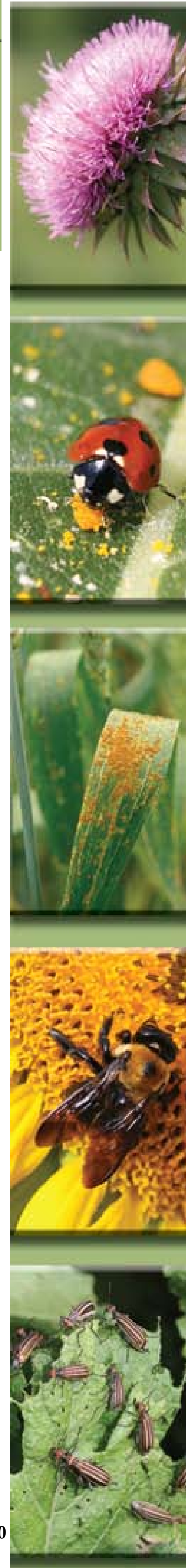
Plant Protection Programs University of Missouri

Integrated Pest & Crop Management



Soybean Rust Spreads Rapidly in Southeast Missouri

By Allen Wrather

Asian soybean rust was found on September 18 in four southeast Missouri Counties: Butler, Dunklin, New Madrid and Pemiscot. The level of infection on soybean leaves was high in Dunklin, Pemiscot and south New Madrid Counties, but it was low in south Butler. The infections were fresh and fairly extensive, and they were probably due to spores that were moved into these counties by a slow-moving low-pressure storm that moved across the southern U.S. on September 10 to 12. An alert about the presence of rust was issued to local radio and TV stations, by contacting crop consultants and agriculture dealers by phone, and Duane Dailey issued a release to all newspapers. Scientists in AL, FL, GA, LA, and MS experienced with this disease feel that yield of soybean will not be reduced by rust when this disease first develops on plants at the R6 or later growth stage. Most of the soybean in southeast Missouri is at the R6 or later growth stage. However, soybean in this area that emerged in early July is at the R3 to R5 stage of growth depending on the maturity group of the variety planted. Farmers with young soybean plants must decide if these should be treated with a fungicide for protection against rust, and they should consider the growth stage, and potential yield when making this decision. Low levels of rust were found on September 28 from three other southeast Missouri counties: Mississippi, Stoddard and Scott. I expect to find soybean rust in counties further north during the next few weeks. I don't know if rust will develop in the southwest area of Missouri since rust did not develop in Texas this year due to drought, and it only recently developed in two east Oklahoma counties. We will continue to examine soybean leaf samples from southwest Missouri and from other east Missouri counties until mid October. Rust has now been found in AL, AR, FL, GA, KY, LA, OK, MO, MS, SC, TN, VA, and NC.

Please call me if you have questions about this 2009 soybean rust survey project. I am most accessible by calling my mobile phone, 573-379-0259. More information about the spread of rust in the U.S. is available at www.sbrusa.net.

Missouri farmers and crop consultants may have soybean leaves examined for rust at the University of Missouri Plant Diagnostic Clinic. Soybean leaves and a moist paper towel should be sealed in a plastic bag, and these should be sent immediately by express mail to the clinic along with a completed information form. The information form and more instructions about collecting and mailing samples to the clinic are posted at http://soilplantlab.missouri.edu/plant/index.htm. You may also call, 573-882-0623, or email the clinic, plantclinic@missouri.edu, about this and other services they provide. The clinic can also provide diagnosis and management information for other soybean problems including diseases, insects, and weeds. There is a $15 fee for examination of samples submitted to the diagnostic clinic.

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Fall Herbicide Applications: It's About More than Just the Weeds

By Kevin Bradley

Winter annual weeds like henbit, purple deadnettle, and chickweed are already emerging in many corn and soybean fields throughout Missouri, and as we progress with our corn and soybean harvest many growers are once again asking about the utility of fall herbicide applications.

As I have said in many previous newsletter articles and talks on this issue, our research indicates that applications of residual herbicides made in early March (or sometime similar in the early spring) can provide the same level of winter annual weed control as applications of these same herbicides in the fall. In addition, our data indicate that early spring applications of residual herbicides provide better control of emerging summer annual weed seedlings than fall herbicide applications. This is especially the case with our current herbicidal options available in soybeans. Although we realize that this early spring timing defeats some of the purposes of the fall herbicide strategy, our results indicate that with our current herbicide arsenal, the early spring timing is better if your objective is to achieve excellent winter annual and some summer annual weed control. If your primarily goal is just to eliminate your winter annual weed populations, then our experiments show that fall and early spring applications of residual herbicides will perform similarly.

Although I usually write each year about specific products for use in the fall herbicide market, I'm not going to do that this year. And that's because fall herbicide applications are about more than just the weeds. This is something that often gets lost in the decision-making process surrounding fall herbicide applications. So, this article is going to be about some of the other factors that you should consider when deciding whether or not to make a fall herbicide application.

First, one significant issue to consider is that many winter annual weeds like henbit and purple deadnettle can serve as alternate hosts for soybean cyst nematode. Researchers at Purdue University have recently done a great deal of work on this interaction and have a website and publication you can reference to learn more about this issue: http://www.btny.purdue.edu/weedscience/SCN/index.html.

Second, dense fields of henbit and other winter annual weeds that are flowering in the early spring are attractive sites for black cutworm moths to lay their eggs in which can then hatch and feed on the developing corn crop. In our research we have also seen that winter annual weeds can act as an alternative host for corn flea beetle and some Lepidopteran insects in corn, and can act as an alternate host for Negro bugs in soybean.

Lastly, another factor to consider is that the removal of winter annual weeds with fall herbicide applications can have a significant impact on the soil conditions experienced at planting. Obviously, dense mats of winter annual weeds can make planting difficult to say the least, but the results from our research also show that winter annual weeds can "wick" significant amounts of moisture from the soil. In both our corn and soybean experiments conducted across 6 site-years, we observed that the untreated plots that contained winter annual weeds had a significantly lower soil moisture content than plots that were treated with herbicides and contained no winter annual weeds. If we're experiencing a wet spring, then from that standpoint having winter annual weeds present may actually be a good thing. However if it's dry, we certainly don't want the winter annual weeds to take the available soil moisture from the emerging corn or soybean crop.

In addition to soil moisture, in our research we've found that the removal of winter annual weeds with fall herbicide applications does increase soil temperatures compared to areas with dense infestations of winter annual weeds (Figures 1 and 2). In our experiments this difference was especially pronounced once temperatures reached 50°F in corn and 68°F in soybeans.

It is clear from the results of our experiments that there are many other factors, other than weed control, that you should consider when deciding whether or not to make a fall herbicide application. Another one that I didn't mention is cost. Make sure that the fall herbicide program matches your needs and won't just be an added cost to your operation. As mentioned previously it is of little value to apply a herbicide in the fall to control winter annual weeds and have to come back with a burndown in the spring anyway.

To see a more complete summary of the results from some of our fall herbicide trials in corn and soybeans, you can go to our website and view a more detailed slideshow at: http://weedscience.missouri.edu/extension/extension.htm.

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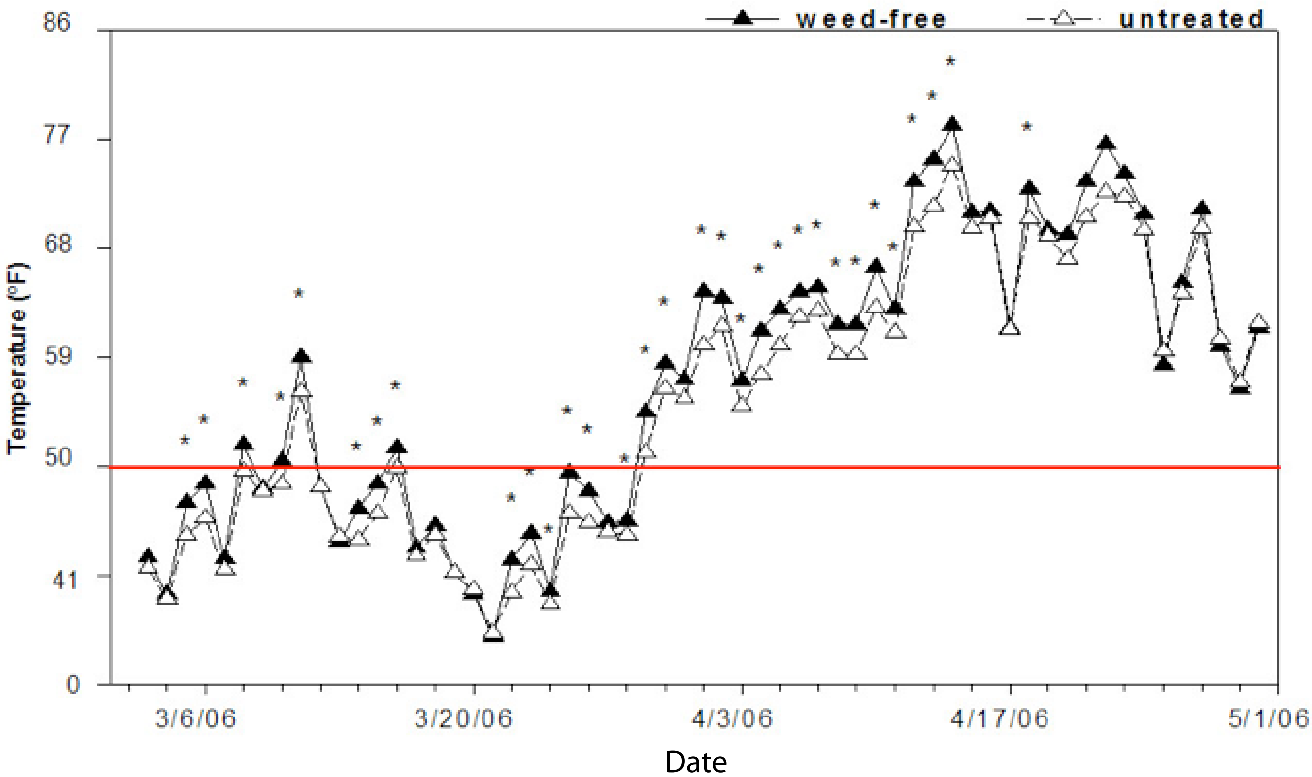

Figure 1. Influence of winter annual weed removal with fall herbicide applications on soil temperature prior to corn planting as compared to untreated plots with a dense cover of winter annual weeds. Asterisks indicate significant differences in soil temperature within a day.

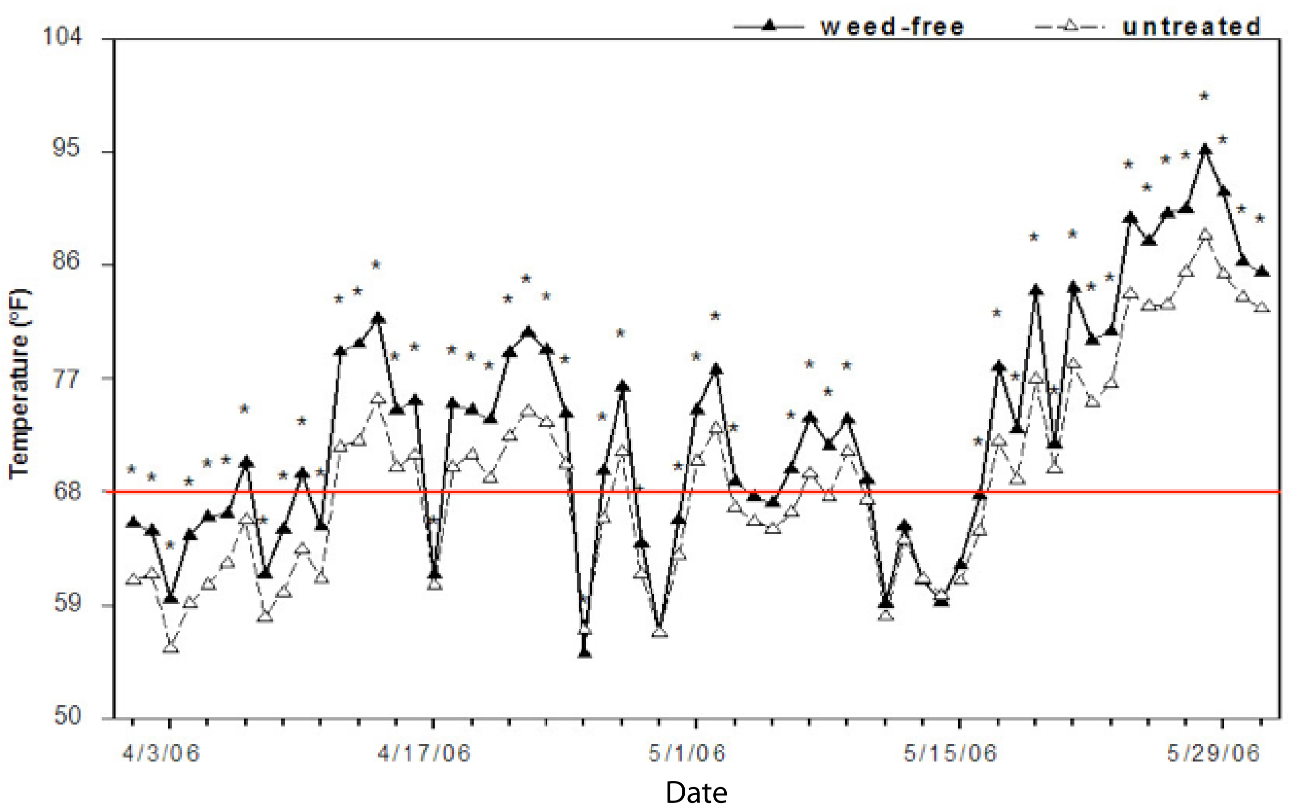

Figure 2. Influence of winter annual weed removal with fall herbicide applications on soil temperature prior to soybean planting as compared to untreated plots with a dense cover of winter annual weeds. Asterisks indicate significant differences in soil temperature within a day.

Discolored Soybean Seed

By Laura Sweets

This may be a year when soybean seed discoloration is a widespread problem in Missouri. Soybean diseases are one of several factors which can cause discoloration and deterioration of soybean seed. But soybean diseases are only one of the factors which may be involved in this year's problem. Much of the state has been unusually wet for most of the season. The late season soybean diseases which can lead to discolored soybean seed tend to be favored by wet conditions including frequent rains, heavy dews and high humidity. Discoloration of soybean seed this year appears to be the result of environmental stress compounded by late season stem and pod diseases.

When the late season pod and stem diseases occur, maturing plants have a blackish cast and black to gray spots, blotches and streaks may cover stems, branches and pods. The late season diseases lead to increased problems with discolored and damaged soybean seed. Purple seed stain; a general blotchy brown discoloration that might be the result of the Cercospora or Colletotrichum species which cause anthracnose and tipblight; bleeding hilum which can be caused by virus diseases such as soybean mosaic and bean pod mottle; a white mold growth which could be Phomopsis seed decay or secondary fungi entering through pods damaged by insects are all showing up in beans. The diseases which contribute to discolored soybean seed are usually favored by wet conditions late in the season. Weather conditions from now through harvest will have a major influence on how severe discoloration and deterioration of soybean seed is this season.

Symptoms of the seed damage which may result from Phomopsis seed decay, purple seed stain, frogeye leaf spot, virus diseases and Colletotrichum anthracnose and tipblight are described below.

Phomopsis seed decay: Phomopsis seed decay results when the fungi which cause pod and stem blight move from the stems and pods onto the seed. Plants infected with pod and stem blight may be stunted and have discolored stems. Black pycnidia or fruiting bodies of the fungi *Phomopsis sojae* or *Phomopsis longicolla* develop on the lower portion of the main stem, branches and pods as plants reach maturity. The pycnidia may be limited to small patches usually near the nodes or may cover dead stems and pods. On stems, the pycnidia are usually arranged in linear rows while on pods they are randomly scattered. Prolonged periods of warm, wet weather during flowering and pod fill favor the development of pod and stem blight. If conditions remain warm and wet, the fungus may grow through the pods and infect the seed. Infected seed is oblong or misshapen and may have a white moldy appearance.

Purple seed stain: *Cercospora kikuchii* can infect soybean seeds, pods, stems and leaves but is most commonly found on the seed. However, during the last several years leaf spot and leaf blight caused by this fungus have been prevalent in parts of the state. Leaf blight occurs on the uppermost leaves and begins as reddish purple to reddish brown angular to somewhat circular lesions on the soybean leaves. These lesions may coalesce to kill larger areas of leaf tissue. The entire uppermost trifoliolate leaf and petiole may be blighted and brown. Cercospora leaf spot may develop as a premature yellowing and then blighting of the youngest, upper leaves over large areas of affected fields. Brown lesions or spots are usually evident in the yellowed tissue. In most fields symptoms do not progress down the plants more than one to two nodes. Pods at the uppermost nodes may develop round, reddish purple to reddish brown lesions. Infected seed show a conspicuous discoloration varying in color from pink to pale purple to dark purple. The discoloration may range from small specks to large blotches which cover the entire surface of the seed coat. Warm, humid weather favors disease development. Yields are usually not reduced but a high percent of seed stain may be evident at harvest.

Frogeye leaf spot: *Cercospora sojina* causes frogeye leaf spot on soybean. Symptoms occur primarily on leaves although the causal fungus may also infect stems, pods and seeds. Lesions are small, circular to somewhat angular spots that develop on the upper leaf surfaces. Initially the spots are dark and water soaked in appearance. As the lesions age they develop a dark reddish-brown border. The center of the lesion becomes light brown to light gray in color. Lesions may merge to kill larger areas of the leaf. Heavily spotted leaves may wither and drop prematurely. Stem lesions usually develop later in the season. Young stem lesions are deep red with a narrow, dark brown to black margin. As the stem lesions age, the centers become brown to smoky gray in color. Lesions on pods are circular to elongate, slightly sunken and reddish brown. The fungus can grow through the pod wall to infect maturing seed. Infected seeds may show discoloration of the seed coat that ranges from small specks to large blotches of light gray to dark gray or brown.

Virus diseases: There are several virus diseases which may occur on soybean in Missouri including bean pod mottle, soybean mosaic and tobacco ringspot or budblight. Of these, soybean mosaic virus and bean pod mottle virus are most likely to cause symptoms on the seed. Seed infected with soybean mosaic or bean pod mottle virus may have a symptom called bleeding hilum. This is a discoloration, usually black or dark in color that bleeds from the hilum down the sides of the seed. The affected area may be quite small and near the hilum or may be quite extensive and cover most of the seed. It is important to keep in mind that bleeding hilum is also a genetic characteristic of certain soybean varieties. The intensity of the discoloration can be influenced by environmental conditions during the growing season.

Colletotrichum anthracnose and tipblight: *Colletotrichum truncatum* and several other *Colletotrichum* species cause anthracnose of soybean. Typically, anthracnose is a late season stem and pod disease of soybean. Symptoms occur on stems, pods and petioles as irregularly

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shaped, light to dark brown spots, streaks or lesions. Eventually black fungal structures may be evident in these lesions. Anthracnose may also cause a tipblight. The tipblight phase of anthracnose causes a yellowing or browning of the uppermost leaves and pods. The blighted tips may dry up and die prematurely. This fungus may also infect seed. Seed may be smaller than normal and severely infected seed may be a moldy, dark brown in color and shriveled. Anthracnose is favored by warm, wet weather, and the tipblight phase of anthracnose is most likely to occur after a rainy period.

The incidence and severity of the soybean diseases which cause seed discoloration and deterioration are greatly increased by warm, wet conditions late in the season. For grain crops there are no potential rescue treatments. Fields should be harvested as soon as possible to prevent further seed damage.

Many of the pathogens causing seed discoloration and deterioration can survive on soybean seed. Heavily infected seed, if planted, could produce diseased seedlings resulting in stand problems. Therefore, seed from infected fields should not be saved for planting. If infected seed must be used for planting, it should be thoroughly cleaned, a sample submitted for a germination test (preferably a stress test) and a fungicide seed treatment applied.

Many of the pathogens that cause these diseases may also survive in infested residues left on the soil surface. Thus, crop rotation is an important means of preventing or reducing disease outbreaks. At least one year between soybean crops is recommended. Varieties may differ in their reaction to these various diseases and, if possible, good quality seed of resistant varieties should be planted.

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Insecticides for Protection of On-Farm Stored Grains

By Wayne Bailey

Successful protection of stored corn and wheat grains from insect pest infestations is best achieved by:

1. Sanitation

is an important component of a stored grain insect IPM program for prevention of stored grain insect infestations in fall harvested grain crops. Sanitation around storage facilities is most effective in prevention of stored grain insect infestation when applied 30-45 days prior to harvest, although following good sanitation procedures are encouraged throughout the year. Removal or elimination of any waste grain scattered in the area outside the storage facilities, in combine and grain handling augers, and under drying floors inside the storage facility will help prevent pest outbreaks.

2. Preventative Insecticides

are available for use on areas surrounding bins and in bin interiors. Insecticides labeled for use as structural sprays or bin preparation sprays in empty bins include Beta-cyfluthrin (Tempo SC Ultra, Tempo WP Ultra and Tempo Ultra WSP), Chlorpyrifos-methyl and deltamethrin (Storcide II), and Malathion available as several products. Two additional non-traditional products available for use in treating empty bins include Diatomaceous earth/Silicon dioxide (sold as several products) and Methoprene (Diacon II). Diatomaceous earth kills insects by either scratching the insect cuticle which allows for desiccation and death of the insect or by plugging the insects breathing structures causing insect death through suffocation.

3. Grain Mass Management Methods and Insecticides

Grain placed in on-farm storage this fall should be treated with an insecticide if it will remain in storage into the summer months of 2010. Grain stored for just winter months is best managed by cooling the entire grain mass to a temperature of 50 degrees Fahrenheit or less as soon as fall temperatures allow. Regardless of which management option is selected, regular monthly inspections of the surface and body of the grain mass are recommended to prevent loss from stored grain insects.

Insect infestations may occur throughout the grain mass, on the upper surface of the grain mass, or in both areas depending on the species of insects infesting the bin. Indian meal moth is the most common insect problem found in the upper twelve inches of the grain mass where larval feeding results in areas of moist, sour smelling grain and thick webbing. If such an infestation occurs and larvae are still active, removal of the damaged grain and insect webbing followed by an insecticide application to the remaining grain surface may be one method of control. Pest strips hung above the grain mass inside the storage structure may help prevent Indian meal moth infestations from developing and help with control of moths if present in the air space inside the bin and above the grain mass.

If an infestation of various flour beetles, grain weevils, or other stored grain beetles is found infesting the grain mass, then immediate use of the grain mass, moving and treatment of the grain mass with insecticide, or use of fumigants are some possible control options. If fumigation is selected, a professional fumigator should be used as a self-contained breathing apparatus is required plus the poisonous gases associated with fumigation are

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Insecticides for Protection of On-Farm Stored Grains *continued from page 141*

extremely dangerous if used improperly. The best option for management of stored grain insect infestations in summer is to immediately use the grain as livestock feed or some other use where the insects do not cause a problem in the end product.

Insecticides labeled for use on grain mass are best applied when bin or structure is being filled with grain. Insecticides label for control of stored grain insects found in the grain mass include Pirimiphos-methyl (Actellic 5E) labeled for use on corn and sorghum, but not labeled for use on empty bins or storage structures, Chlorpyrifos-methyl and deltamethrin (Storcide II)labeled for use on the grains of wheat, sorghum, barley, oats and rice, but in not labeled for corn. The non-traditional stored grain products of Diatomaceous Earth and Methoprene (Diacon II) are labeled for grain use, however diatomaceous earth can alter grain flow if applied to entire grain mass and methoprene is a growth regulator which will not prevent larval feeding, but will eventually prevent the development larvae from changing into the adult stage. Methoprene (Diacon II) is labeled for use on corn, wheat, grain sorghum, barley, oats, and rice.

4. Scouting Methods

differ by location in the bin. Indian meal moth infestations can generally be seen by observing the top of the grain mass from the roof access door. If no webbing or foul grain odors are found, then it is unlikely that Indian meal moths are present in high numbers. If the grain was properly leveled and treated with an appropriate insecticide after filling of the storage facility the previous fall, it is best not to break or disturb the protective cap of insecticide applied at that time. Some probing of the grain surface from the side access door may be necessary to determine level of insect infestations if found. Scouting for stored grain insects in the grain mass can be accomplished by using a grain probe to collect samples through the side access panel. Grain collected should be placed in a glass jar, plastic bag, or some other container through which insects can be seen if they are present in the grain. These containers of grain should be placed in a warm area to allow the grain to warm to at least 60 degrees F or higher in order to stimulate insect activity.

5. In Summary

several insecticides are labeled for use outside of grain bins, for inside surfaces in empty bins, for addition to the grain mass at the time of filling or possibly when insect infestations occur in the storage structures. All insecticides for stored grain insects have very specific labeled uses so pay special attention when selecting an insecticide for these specific uses. Some insecticides are only labeled for empty bin use while others are labeled for use on the grain mass. Some insecticides are labeled for wheat only or corn only, whereas others may be labeled for both. Using the wrong insecticide (not labeled for your use) can result in the grain being destroyed. Be sure to read and follow all insecticide label instructions, restrictions, and precautions when using insecticides for management of stored grain insect pests.

6. Additional Information

Moisture in the grain mass is one very important factor which attracts insect pests to these structures. Charles Ellis discussed the aeration and moisture zones in on-farm grain storage facilities in the January 15, 2009 issue of this newsletter (Volume 19, Number 1). Proper aeration of the grain mass to manage moisture and grain mass temperature is essential for good insect control. Note: it often requires a week or more of aeration to move a moisture layer through and out of a grain mass depending on several factors including the volume of air moved, the size of the storage structure, and the temperature of the air being moved into or out of the grain mass.

Color images of common stored grain insects can be found on the Commercial AG Electronic Bulletin Board at http://www.agebb.missouri.edu/storage/pests/insect.htm.

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Pest of the Month: Fall Armyworm

By Steven Kirk

The Fall Armyworm, Spodoptera frugiperda (Smith), is a late season pest in Missouri, found especially in southern parts of the state. It does not overwinter in Missouri, but arrives here in late June/ early July from the Gulf Coast area where it overwinters. Fall Armyworm feeds on a variety of crops including corn, wheat, cotton, rice, alfalfa and occasionally turfgrass.

Fall Armyworm adults are medium sized, dull-colored moths with a wingspan of about 1 1/2 inches. They resemble cutworm moths, a close relative. The front wings of male moths are dark gray, mottled with lighter and darker splotches, with a noticeable whitish blotch near the extreme tip (see Figure 1.). The forewings of females are more uniform gray, with less distinct markings. The hind wings of both sexes are grayish white. Adult moths are mainly active at night. The larvae of newly hatched Fall Armyworm are about 1/16 inch long and light grayish green in color, with older larvae ranging from light tan, to olive green, to nearly black. The full grown larvae measure about 1 1/2 inches long and have longitudinal stripes running along their sides. Although Fall Armyworm larvae resemble True Armyworms, they can be distinguished by the more prominent, light-colored, inverted Y-shaped marking on the front of the head as well as the presence of four distinct, black tubercles (a little projecting knob) on the back of each abdominal segment (Figure 2.). In addition, Fall Armyworms have well-defined teeth on their mandibles, unlike True Armyworms. The pupae of both Fall and True Armyworm are very similar in appearance.

Several generations of Fall Armyworms can occur each year, but generally only two occur in Missouri. Female moths are capable of laying 50 to several hundred eggs in masses covered with the grayish moth scales. Larvae hatch in 3 to 5 days and a new generation can take anywhere from 24 to 35 days to mature.

On corn, Fall armyworm feeding damage typically begins with removal of the top leaf layer. The larvae eat through the leaf as they grow, creating pin-sized holes that resemble European corn borer infestation. Larger Fall Armyworm larvae can consume large amounts of leaf tissue resulting in a ragged appearance similar to grasshopper damage. Fall Armyworms also damage corn by feeding on developing tassels, damaging immature ears and by boring into stalks. Fall Armyworm can be particularly damaging to late-planted pre-tasseled corn or later maturing hybrids. After plants begin to tassel, larvae can move to the young ears. Ear damage may be much more important than leaf damage.

Figure 1.

Fall armyworm can be one of the more difficult insect pests to control in field corn. Early detection and proper timing of an insecticide application are critical. Corn growers should pay close attention to late planted fields or fields with a history of these problems. If present in damaging numbers in the field, it must be controlled while the larvae are still small. Begin checking corn in mid-June and continue to check until silks begin to dry.

On wheat, Fall Armyworms can cause damage by feeding on the upper wheat leaf surfaces creating small round or oval window-panes. As the larvae grow, they can consume entire leaves, eventually chewing plants down to the soil line. Mature larvae become increasingly difficult to control, not only due to size, but because they often hide just under the soil surface.

Early sown wheat can be especially susceptible. Damage often goes un-notice until infestations are so high that replanting is the only option. If populations get too high, about all you can do is destroy the remaining vegetation, wait 2 weeks for the worms to starve, and then replant. Damage thresholds vary, but in many situations, as few as 2 to 3 worms per foot of row can destroy seedlings. If Fall Armyworm feeding is detected on up to 25 % of plants, you should begin inspecting daily.

On cotton, Fall Armyworm can potentially cause substantial boll damage in Missouri, however it is an infrequent economic pest. Typical damage symptoms are blooms and bolls with holes at the base of the bracts. Although it prefers grass, it can also feed broadleaf plants like cotton. Infestations usually occur on alternate host plants (e.g., corn) and then can move to cotton once the original host begins to mature and dry down.

Scouting for Fall Armyworm should begin as soon as its preferred alternate hosts begin to mature or turn brown.

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Examine five cotton plants at each of 10 locations per field for egg masses, larvae or damage. Egg masses are typically laid on both sides of the leaf. Within a few days of hatching from their eggs, the larvae become difficult to detect because they disperse and start feeding on the boll exterior. Insecticide treatments are recommended when four or more larvae per 100 bolls or blooms are present.

On rice, Fall Armyworm infestations occur July and August. Fall armyworm infestations generally start along grassy field borders and levees. Early detection can help limit insecticide use to these areas. Inspect foliage for small immature Fall Armyworm larvae early. Larvae can quickly grow to about 3/4 inch before they pupate. Although rice can withstand a lot of defoliation when seedlings are small, even a little defoliation can retard plant development. As a general rule, apply a control measure when at least 20 percent defoliation occurs and larvae have been detected.

Figure 2.

On alfalfa, Fall Armyworm can be a significant defoliator because they have the potential to continue feeding until the first frost. Producers can see healthy plants destroyed within a few days of infestation. Alfalfa stands seeded into wheat stubble can be especially hard hit. Fall Armyworm infestations in alfalfa tend to be clumped and intense because each female can lay 100 or more eggs in a mass. Small larvae will move out from these egg masses as they grow and consume all of the nearby plants. Look for roughly circular areas of missing plants in alfalfa stands, and examine the soil surface for the striped larvae. If needed, spot treatments can be used to deal with the problem. Treatment for Fall Armyworm larvae in seedling alfalfa is justified if larvae are reducing a newly seeded alfalfa stand and/or when one to two half-grown or smaller larvae are present.

On turfgrass, Fall Armyworm is a sporadic, but occasionally severe pest. Damage is very similar to that of the True Armyworm. Newly hatched larvae feed gregariously at first, scraping the underside of leaf blades and leaving the clear, upper epidermal layer, or chewing the leaf margins and producing a tattered look. As the larvae grow they can consume the equivalent of a good-sized handful of grass. The Fall Armyworm can feed anytime during the day or night, but move about mostly in the early morning or after dark. Although they are not as aggressive as the true armyworm; they can progressively thin a lawn over several days if not treated.

Look for discolored areas of turfgrass as the first sign of fall armyworms. damage often begins along one edge of the turf area. Large numbers of birds looking for larvae in a turf area may well be a sign of Fall Armyworms infestation. Also look for green, fecal pellets that can often be seen in areas of damage. A valuable time-saving tool to use when scouting for Fall Armyworms in turf is to use a soapy water flush to bring to the larvae to the surface prior to severe damage. Mix two tablespoons of liquid dishwashing detergent in two gallons of water. From a bucket or sprinkling ca, slowly pour the entire contents onto a square yard area where signs of infestation have occurred and then observe closely over the next few minutes for the Fall Armyworms (and any other larvae present) to make there way to the top of the turfgrass. It is not uncommon for the turf to be severely damaged and by the time someone begins looking for caterpillars, they have already entered the soil to pupate.

Fall Armyworm can be more difficult to control chemically than True Armyworm. Control will be improved if you cut the turf prior to treating. Light irrigation prior to treatment may also help as will treating late in the day. Chemical control is needed if natural enemies do not keep infestations below the economic threshold of 1 per square foot on general turf or 1 per square yard on golf greens. If possible, do not mow turf and remove clippings for several days after treating for any of the caterpillar pests.

Fall Armyworm (FAW) is one of eleven insect pests currently monitored by the IPM Pest Monitoring Network. Thirteen pheromone traps located in 6 of Missouri's 8 geographical regions are checked frequently to provide up-to-date pest-population data as an important tool to help pest managers make sound pest management decisions. Since the FAW monitoring season began in mid-May, there have been 8 FAW Pest Alerts sent to our subscribers from August 28th through October 4th due to potentially significant moth captures in pheromone traps. Significant captures have occurred in 2 Missouri counties in the Southeast region; 5 alerts at the Delta Center near Hayward in Pemiscot County, and 3 alerts from Benton in Scott, County.

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Pest of the Month: Fall Armyworm *continued from page 144*

Individuals interested in pest management can sign up and receive electronic Pest Monitoring Alerts when potentially significant insect captures have been reported. To subscribe to this service, visit our web site at:

http://ppp.missouri.edu/pestmonitoring/subscribe.htm.

Although Pest alerts from moth and beetle captures in pheromone traps DO NOT indicate that treatment is necessary, they do provided valuable tool to our subscribers indicating that scouting for potential pests in nearby locations may be in order.

Monitoring for pest outbreaks is a cornerstone of MU's Integrated Pest Management (IPM) Program. IPM stresses scouting practices rather than calendar-based treatments to detect pests and determine if action is necessary. MU's IPM Pest Monitoring Network provides farmers, landowners and pest managers with an up-to-date tally on several economically important insect species captured in pheromone traps throughout Missouri.

For additional information on Fall Armyworm and possible damage symptoms on corn and other crops as well as treatment recommendations follow this link:

http://extension.missouri.edu/publications/DisplayPub.aspx?P=G7115.

Image citations:

Figure 1: Spodoptera frugiperda moth: University of Georgia Archive, University of Georgia, Bugwood.org

Figure 2: Spodoptera frugiperda larva with inverted 'Y' on front of head, and four distinct, black tubercles on back of abdominal segments: Russ Ottens, University of Georgia, Bugwood.org

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Weather Data for the Week Ending October 5, 2009

By Pat Guinan

Station	County	Weekly Temperature (ºF)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	Sept 1 - Sept 30	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	67	40	73	32	54	-7	0.88	-2.51	3185	-124
St. Joseph	Buchanan	66	43	72	39	54	-7	1.83	-2.50	3104	-238
Brunswick	Carroll	68	39	74	33	53	-8	0.94	-2.40	3173	-210
Albany	Gentry	*	*	*	*	*	*	*	*	*	*
Auxvasse	Audrain	65	43	72	38	54	-8	3.55	-0.05	3171	-249
Vandalia	Audrain	65	42	72	36	54	-8	3.22	-0.27	3147	-263
Columbia-Bradford	Boone	67	43	72	37	54	-8	2.94	-0.60	*	*
Columbia-Jefferson Farm	Boone	66	44	72	38	55	-7	2.89	-0.59	3243	-297
Columbia-South Farms	Boone	66	44	72	37	55	-7	3.06	-0.48	3240	-297
Williamsburg	Callaway	66	43	72	37	54	-7	3.45	-0.45	3165	-203
Novelty	Knox	62	42	69	38	53	-8	3.38	-0.18	2869	-451
Linneus	Linn	64	41	70	34	53	-8	0.87	-2.69	2974	-268
Monroe City	Monroe	64	42	69	36	53	-9	3.51	-0.09	3027	-349
Versailles	Morgan	68	44	74	40	56	-7	4.64	+0.93	3394	-207
Green Ridge	Pettis	68	42	74	38	55	-7	3.55	-0.73	3227	-111
Lamar	Barton	70	44	79	40	57	-7	5.90	+1.10	3422	-347
Cook Station	Crawford	69	42	76	34	55	-7	5.64	+1.74	3159	-451
Round Spring	Shannon	69	41	75	38	54	-8	5.45	+1.94	3217	-237
Mountain Grove	Wright	66	43	72	37	55	-7	3.86	-0.23	3140	-305
Delta	Cape Girardeau	71	45	79	41	58	-6	2.87	-0.23	3656	-317
Cardwell	Dunklin	70	49	78	46	59	-7	2.32	-0.92	4003	-300
Clarkton	Dunklin	71	50	80	46	60	-6	3.54	+0.36	3901	-350
Glennonville	Dunklin	70	48	78	44	59	-7	2.19	-0.99	3944	-281
Charleston	Mississippi	70	48	79	45	59	-5	3.44	+0.44	3853	-112
Portageville-Delta Center	Pemiscot	71	51	78	48	60	-6	6.14	+2.81	4096	-150
Portageville-Lee Farm	Pemiscot	71	51	79	47	60	-6	4.43	+1.00	4107	-109
Steele	Pemiscot	72	50	80	47	61	-5	4.42	+1.10	4176	-70

* Complete data not available for report

‡Growing degree days are calculated by subtracting a 50 degree (Fahrenheit) base temperature from the average daily temperature. Thus, if the average temperature for the day is 75 degrees, then 25 growing degree days will have been accumulated.

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