread by wind currents. Gray leaf spot will continue to develop in these crops if weather continues to be favorable. When severe disease develops (one third or more of green leaf tissue is dead or highly diseased), cut the crop for hay before continued loss of quality occurs.

**SHADE TREES & ORNAMENTALS**

**LANDSCAPE PLANT DAMAGE CAN BE CAUSED BY EXCESS WATER**

by John Hartman

High rainfall levels during July and early August which result in high soil moisture levels may cause symptoms to appear on some landscape plants. Prolonged soil saturation and flooding which has been occurring in some regions of Kentucky would reduce soil oxygen levels, causing roots to function abnormally, thus stressing plants.

It has been our experience that when excess soil moisture is present in landscapes due to frequent, heavy rainfall, landscape plants can show symptoms of damage caused by excess water. Extension agents, landscape professionals and homeowners can be looking for symptoms which may include:

- chlorosis - particularly on plants such as flowering crabapple that don't normally get chlorosis from iron deficiency;
- edema - many plants such as day lily, euonymus, holly, and spruce can show edema;
- red or purple coloration - euonymus and kousa dogwood sometimes show this, but be aware that flowering dogwoods with powdery mildew may also show purple coloration;
- marginal leaf browning or sunscald - can occur on some plants, but we are now getting into the bacterial leaf scorch season, so don’t mistake flooding symptoms for bacterial leaf scorch;
- wilt - sometimes the wilt is associated with Phytophthora root rot, but excess water alone can cause wilt;
- twig dieback - canker-causing pathogens, active on flood-stressed plants, can be involved; and
- plant death - Phytophthora root rot, especially on hemlock, taxus, and rhododendron is likely to be associated with excess soil moisture.
- Epinasty (downward bending of leaf petioles), stem swelling, and leaf drop are also symptoms of excess water damage to plants.

Some trees and shrubs show symptoms or die if only flooded for a few days during the growing season. Local short-term flooding and soil saturation have certainly occurred in many instances these past two weeks in some low-lying areas in Kentucky.

Roots in flooded or waterlogged soils often die of anoxia (oxygen deficiency). In flooded soil, plant roots and microorganisms use up the available oxygen while adding to a buildup of carbon dioxide. As redox (chemical reduction and oxidation) potential decreases due to low oxygen levels, some mineral elements may be reduced to toxic forms. In addition, a variety of toxic organic substances can form in the soil. The metabolism of the tree is changed and adversely affects the tree by using energy less efficiently, producing toxic byproducts, inadequately taking up water and mineral elements, closing stomata, and depressing photosynthesis and translocation.

After the soil drains, plants with killed roots may subsequently suffer drought stress and death. For many of these plants, the only functioning roots are near the soil surface, and when dry weather follows wet, those surface roots quickly dry out. Plants enduring a flooding episode may also become abnormally susceptible to Phytophthora root rot or collar rot. Excess water promotes susceptibility of roots to this disease and aids the fungus in moving to new infection sites during its swimming phase. So, if the roots don’t die of anoxia, water molds such as Phytophthora are waiting for their turn to kill the plant by causing root and collar rot.

**GIANT CATERPILLARS ACTIVE NOW**

By Lee Townsend and Ric Bessin

Several large caterpillars can be seen in late summer. Often they are caught as the crawl across lawns in search of a pupation site. The common ones being sent in to us now are the cecropia caterpillar and the hickory horned devil. Both are spectacular, neither is harmful.

The cecropia moth caterpillar takes most of the summer to mature and is up to four inches long when fully developed. They are bluish green and there is a pair of yellow projections along the back on each body segment. The first three pairs are
yellow balls with black spines. Cecropia caterpillars feed mainly on cherry, plum, apple, elderberry, box elder, maple, birch and willow, but will also feed on linden, elm, sassafras and lilac.

In early fall the mature caterpillar spins a spindle-shaped cocoon which is about three inches long. The cocoon is attached along its full length to a twig on the host tree. Inside the cocoon the caterpillar changes to a pupa, the life stage in which it spends the winter.

The hickory horned devil is the largest of the silk moth caterpillars, commonly reaching five inches in length. The long barbed horns on the forward end of the body make the caterpillar look intimidating but it is entirely harmless to humans. These rotund caterpillars feed on hickory, sumac, sweet gum, lilac, persimmon, ash and beech. They pupate in the soil.

Information on these and other impressive caterpillars is available in Entfact 008 Saturniid Moths. Color pictures of many can be seen on our web site at - www.uky.edu/Agriculture/Entomology/entfacts/misc/

FOREIGN GRAIN BEETLE ALERT
by Mike Potter

“I keep seeing tiny, brown beetles crawling along windows, walls, and floors of my new home. I spray the ones I see, but they keep coming back. What kind of bugs are these and how do I get rid of them?” These are the questions typically asked by clients who have foreign grain beetles, especially when the calls come in late summer (August-September). This year the beetles have begun to appear earlier than normal.

Foreign grain beetles are very small (about 1/16-inch long), brownish, and are often mistaken for flour beetles or other stored product insects. The key characteristic to look for in identifying this beetle is the presence of a slight projection or knob on each front corner of the segment directly behind the head. A microscope or good quality hand lens is necessary to see this character (See Entomology Entfact-610, Foreign Grain Beetle).

Foreign grain beetles are frequently a problem in new houses (less than 5 years old). These beetles are one of a group of beetles called “fungus beetles” that feed on the molds and fungi that grow on poorly seasoned lumber or wet plaster and wall board. If they are found infesting flour, grain, or other stored products, the products are generally moldy or in poor condition. When new homes are built, damp wood is often covered with molds or mildew which attracts the beetles. The beetles are also attracted to accumulations of sawdust trapped behind walls during construction. Eggs are laid on this food material and the larvae develop on the surface fungi. The adults usually become a problem in late summer when they move out of wall voids and are attracted to windows and lights. Foreign grain beetles can also be associated with plumbing leaks, condensation problems, or poor ventilation.

There is no fast or easy way to get rid of foreign grain beetles. Control is difficult because the breeding source of the beetles is sealed up within the walls. The ultimate solution is time and patience. Most new homes dry out naturally within the first few years, and the fungi and molds disappear along with the beetles. Drying time can be enhanced by increasing ventilation, e.g., by use of fans and air conditioning. A vacuum cleaner can be used to remove beetles emerging from hidden locations. Pest control companies may be able to provide additional relief by locating the infested wall areas or source of dampness (usually next to where the beetles are most abundant), and injecting residual aerosols or dusts into cracks and crevices along baseboards and into the wall voids.

If the homeowner can tolerate the emergence of the adult beetles during August-September, the problem will usually resolve itself. Most newly-built houses cease to have problems after a few summers. Some comfort can be taken in the fact that foreign grain beetles are only a nuisance by their presence, i.e., they do not bite or damage wood, fabric or stored food in sound condition.

LIVESTOCK

JULY 31 - OPENING OF CATTLE GRUB TREATMENT SEASON
by Lee Townsend

Application of a cattle grub treatment is one of the
Kentucky CPH requirements. Cattle grub damage to muscle and hide requires extra trimming of carcasses and decreases the value of hides. Grubby carcasses are routinely docked by packers.

Cattle grub control is a part of producing quality steers for the feedlot. While the damage (cysts or swellings long the back line) will not show up for several months, control measures must be applied to Kentucky cattle between now and October 31 to kill the pests without harming the animal.

**Host Reaction to Cattle Grubs**

Depending upon the species, cattle grub larvae move either to the esophagus (common cattle grub) or spinal column (northern cattle grub) during their migration to the back. The grub larvae are in these sensitive areas during November and December. If large grubs are killed there, the surrounding tissue can become severely inflamed and additional symptoms can develop.

In animals infested with the common cattle grub, the esophagus can swell shut, and produce difficulty swallowing, drooling, or bloat. Northern cattle grubs killed in the region of the spine can put pressure on the spinal column. This results in stiffness in the hind quarters, loss of balance, or inability to lift the hind feet.

Be careful when treating for grubs. Use accurate weight estimates to determine the proper dose. Undertreating may not provide satisfactory control. At best, overtreatment will waste money; at worst, it may cause the animal to become sick.

There are a variety of formulations of cattle grub insecticides. Pour-on or Spot-On products are convenient if good handling facilities are available. High pressure sprays are an alternative when chutes or working pens are not an option. Animals must be wet to the skin when high pressure sprays are used. Products for internal parasite control, such as Cydectin, Dectomax, or Ivomec, also will control cattle grubs. When these products are applied, there is no need to treat with an insecticide, too.

**DIAGNOSTIC LAB HIGHLIGHTS**

**by Julie Beale and Paul Bachi**

Last week in the Diagnostic Lab we diagnosed charcoal rot, sudden death syndrome and soybean cyst nematode on soybean; black shank, Fusarium stem rot, blue mold, alfalfa mosaic virus, and tobacco streak virus on tobacco.

On fruits and vegetables, we have seen anthracnose on grape; black root rot (Rhizoctonia) on strawberry; brown rot and scab on peach; anthracnose on cucumber; bacterial wilt on pumpkin; and buckeye rot and Septoria leaf spot on tomato.

On ornamentals, we have seen Cercospora leaf spot on astilbe; bacterial spot, Pythium root rot and Rhizoctonia root/ stem rot on chrysanthemum; rust on daylily; Xanthomonas blight on gladiolus; Rhizoctonia root/ stem rot on petunia; dollar spot and brown patch on bentgrass; summer patch on Ky bluegrass; Pythium blight on ryegrass; powdery mildew, rose mosaic virus and rose rosette disease on rose; black root rot on holly; Pseudonectria (Volutella) dieback on boxwood; Septoria leaf spot and powdery mildew on dogwood; Botryosphaeria canker on black gum; anthracnose on redbud and walnut; and Marssonina leaf spot on maple.

**UKREC, Princeton, July 27-August 3, 2001**

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