



KENTUCKY PEST NEWS

ENTOMOLOGY • PLANT PATHOLOGY • AGRONOMY

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Number 826

August 17, 1998

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TOBACCO

CURRENT BLUE MOLD STATUS

By William Nesmith

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damage to this year's tobacco crop in Kentucky. Although, actual yield losses are not yet available, it is clear from County Extension Agents that black shank has caused considerable damage, approaching the losses in 1993 and 1995, when farm-level losses approached or exceeded 5% of the crop value.

Although cyclic wet and dry weather events stressed tobacco plants and favored spread and development, it is important to appreciate that growers put themselves in a position for the disease to cause damage by the production approaches they selected. Black shank can be controlled, but not without some rotation using currently available tools. In my opinion, the number one reason for the increased incidence of and high losses from black shank rest with the decline in the use of crop rotation on Kentucky's tobacco farms. The second most important factor is the decline in Ridomil use. Problems would have been much worse had so much of the crop not been planted with Tennessee 90, having level 4 black shank resistance, although most farmers selected TN 90 for reasons other than its resistance to black shank.

Crop rotation remains critical and fundamental to root disease management of tobacco in Kentucky, especially for black shank. Kentucky's Tobacco Industry needs to understand and accept that it does not have available adequate tools to abandon crop rotation. The tools available only allow one to shorten the rotational interval while using resistant varieties, fumigation, and soil fungicides. The bottom line is either maintain adequate crop rotation or expect continued losses from black shank and other soilborne diseases until new tools become available.

CORN

EFFECT OF DRYING TEMPERATURE ON MALATHION GRAIN PROTECTANT

By Lee Townsend

Malathion is a commonly available protectant that provides good control of many stored grain pests. The most conservative bin management program would include a use of a protectant, along with thorough pre-binning sanitation. This approach is especially worthwhile if grain is likely to be in storage for 6 months or longer. Often, there are questions as to the effect of both grain drying temperatures and storage temperatures on the

residual life of malathion.

Results from Iowa State University study indicated that malathion remained an effective protectant against rice weevils and red flour beetles over 11 months when applied to corn either before or after drying at temperatures of 70°, 118°, or 160° F. The treated grain was stored then for 3 months at 37° F (winter) and 8 months at 70° F (summer) before it was exposed to the test insects.

If the malathion was applied before drying, a significantly greater amount of residue was lost during the first 15 days after treatment for corn dried at 118° or 160° than at 70° F. Very little reduction in malathion residue was seen if the malathion was applied to grain dried at any of the three temperatures after cooling .

Very little degradation of malathion occurred over the 3 months of winter storage. After the temperature was increased to 70° F, the loss rate was greatest in the corn dried at 70° F.

Malathion residues on treated corn will decline over an 11 month period, regardless of whether the application is made before or after drying at the temperatures listed above. However, the remaining residues are sufficient to provide good grain protection at the end of an 11 month storage period.

SOYBEAN

STEM CANKER OR SUDDEN DEATH SYNDROME?

By Don Hershman

Stem canker (SC), sudden death syndrome (SDS) or both diseases are relatively common now in west Kentucky soybean fields. Because of the media hype that has characterized SDS since 1985, most farmers have heard of SDS and are generally aware of the symptoms of that disease. In contrast, SC, which is a much bigger threat to soybean production in the mid-south, has never received much attention in Kentucky. This lack of attention is because serious SC epidemics are few and far between in Kentucky and because, superficially, the foliar symptoms of SC resemble those of SDS. As a result, a lot of SC is incorrectly identified as SDS.

Once you know all of the symptoms associated with both SDS and SC, differentiation of the two diseases becomes relatively simple.

Root symptoms:

SDS: Primary, secondary and tertiary roots are severely rotted. Nitrogen-fixing nodules are mushy. This is a key point, because SDS starts as a root disease.

SC: Roots are healthy.

Stem symptoms:

SDS: Exterior of the stem appears healthy. Interior of the stem is a milky-brown color compared to the yellow-white color of a healthy stem.

SC: As the name indicates, SC is a stem disease. Early symptoms are a dark brown-firm canker in the vicinity of nodes which are visible on the external stem. Initially, the interior of the stem will be unaffected, except for slight discoloration associated with the exterior canker. As the disease progresses, however, the dark brown canker may extend the length of the stem, often on one side, and the entire stem may become involved. Individual branches of plants may die, while others remain unaffected. The interior of severely diseased stems are completely deteriorated.

Foliar symptoms:

SDS: The first symptoms are yellow blotches forming between the veins, usually developing first on the uppermost leaves. Within a few days of first symptoms, the yellow blotches will coalesce and begin to turn brown. The end stage is complete tissue death between the veins, with the only green tissue remaining being that associated with the primary leaf veins. The edges of severely diseased leaves will roll inward. Over time the diseased leaflets may fall off the petioles or they may remain attached to the plant. Serious yield loss usually only occurs when plants are exhibiting serious foliar symptoms BEFORE mid pod fill. After that time, plants can look pretty rough, but sustain little reduced yield.

SC: Unlike with SDS which initially appears as yellow spots, leaves of plants with SC develop a general yellowing of all or most of the tissue between the veins. Over time these areas die and the end symptoms are essentially identical to those caused by SDS. More often than not, however, the leaves of plants with SDS will drop off the plant

while those with SC will die and remain attached to the plant. Interesting enough, plants with SC usually deteriorate faster than do those with SDS, despite the fact that the first “S” in SDS stands for sudden.

Time of appearance:

SDS and SC: With both diseases, plants are infected early in the season, but symptoms are rarely (in the case of SDS) and never (in the case of SC) expressed prior to the plant reaching the reproductive stages. Both SDS and SC cause great concern when vigorous, good looking crops start to deteriorate towards the end of the season.

Pattern of symptoms:

SDS: Individual and groups of plants 10-50 feet in radius usually show a range of symptoms from some spotting to defoliation. Wet or otherwise stressed areas of fields will be the first to develop symptoms. In extreme cases, which are rare, entire fields will show symptoms. When SDS is severe, symptoms will first develop in “hot spots” and later progress into other areas. This gives the visual effect that the disease is spreading, but in reality, it is not. Rather, the timing of infection, crop health, and field conditions vary, so disease symptoms are expressed at varying rates.

SC: Single random plants in small to large areas die suddenly, seemingly overnight. It is not uncommon for entire fields to be completely destroyed by SC in more southern states. Fortunately, complete wipe-outs due to SC are very rare in KY. Since plants are infected only during the vegetative stages, the disease will not “spread” to unaffected plants once symptoms begin to appear during mid-to-late-season. Similar to SDS, SC may appear to spread somewhat only because infection levels and rates of symptom expression may vary from plant to plant and field to field.

SOYBEAN PODWORMS (AKA CORN EARWORM)

By Doug Johnson

This insect could cause soybean producers a great many headaches this year. We have A LOT of late planted beans in Kentucky this year, and it is these late planted beans that are often most heavily infested by podworms. Additionally, pheromone trap counts have averaged a bit over 100 moths per week for the last three to four weeks. Although

there is no direct relationship between trap counts and infestation levels, it does tell us that the moths are about in large numbers. On top of this, we are about ready to begin harvesting corn. Corn near harvest condition is less attractive to the moths, they will move from corn to beans and other hosts. All in all, it is time to prepare for this pest.

You need to scout fields from late bloom through maturity. Late planted fields, especially those without a closed canopy, are at greatest risk. Don't ignore any fields but check these first.

Podworm adults are buff to light green moths with a wingspan at rest of about 1/2". Eggs are white to pink, about 1/30" wide and laid singly. Larvae (worms) are very small to 1 1/2" in length when full grown. They are usually tan to pale green with several dark stripes down the back. However, color may be quite variable, with some individuals almost black.

These insects feed almost exclusively on pods. They eat away the podwall and completely consume the seed. This will not only destroy the seed upon which they are feeding but also allow the entry of pathogens which may destroy the remaining seeds. REMEMBER if you do not check the pods you may not know this pest is present. If often does not feed on any other portion of the plant.

Use a four foot shake cloth sample. Lay a light colored cloth on the ground between rows and shake the beans over the cloth. Count and record the number of worms per a four foot sample area. Calculate the number of worms per foot of row. The Economic Threshold is Two worms per row foot. This is quite a small number. Much different from the leaf feeder green cloverworm that requires 15 - 20 worms per row foot to cause economic damage.

Because of the low Economic Threshold and the fact that they only feed on the pods, it is very easy to be late in controlling this pest. Insecticides recommended for control of soybean podworm may be found in ENT-13.

FRUIT CROPS

SECONDARY APPLE SCAB CAN INFECT FRUITS

By John Hartman

Apple scab, caused by the fungus *Venturia inaequalis*, has been severe this growing season, especially in poorly sprayed trees, but many growers did manage to apply fungicides between the rains this spring to achieve excellent control in the orchard. As the end of the summer approaches and apples are nearly ready to harvest and store, growers sometimes have a tendency to reduce their fungicide spray program. In most seasons, this makes good sense, but this year inoculum levels in the orchard or in neighboring crabapple or unsprayed apples is high. Thus, there is a risk of additional fruit infection, especially if the weather is mild and moist in the coming weeks.

Secondary infection of fruit can occur in the late summer and fall, but not show up until the fruit have been stored for several months. These fruit infections lead to small dark scab lesions sometimes called pinpoint scab. Although small, these scab lesions penetrate the skin and will make the fruit less valuable. There is another reason to continue scab fungicide treatments up to a couple of weeks before harvest. Scab disease can also build up on the leaves after harvest, resulting in high overwintering inoculum for the next year.

Fungicides such as Benlate, Captan, and Ziram used for fruit disease and scab control in the late summer have a 14-day waiting interval before harvest. This should be sufficient to provide good control of scab for fruit going into storage and provide some protection on leaves after harvest. If apple scab has been serious in the orchard this season, growers may want to reduce scab potential by making applications of 5% urea to the foliage this fall just before leaves drop. This application of nitrogen will hasten leaf decomposition and reduce primary inoculum for next season. In addition, after leaves fall, if they can be chopped into small pieces, overwintering inoculum will be reduced.

WATCH OUT FOR LATE SEASON CODLING MOTH

By Ric Bessin

As many apple producers are gearing up for harvest of their early varieties, codling moth remains as serious threat. Typically, there are three

generations of this insect each year in Kentucky. This year we expect at least three generations and development is one to two weeks ahead of where it usually is in a normal year.

The control decision for the rest of the season is based on the number of moths captured in pheromone traps. When an average of five or more are captured per trap, an insecticide should be applied 250DD later. Keep in mind that there are three to four generations of codling moths each season, so traps need to be maintained and monitored for the ENTIRE season. For a description of codling moths and an explanation on how to calculate degree days, see ENTFACT 202, Codling Moth.

If codling moth reaches the threshold two weeks in a row, an additional insecticide cover spray is not necessary. The spray targeting the emerging larvae corresponding to the first week's capture should provide 10 to 14 days protection, enough to control the larvae resulting from the moth flight the second week. A second insecticide cover spray may be necessary when excessively large trap catches occur. When moth captures exceed 20 moths per trap per week, a second application may be necessary.

VEGETABLES

TOMATO INSECT ACTIVITY INCREASING By Ric Bessin

With most of the field corn in the state starting to dry down, tomato producers should watch for tomato fruitworm moving from corn to tomatoes. The tomato fruitworm is also called the corn earworm, they are the same insect. Generally, this pest is more attracted to corn when corn is silking and large numbers of adults can be produced in corn. However, as corn begins to dry down, tomatoes become more attractive to this insect.

The tomato fruitworm is potentially the most damaging insect pest of tomato. The larvae are variable in color, ranging from pale yellow, to red, to green, to brown with pale stripes running lengthwise. The larvae have four pairs of prolegs and are densely covered with microscopic spines that makes the larvae feel rough. The moths lay eggs at night on leaves near green fruit at the outer edges of the plant. The dome shaped eggs are white when first laid and develop a reddish brown band before hatching. After the egg hatches, the larva

feed for a short period of time on the foliage before attacking the fruit. They prefer to feed on green fruit and usually do not enter ripe fruit. Damage consists of deep watery cavities frequently in the stem end of the fruit. During its development, one larva may injure several fruit.

Producers should consider actions against tomato fruitworm when the plants have green fruit and an average of 1 infested plant (larvae or fresh feeding damage) per 40 plants or when any eggs are present on foliage. Pheromone traps are commonly used to monitor for adult activity around fields. Monitor for eggs carefully when trap catches exceed 7 moths per trap per week.

Growers should also monitor for stink bugs, their nymphs, and the damage they cause to the fruit. There are several species of stink bugs that feed on tomato fruit, but the brown stink bug is the most serious. Stink bugs feed with piercing sucking mouthparts which cause whitish-yellow corky spots underneath the skin of the fruit. This damage is serious for fresh market tomatoes and whole pack processing tomatoes because they render the fruit unmarketable.

Adult stink bugs migrate from weedy areas into tomato fields, particularly when the weeds begin to decline. On green fruit, stink bug damage appears as a pin prick, surrounded by a light discolored area. This may turn yellow or remain green on ripe fruit and the tissue below these spots corky. Producers should check 40 plants per field weekly for stink bugs. Any stink bugs in the 40 plant sample would indicate the need for control.

LAWN AND TURF

DECISION-MAKING TIME FOR WHITE GRUBS

By Mike Potter

White grubs are the most important insect pests of lawn grasses in Kentucky. Several different kinds of white grubs, in particular, the larvae of masked chafers and Japanese beetles can cause damage. Turf is damaged when the grubs feed on the grass roots. The cutting of the roots kills the grass and loosens the turf so that it can be rolled back like a carpet.

Although this year's adult Japanese beetle flight

was light in some areas, masked chafers were abundant and may warrant treatment. Homeowners or turf managers considering a curative insecticide application for white grubs should first confirm that treatment is justified.

Diagnosis -- Drought stressed or diseased turf can easily be mistaken for grub damage. Early symptoms of white grubs include gradual thinning, yellowing, and weakening of the grass stand followed by the appearance of scattered, irregular dead patches. As damage continues, the dead patches may increase in size, and apparently healthy turf areas may suddenly wilt. The turf may feel spongy as you walk over the infested area.

Sod that is heavily grub-damaged is not well anchored and can be pulled loose from the soil like a carpet, exposing the white, C-shaped larvae. If the brown patches do not pull up easily, the problem is usually related to other causes. Another indication that white grubs may be present is if moles, skunks or flocks of blackbirds find the turf attractive. White grubs should also be suspected if adult beetles were abundant in the area in June and July, or if you had a serious grub problem last year.

To determine the degree of infestation, sample the lawn in several spots. In each area, cut out a square-foot piece of sod and inspect the roots closely for grubs. Any grubs that are present in mid-August will be small -- about 1/4 to 1/2-inch. After examining the sample, tamp it back into place and water it well to encourage recovery. An average of eight or more grubs per sample may indicate a need for treatment. Healthy, vigorous, well-watered turf often will tolerate higher grub densities (10-15 per sq. ft.) without showing damage.

Control -- If damaging numbers are present, the ideal time to treat curatively is now, while the grubs are still small. Grubs are still vulnerable to most insecticides in September, but treatment should not be made any later than mid-October. Normally the entire lawn will not need to be treated. Grub "hot spots," which can be confirmed by sampling, are most likely to be in full sun, lawns seeded with Kentucky bluegrass, lawns that were heavily irrigated during June and July, and turf areas that were damaged by grubs in previous years.

For best results, mow the lawn and rake out dead grass and thatch before treatment. Water the lawn immediately after application to wash the

insecticide down into the root zone where the grubs are feeding. Watering in is especially important for spray applications; once spray residues dry on foliage, they cannot be washed into the root zone by later drenchings. For this reason, granular formulations may be easier to use since timing of irrigation is not so critical. Treated areas should be drenched with 1/2 - 1 inch of water, using a lawn sprinkler. The required amount of water can be determined by placing a disposable pan or rain gauge in the treated area.

Several products are labeled for curative control of white grubs on home lawns. Dylox 6.2G has worked particularly well in University of Kentucky tests; Oftanol, diazinon and Sevin have also given adequate control, whereas products containing Dursban performed poorly.

Merit (active ingredient imidacloprid) is labeled for use on both golf courses and home lawns. The product is marketed to homeowners under the brand name GrubX. Merit/GrubX is highly effective, but works best when applied against very young grubs (between early June and late July in Kentucky). *Thus, the effective period for using this product has already passed.* Mach 2 (halofenozide) is another effective new product for treatment of golf courses, sod farms and home lawns (professional use only). Similar to Merit, Mach 2 is most efficacious when applied earlier in the season against smaller grubs. At this stage, better results may be obtained using Dylox or one of the other curative products previously mentioned.

Milky disease products (Doom) have performed poorly in research trials in Kentucky. Formulations containing insect-parasitic nematodes also cannot yet be recommended as reliable alternatives to conventional grubicides.

For more information, consult the product labels and ENT-10, *Controlling White Grubs In Turfgrass*.

HOUSEHOLD

CRICKET WARS

By Mike Potter

"Hundreds of black, 1/2 -inch long bugs are hopping out of my grass, flower beds, and onto my patio . When I open the garage door in the morning, a bunch more jump inside. What are these critters and how do I get rid of them? Several homeowners have called with this complaint in recent weeks. The culprits are field

crickets.

Warm, humid conditions often produce outbreaks of field crickets during late summer in Kentucky. Infestations are especially common around buildings that are heavily mulched, landscaped or overgrown. Crickets lay their eggs in moist soil, and the immatures (nymphs) pass through several stages or instars. There may be 1 to 3 generations per year.

Management -- Field crickets are primarily a nuisance pest; they do not bite, transmit diseases or infest foodstuffs. Since they are dependent upon moisture, they typically do not survive indoors more than a few days. One option is to do nothing other than vacuum or sweep up those that manage to get inside. Removing excess mulch (a 2 to 3-inch layer is plenty for landscaping), weeds and debris close to the foundation will make the area less attractive to crickets. Installing tight-fitting door sweeps, sealing cracks, and performing other forms of exclusion (see *Entfact-641 How to Pest-Proof Your Home*) will further limit the entry of crickets, spiders, ground beetles and other unwanted pests.

For clients demanding immediate relief, pest proofing can be supplemented with exterior insecticide treatment. Homeowners will get the most for their efforts by applying longer-lasting liquid formulations containing synthetic pyrethroids (e.g., Spectracide Bug Stop™, Ortho Home Defense System™) or microencapsulated, slow-release Dursban, sold at hardware/lawn and garden shops. Apply with a pump up sprayer, hose end sprayer, etc. treating along the bottom of exterior doors, up underneath siding, and around the outside perimeter of the foundation in a 2 to 6-foot wide band along the ground, and 2-3 feet up the foundation wall. Pay particular attention to the crack where grass meets the foundation. Homeowners or businesses who choose not to tackle these activities may wish to hire a professional pest control firm. Field cricket problems subside with the onset of cooler weather.

PLANT DIAGNOSTIC-HIGHLIGHTS

By Julie Beale and Paul Bachi

Diseases diagnosed on **soybean** this week have included **downy mildew, stem canker and sudden death syndrome**. On **tobacco**, we are still seeing a number of disease problems, including continued **blue mold activity, black shank, Fusarium wilt, hollow stalk, frog-eye, target spot and the**

aphid-borne virus complex.

Landscape diseases diagnosed this week were mostly foliar problems: **Phyllosticta and Cercospora leaf spots** (various woody hosts), **anthracnose on maples, leaf blister on maples, Guignardia leaf blotch on horse chestnut.**

On vegetables, we are seeing **powdery mildew and downy mildew**, as well as **bacterial wilt on cucurbits**, and **Septoria leaf spot on tomato.**

PESTICIDE NEWS AND VIEWS

WILMINGTON, Del., Jul 28 (Reuters) - Zeneca, Inc sued Monsanto Co. for allegedly violating antitrust laws to maintain its dominance in the rapidly expanding market for genetically-engineered soybean seed.

Monsanto spokesman David Snively told Reuters "This is an action triggered by a competitor seeking early entry into the market place. Our business actions have been totally appropriate...(and) we will intensely defend claims."

Zeneca has applied for U.S. regulatory approval of its herbicide Touchdown, a rival to Monsanto's Roundup.

In papers filed in the U.S. District Court in DE, Zeneca claims Monsanto's restrictive agreements and incentive programs for growers, researchers, and distributors are intended to exclude competitors of its Roundup Ready seeds and Roundup glyphosate herbicides.

The agreements "unlawfully tie sales of its glyphosate- tolerant soybean seeds to an agreement to use... only Monsanto's Roundup...and typically restricts growers...from utilizing glyphosate herbicides other than Roundup," court papers say.

Zeneca also alleges that Monsanto is improperly using patent law enforcement provisions.

"The purpose and effect of Monsanto's effort to enforce the Monsanto patents...against Zeneca is to thwart and suppress competition in the relevant herbicide market for the benefit of Monsanto and to the detriment of soybean growers and the herbicide industry," the lawsuit says.

In 1997, Monsanto reported \$3.1 billion in net sales for agricultural products, a record "fueled by higher

worldwide sales volumes for Monsanto's family of Roundup herbicides."

According to the lawsuit, Monsanto products could account for 77% of the genetically engineered crops planted worldwide in 1998. In the U.S., Roundup Ready soybean seeds are expected to account for 35% of this year's total U.S. soybean acreage, a figure projected to reach 60 to 70% "in the near future."

Growers typically spend \$25/acre for soybean herbicides. A single application of Roundup costs about \$12/acre, which gives it "a distinct competitive advantage," court papers say.

Snively said Monsanto sued Zeneca last month for "unlawfully testing its chemicals on Monsanto roundup ready crops." A preliminary injunction hearing in that case is scheduled in Alabama state court in August.

Zeneca, a large purchaser of Monsanto chemicals, was scheduled to meet with Monsanto "to discuss our business differences on a variety of topics. The suit was obviously filed in advance of that meeting to alter negotiation positions," Snively said.

Zeneca's suit seeks a court finding that Monsanto's patents, set to expire in 2000, are invalid and unenforceable and its "exclusionary practices" violate antitrust law. The suit also seeks punitive damages and unspecified but triple actual damages; and injunctions against Monsanto's alleged acts of unfair competition.

INSECT TRAP COUNTS

August 3-10

European Corn Borer	31
Southwestern Corn Borer	68
Fall Armyworm	12
Corn Earworm	20

Lee Townsend, Extension Entomologist



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STEM CANKER OR SUDDEN DEATH SYNDROME?

By Don Hershman

Stem canker (SC), sudden death syndrome (SDS) or both diseases are relatively common now in west Kentucky soybean fields. Because of the media hype that has characterized SDS since 1985, most farmers have heard of SDS and are generally aware of the symptoms of that disease. In contrast, SC, which is a much bigger threat to soybean production in the mid-south, has never received much attention in Kentucky. This lack of attention is because serious SC epidemics are few and far between in Kentucky and because, superficially, the foliar symptoms of SC resemble those of SDS. As a result, a lot of SC is incorrectly identified as SDS.

Once you know all of the symptoms associated with both SDS and SC, differentiation of the two diseases becomes relatively simple.

Root symptoms:

SDS: Primary, secondary and tertiary roots are severely rotted. Nitrogen-fixing nodules are mushy. This is a key point, because SDS starts as a root disease.

SC: Roots are healthy.

Stem symptoms:

SDS: Exterior of the stem appears healthy. Interior of the stem is a milky-brown color compared to the yellow-white color of a healthy stem.

SC: As the name indicates, SC is a stem disease. Early symptoms are a dark brown-firm canker in the vicinity of nodes which are visible on the external stem. Initially, the interior of the stem will be unaffected, except for slight discoloration associated with the exterior canker. As the disease progresses, however, the dark brown canker may extend the length of the stem, often on one side, and the entire stem may become involved. Individual branches of plants may die, while others remain unaffected. The interior of severely diseased stems are completely deteriorated.

Foliar symptoms:

SDS: The first symptoms are yellow blotches forming between the veins, usually developing first on the uppermost leaves. Within a few days of first symptoms, the yellow blotches will coalesce and begin to turn brown. The end stage is complete tissue death between the veins, with the only green tissue remaining being that associated with the primary leaf veins. The edges of severely diseased leaves will roll inward. Over time the diseased leaflets may fall off the petioles or they may remain attached to the plant. Serious yield loss usually only occurs when plants are exhibiting serious foliar symptoms BEFORE mid pod fill. After that time, plants can look pretty rough, but sustain little reduced yield.

SC: Unlike with SDS which initially appears as yellow spots, leaves of plants with SC develop a general yellowing of all or most of the tissue between the veins. Over time these areas die and the end symptoms are essentially identical to those caused by SDS. More often than not, however, the leaves of plants with SDS will drop off the plant

while those with SC will die and remain attached to the plant. Interesting enough, plants with SC usually deteriorate faster than do those with SDS, despite the fact that the first “S” in SDS stands for sudden.

Time of appearance:

SDS and SC: With both diseases, plants are infected early in the season, but symptoms are rarely (in the case of SDS) and never (in the case of SC) expressed prior to the plant reaching the reproductive stages. Both SDS and SC cause great concern when vigorous, good looking crops start to deteriorate towards the end of the season.

Pattern of symptoms:

SDS: Individual and groups of plants 10-50 feet in radius usually show a range of symptoms from some spotting to defoliation. Wet or otherwise stressed areas of fields will be the first to develop symptoms. In extreme cases, which are rare, entire fields will show symptoms. When SDS is severe, symptoms will first develop in “hot spots” and later progress into other areas. This gives the visual effect that the disease is spreading, but in reality, it is not. Rather, the timing of infection, crop health, and field conditions vary, so disease symptoms are expressed at varying rates.

SC: Single random plants in small to large areas die suddenly, seemingly overnight. It is not uncommon for entire fields to be completely destroyed by SC in more southern states. Fortunately, complete wipe-outs due to SC are very rare in KY. Since plants are infected only during the vegetative stages, the disease will not “spread” to unaffected plants once symptoms begin to appear during mid-to-late-season. Similar to SDS, SC may appear to spread somewhat only because infection levels and rates of symptom expression may vary from plant to plant and field to field.

SOYBEAN PODWORMS (AKA CORN EARWORM)

By Doug Johnson

This insect could cause soybean producers a great many headaches this year. We have A LOT of late planted beans in Kentucky this year, and it is these late planted beans that are often most heavily infested by podworms. Additionally, pheromone trap counts have averaged a bit over 100 moths per week for the last three to four weeks. Although

there is no direct relationship between trap counts and infestation levels, it does tell us that the moths are about in large numbers. On top of this, we are about ready to begin harvesting corn. Corn near harvest condition is less attractive to the moths, they will move from corn to beans and other hosts. All in all, it is time to prepare for this pest.

You need to scout fields from late bloom through maturity. Late planted fields, especially those without a closed canopy, are at greatest risk. Don't ignore any fields but check these first.

Podworm adults are buff to light green moths with a wingspan at rest of about 1/2". Eggs are white to pink, about 1/30" wide and laid singly. Larvae (worms) are very small to 1 1/2" in length when full grown. They are usually tan to pale green with several dark stripes down the back. However, color may be quite variable, with some individuals almost black.

These insects feed almost exclusively on pods. They eat away the podwall and completely consume the seed. This will not only destroy the seed upon which they are feeding but also allow the entry of pathogens which may destroy the remaining seeds. REMEMBER if you do not check the pods you may not know this pest is present. If often does not feed on any other portion of the plant.

Use a four foot shake cloth sample. Lay a light colored cloth on the ground between rows and shake the beans over the cloth. Count and record the number of worms per a four foot sample area. Calculate the number of worms per foot of row. The Economic Threshold is Two worms per row foot. This is quite a small number. Much different from the leaf feeder green cloverworm that requires 15 - 20 worms per row foot to cause economic damage.

Because of the low Economic Threshold and the fact that they only feed on the pods, it is very easy to be late in controlling this pest. Insecticides recommended for control of soybean podworm may be found in ENT-13.

FRUIT CROPS

SECONDARY APPLE SCAB CAN INFECT FRUITS

By John Hartman

Apple scab, caused by the fungus *Venturia inaequalis*, has been severe this growing season, especially in poorly sprayed trees, but many growers did manage to apply fungicides between the rains this spring to achieve excellent control in the orchard. As the end of the summer approaches and apples are nearly ready to harvest and store, growers sometimes have a tendency to reduce their fungicide spray program. In most seasons, this makes good sense, but this year inoculum levels in the orchard or in neighboring crabapple or unsprayed apples is high. Thus, there is a risk of additional fruit infection, especially if the weather is mild and moist in the coming weeks.

Secondary infection of fruit can occur in the late summer and fall, but not show up until the fruit have been stored for several months. These fruit infections lead to small dark scab lesions sometimes called pinpoint scab. Although small, these scab lesions penetrate the skin and will make the fruit less valuable. There is another reason to continue scab fungicide treatments up to a couple of weeks before harvest. Scab disease can also build up on the leaves after harvest, resulting in high overwintering inoculum for the next year.

Fungicides such as Benlate, Captan, and Ziram used for fruit disease and scab control in the late summer have a 14-day waiting interval before harvest. This should be sufficient to provide good control of scab for fruit going into storage and provide some protection on leaves after harvest. If apple scab has been serious in the orchard this season, growers may want to reduce scab potential by making applications of 5% urea to the foliage this fall just before leaves drop. This application of nitrogen will hasten leaf decomposition and reduce primary inoculum for next season. In addition, after leaves fall, if they can be chopped into small pieces, overwintering inoculum will be reduced.

WATCH OUT FOR LATE SEASON CODLING MOTH

By Ric Bessin

As many apple producers are gearing up for harvest of their early varieties, codling moth remains as serious threat. Typically, there are three

generations of this insect each year in Kentucky. This year we expect at least three generations and development is one to two weeks ahead of where it usually is in a normal year.

The control decision for the rest of the season is based on the number of moths captured in pheromone traps. When an average of five or more are captured per trap, an insecticide should be applied 250DD later. Keep in mind that there are three to four generations of codling moths each season, so traps need to be maintained and monitored for the ENTIRE season. For a description of codling moths and an explanation on how to calculate degree days, see ENTFACT 202, Codling Moth.

If codling moth reaches the threshold two weeks in a row, an additional insecticide cover spray is not necessary. The spray targeting the emerging larvae corresponding to the first week's capture should provide 10 to 14 days protection, enough to control the larvae resulting from the moth flight the second week. A second insecticide cover spray may be necessary when excessively large trap catches occur. When moth captures exceed 20 moths per trap per week, a second application may be necessary.

VEGETABLES

TOMATO INSECT ACTIVITY INCREASING By Ric Bessin

With most of the field corn in the state starting to dry down, tomato producers should watch for tomato fruitworm moving from corn to tomatoes. The tomato fruitworm is also called the corn earworm, they are the same insect. Generally, this pest is more attracted to corn when corn is silking and large numbers of adults can be produced in corn. However, as corn begins to dry down, tomatoes become more attractive to this insect.

The tomato fruitworm is potentially the most damaging insect pest of tomato. The larvae are variable in color, ranging from pale yellow, to red, to green, to brown with pale stripes running lengthwise. The larvae have four pairs of prolegs and are densely covered with microscopic spines that makes the larvae feel rough. The moths lay eggs at night on leaves near green fruit at the outer edges of the plant. The dome shaped eggs are white when first laid and develop a reddish brown band before hatching. After the egg hatches, the larva

feed for a short period of time on the foliage before attacking the fruit. They prefer to feed on green fruit and usually do not enter ripe fruit. Damage consists of deep watery cavities frequently in the stem end of the fruit. During its development, one larva may injure several fruit.

Producers should consider actions against tomato fruitworm when the plants have green fruit and an average of 1 infested plant (larvae or fresh feeding damage) per 40 plants or when any eggs are present on foliage. Pheromone traps are commonly used to monitor for adult activity around fields. Monitor for eggs carefully when trap catches exceed 7 moths per trap per week.

Growers should also monitor for stink bugs, their nymphs, and the damage they cause to the fruit. There are several species of stink bugs that feed on tomato fruit, but the brown stink bug is the most serious. Stink bugs feed with piercing sucking mouthparts which cause whitish-yellow corky spots underneath the skin of the fruit. This damage is serious for fresh market tomatoes and whole pack processing tomatoes because they render the fruit unmarketable.

Adult stink bugs migrate from weedy areas into tomato fields, particularly when the weeds begin to decline. On green fruit, stink bug damage appears as a pin prick, surrounded by a light discolored area. This may turn yellow or remain green on ripe fruit and the tissue below these spots corky. Producers should check 40 plants per field weekly for stink bugs. Any stink bugs in the 40 plant sample would indicate the need for control.

LAWN AND TURF

DECISION-MAKING TIME FOR WHITE GRUBS

By Mike Potter

White grubs are the most important insect pests of lawn grasses in Kentucky. Several different kinds of white grubs, in particular, the larvae of masked chafers and Japanese beetles can cause damage. Turf is damaged when the grubs feed on the grass roots. The cutting of the roots kills the grass and loosens the turf so that it can be rolled back like a carpet.

Although this year's adult Japanese beetle flight

was light in some areas, masked chafers were abundant and may warrant treatment. Homeowners or turf managers considering a curative insecticide application for white grubs should first confirm that treatment is justified.

Diagnosis -- Drought stressed or diseased turf can easily be mistaken for grub damage. Early symptoms of white grubs include gradual thinning, yellowing, and weakening of the grass stand followed by the appearance of scattered, irregular dead patches. As damage continues, the dead patches may increase in size, and apparently healthy turf areas may suddenly wilt. The turf may feel spongy as you walk over the infested area.

Sod that is heavily grub-damaged is not well anchored and can be pulled loose from the soil like a carpet, exposing the white, C-shaped larvae. If the brown patches do not pull up easily, the problem is usually related to other causes. Another indication that white grubs may be present is if moles, skunks or flocks of blackbirds find the turf attractive. White grubs should also be suspected if adult beetles were abundant in the area in June and July, or if you had a serious grub problem last year.

To determine the degree of infestation, sample the lawn in several spots. In each area, cut out a square-foot piece of sod and inspect the roots closely for grubs. Any grubs that are present in mid-August will be small -- about 1/4 to 1/2-inch. After examining the sample, tamp it back into place and water it well to encourage recovery. An average of eight or more grubs per sample may indicate a need for treatment. Healthy, vigorous, well-watered turf often will tolerate higher grub densities (10-15 per sq. ft.) without showing damage.

Control -- If damaging numbers are present, the ideal time to treat curatively is now, while the grubs are still small. Grubs are still vulnerable to most insecticides in September, but treatment should not be made any later than mid-October. Normally the entire lawn will not need to be treated. Grub "hot spots," which can be confirmed by sampling, are most likely to be in full sun, lawns seeded with Kentucky bluegrass, lawns that were heavily irrigated during June and July, and turf areas that were damaged by grubs in previous years.

For best results, mow the lawn and rake out dead grass and thatch before treatment. Water the lawn immediately after application to wash the

insecticide down into the root zone where the grubs are feeding. Watering in is especially important for spray applications; once spray residues dry on foliage, they cannot be washed into the root zone by later drenchings. For this reason, granular formulations may be easier to use since timing of irrigation is not so critical. Treated areas should be drenched with 1/2 - 1 inch of water, using a lawn sprinkler. The required amount of water can be determined by placing a disposable pan or rain gauge in the treated area.

Several products are labeled for curative control of white grubs on home lawns. Dylox 6.2G has worked particularly well in University of Kentucky tests; Oftanol, diazinon and Sevin have also given adequate control, whereas products containing Dursban performed poorly.

Merit (active ingredient imidacloprid) is labeled for use on both golf courses and home lawns. The product is marketed to homeowners under the brand name GrubX. Merit/GrubX is highly effective, but works best when applied against very young grubs (between early June and late July in Kentucky). *Thus, the effective period for using this product has already passed.* Mach 2 (halofenozide) is another effective new product for treatment of golf courses, sod farms and home lawns (professional use only). Similar to Merit, Mach 2 is most efficacious when applied earlier in the season against smaller grubs. At this stage, better results may be obtained using Dylox or one of the other curative products previously mentioned.

Milky disease products (Doom) have performed poorly in research trials in Kentucky. Formulations containing insect-parasitic nematodes also cannot yet be recommended as reliable alternatives to conventional grubicides.

For more information, consult the product labels and ENT-10, *Controlling White Grubs In Turfgrass*.

HOUSEHOLD

CRICKET WARS By Mike Potter

"Hundreds of black, 1/2 -inch long bugs are hopping out of my grass, flower beds, and onto my patio . When I open the garage door in the morning, a bunch more jump inside. What are these critters and how do I get rid of them? Several homeowners have called with this complaint in recent weeks. The culprits are field

crickets.

Warm, humid conditions often produce outbreaks of field crickets during late summer in Kentucky. Infestations are especially common around buildings that are heavily mulched, landscaped or overgrown. Crickets lay their eggs in moist soil, and the immatures (nymphs) pass through several stages or instars. There may be 1 to 3 generations per year.

Management -- Field crickets are primarily a nuisance pest; they do not bite, transmit diseases or infest foodstuffs. Since they are dependent upon moisture, they typically do not survive indoors more than a few days. One option is to do nothing other than vacuum or sweep up those that manage to get inside. Removing excess mulch (a 2 to 3-inch layer is plenty for landscaping), weeds and debris close to the foundation will make the area less attractive to crickets. Installing tight-fitting door sweeps, sealing cracks, and performing other forms of exclusion (see *Entfact-641 How to Pest-Proof Your Home*) will further limit the entry of crickets, spiders, ground beetles and other unwanted pests.

For clients demanding immediate relief, pest proofing can be supplemented with exterior insecticide treatment. Homeowners will get the most for their efforts by applying longer-lasting liquid formulations containing synthetic pyrethroids (e.g., Spectracide Bug Stop™, Ortho Home Defense System™) or microencapsulated, slow-release Dursban, sold at hardware/lawn and garden shops. Apply with a pump up sprayer, hose end sprayer, etc. treating along the bottom of exterior doors, up underneath siding, and around the outside perimeter of the foundation in a 2 to 6-foot wide band along the ground, and 2-3 feet up the foundation wall. Pay particular attention to the crack where grass meets the foundation. Homeowners or businesses who choose not to tackle these activities may wish to hire a professional pest control firm. Field cricket problems subside with the onset of cooler weather.

PLANT DIAGNOSTIC-HIGHLIGHTS

By Julie Beale and Paul Bachi

Diseases diagnosed on **soybean** this week have included **downy mildew, stem canker and sudden death syndrome**. On **tobacco**, we are still seeing a number of disease problems, including continued **blue mold activity, black shank, Fusarium wilt, hollow stalk, frog-eye, target spot and the**

aphid-borne virus complex.

Landscape diseases diagnosed this week were mostly foliar problems: **Phyllosticta and Cercospora leaf spots** (various woody hosts), **anthracnose on maples, leaf blister on maples, Guignardia leaf blotch on horse chestnut.**

On vegetables, we are seeing **powdery mildew and downy mildew**, as well as **bacterial wilt on cucurbits**, and **Septoria leaf spot on tomato.**

PESTICIDE NEWS AND VIEWS

WILMINGTON, Del., Jul 28 (Reuters) - Zeneca, Inc sued Monsanto Co. for allegedly violating antitrust laws to maintain its dominance in the rapidly expanding market for genetically-engineered soybean seed.

Monsanto spokesman David Snively told Reuters "This is an action triggered by a competitor seeking early entry into the market place. Our business actions have been totally appropriate...(and) we will intensely defend claims."

Zeneca has applied for U.S. regulatory approval of its herbicide Touchdown, a rival to Monsanto's Roundup.

In papers filed in the U.S. District Court in DE, Zeneca claims Monsanto's restrictive agreements and incentive programs for growers, researchers, and distributors are intended to exclude competitors of its Roundup Ready seeds and Roundup glyphosate herbicides.

The agreements "unlawfully tie sales of its glyphosate- tolerant soybean seeds to an agreement to use... only Monsanto's Roundup...and typically restricts growers...from utilizing glyphosate herbicides other than Roundup," court papers say.

Zeneca also alleges that Monsanto is improperly using patent law enforcement provisions.

"The purpose and effect of Monsanto's effort to enforce the Monsanto patents...against Zeneca is to thwart and suppress competition in the relevant herbicide market for the benefit of Monsanto and to the detriment of soybean growers and the herbicide industry," the lawsuit says.

In 1997, Monsanto reported \$3.1 billion in net sales for agricultural products, a record "fueled by higher

worldwide sales volumes for Monsanto's family of Roundup herbicides."

According to the lawsuit, Monsanto products could account for 77% of the genetically engineered crops planted worldwide in 1998. In the U.S., Roundup Ready soybean seeds are expected to account for 35% of this year's total U.S. soybean acreage, a figure projected to reach 60 to 70% "in the near future."

Growers typically spend \$25/acre for soybean herbicides. A single application of Roundup costs about \$12/acre, which gives it "a distinct competitive advantage," court papers say.

Snively said Monsanto sued Zeneca last month for "unlawfully testing its chemicals on Monsanto roundup ready crops." A preliminary injunction hearing in that case is scheduled in Alabama state court in August.

Zeneca, a large purchaser of Monsanto chemicals, was scheduled to meet with Monsanto "to discuss our business differences on a variety of topics. The suit was obviously filed in advance of that meeting to alter negotiation positions," Snively said.

Zeneca's suit seeks a court finding that Monsanto's patents, set to expire in 2000, are invalid and unenforceable and its "exclusionary practices" violate antitrust law. The suit also seeks punitive damages and unspecified but triple actual damages; and injunctions against Monsanto's alleged acts of unfair competition.

INSECT TRAP COUNTS

August 3-10

European Corn Borer	31
Southwestern Corn Borer	68
Fall Armyworm	12
Corn Earworm	20

Lee Townsend, Extension Entomologist