Integrated Pest & Crop Management

Weed of the Month: Fall Panicum

By Doug Spaunhorst and Kevin Bradley

Fall panicum (*Panicum dichotomiflorum* Michx.) is a summer annual grass weed found throughout the United States in a variety of agronomic, non-crop, nursery, landscape, and turfgrass settings. Over the past several years, fall panicum has become an increasingly problematic weed of corn and soybean production in Missouri.

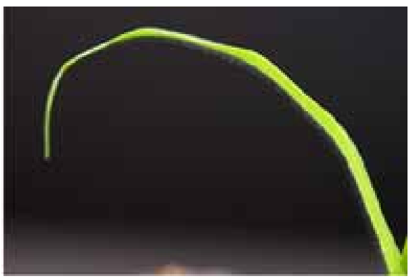

Figure 1. Fall panicum seedlings have hairs on the leaf undersides only, but these disappear with maturity.

Fall panicum seedlings can appear much different than mature plants. Perhaps the most notable characteristic of fall panicum seedlings are the hairs that occur on the lower leaf surfaces (Figure 1). Seedlings also have hair-like ligules that typically measure 2 mm or less in length and are without auricles. Mature plants have leaves that are quite large at maturity, measuring 15-20 mm in width, are rolled in the bud, and are hairless on both surfaces. Leaves also have a distinct white midvein and are often glossy in appearance (Figures 2 and 3). With maturity, plants take on a "zigzagged" growth habit. Stems are relatively thick, hairless, and usually enlarged at the nodes. Fall panicum seedheads are wide, spreading panicles that develop a purplish tint when mature.

Figure 2. As fall panicum plants mature, a white midvein becomes noticeable as well as glossy leaf undersides.

Fall panicum seed emergence occurs most readily at depths of 0 to 2 inches, with few seeds capable of germinating from soil depths greater than this. Other authors have observed extreme variability in the pattern of fall panicum emergence from one year to the next. However, most indications are that this species tends to be a later emerging weed that can germinate throughout the growing season.

In corn, atrazine usually will only provide fair pre-emergence, residual control of fall panicum, which may explain the higher incidence of this weed in our corn and soybean production systems over the past several years. Atrazine premixes that contain metolachlor (Bicep II Magnum, Charger Max, Lumax, Lexar, etc.), acetochlor (Degree Xtra, Harness Xtra, etc.), or dimethenamid (Guardsman Max) will increase control of fall panicum dramatically. Post-emergence control of fall panicum in corn is difficult and must be timely; applications must be

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Figure 3. Mature fall panicum plants with seedheads.

made to small fall panicum plants in order to be effective. However, products that contain ALS-inhibiting herbicides like nicosulfuron (Accent), rimsulfuron (Resolve, Basis), thiencarbazone (Capreno) can provide good control of fall panicum as well as glyphosate (Roundup, etc.) and glufosinate (Ignite), in Roundup Ready and LibertyLink corn systems, respectively. Post-emergence applications of the HPPD-inhibiting herbicides Callisto, Impact, and Laudis generally only provide fair to poor control of fall panicum.

Many of the pre-emergence, residual herbicides that are relied upon for the control of fall panicum in corn can be utilized in soybean as well. For example, pre-emergence applications of products that contain metolachlor (Dual II Magnum, Prefix, Boundary), alachlor (IntRRo), dimethenamid (Outlook, Verdict), and pendimethalin (Prowl, Prowl H2O) will provide good control of fall panicum in soybean. Post-emergence options for the control of fall panicum in soybeans include the grass herbicides like quizalofop (Assure II, Targa, etc.), fluazifop (Fusilade), and clethodim (Select Max, Arrow, etc.), glyphosate (Roundup, Touchdown, etc.) in Roundup Ready soybeans, and glufosinate (Ignite) in LibertyLink soybeans.

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Prep Now For Planting Wheat This Fall

By J. Allen Wrather

Be careful when selecting wheat seed for planting this fall because the germination of seed can affect yields next spring. Seeds that germinate poorly can result in thin stands causing low yields next year. Bin-run seed, seed from a storage tank that has not been cleaned, may or may not germinate well. Farmers should test a small sample of bin-run seed for germination and then make the decision about whether to plant it based on the test results. For the best wheat yields next spring, plant high quality seed this fall.

Wheat seed should be treated with a fungicide before planting to protect the health of the seed and resulting seedlings. Pathogens that cause wheat seed and seedling diseases are in the soil and sometimes on the seeds, and a fungicide seed treatment will help protect the seedlings from these pathogens. Several effective fungicide seed treatments are available at local seed treatment facilities, and a list of labeled fungicide treatments for wheat is on pages 152-163 in M171, http://extension.missouri.edu/explorepdf/manuals/m00171.pdf.

To enhance wheat yield in 2012, I suggest producers follow these three guidelines.

1. Plant after mid-October to avoid Hessian fly problems.

2. Plant only high-quality seed, seeds that germinate greater than 80%, treated with a fungicide.

3. Plant in fertile soil. Ensure that soil pH, phosphate, potash and sulfur levels are proper.

Don’t relax, now is the time to locate your wheat seed for planting this fall and make sure it is clean, high quality, and treated with a fungicide.

Following these suggested procedures will give wheat farmers a better chance of producing the highest wheat yields possible in 2012. For more information contact your University of Missouri Extension Regional Agronomist or read the material available at this University of Missouri web site, http://muextension.missouri.edu/explore/agguides/pests/ipm1022.htm.

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Ear and Kernel Rots of Corn

By Laura Sweets

Corn harvest is beginning or rapidly approaching in many parts of the state. So far we have received very few samples with ear and kernel rots. However, preliminary surveys suggest that a variety of ear and kernel rots of corn could be problems this season. Usually Diplodia ear rot, Gibb ear rot, Penicillium ear rot and *Aspergillus* species other than *Aspergillus flavus* are associated with wet conditions, especially wet falls and harvests that are delayed by wet conditions. Although much of the state was unusually dry from July on, there have already been fields in which these ear and kernel rots are present. In some cases the ears showing molds had been damaged by insects or hail and the molds had come in around the damaged areas. But in other cases Penicillium and Fusarium are showing up on the tips of the ears. And then in areas in which hot, dry conditions occurred at or just after pollination, *Aspergillus flavus* and aflatoxin could be problems. See article by Dr. Allen Wrather in the August 15, 2011 issue of the *Integrated Pest and Crop Management Newsletter* for more information on aflatoxin.

Diplodia ear rot, Penicillium ear rot and Gibb ear rot are common problems year in and year out but the severity varies with weather conditions at pollination or close to harvest. The Penicillium ear rot and Gibb ear rot are particularly evident on the exposed tips of ears, around insect tunnels and on ears that have remained upright. If there are periods of wet weather before corn is harvested, some of the corn plants that died prematurely may show the black discoloration caused by secondary fungi coming in on the senescing plant tissues. Many corn fields in the state were stressed by hot, dry conditions during silking and pollination and were exposed to extended periods of hot, dry weather either during or after pollination. Therefore, there is a potential for *Aspergillus flavus* and aflatoxin in corn throughout the state.

Both *Diplodia maydis* and *Diplodia macrospora* can cause **Diplodia ear rot** of corn. The ear leaf and husks on the ear may appear prematurely bleached or straw-colored. When the husk is peeled back, dense white to grayish-white mold growth will be matted between the kernels and between the ear and the husks. Small, black fungal fruiting bodies may be scattered on husks or embedded in cob tissues and kernels. The entire ear may be grayish-brown, shrunken, very lightweight and completely rotted. Diplodia ear rot is favored by wet weather just after silking and is more severe when corn is planted following corn.

Penicillium rot is usually evident as discrete tufts or clumps of a blue-green or gray-green mold erupting through the pericarp of individual kernels or on broken kernels. Penicillium appears as small, discrete colonies of mold growth with a dusty or powdery appearance. The fungus may actually invade the kernel giving the embryo a blue discoloration. Blue-eye is the term used for this blue discoloration of the embryo.

Gibb ear rot (caused by *Gibberella zeae*) usually begins as a reddish mold at the tip of the ear. Early infected ears may rot completely with husks adhering tightly to the ear and a pinkish to reddish mold growing between husks and ears. Although mold growth usually has a pinkish to reddish color, it can appear yellow to yellow-orange or yellow-red. Gibb ear rot typically begins at the tip of the ear but under favorable conditions it can move down the ear causing extensive damage. It may also develop around injuries from hail, birds or insects.

Aspergillus niger is also common on exposed ear tips. This fungus will be evident as black, powdery masses of spores on the tip of the ear or around insect tunnels.

Black corn occurs when any of a number of saprophytic or weakly parasitic fungi grow on corn plants in the field.

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Alternaria, Cladosporium, Aureobasidium and other species are frequently found on these discolored or black plants. Since the affected plants may have a sooty appearance these fungi are sometimes called sooty molds. These sooty molds or secondary fungi tend to develop on plants when wet or humid weather occurs as the crop is maturing or if harvest is delayed because of wet weather. Typically these fungi come in on plants that are shaded, undersized, weakened or prematurely ripened and on senescing foliage. Plants that are lodged or that have been stressed by nutrient deficiencies, plant diseases or environmental conditions may be more severely affected. Although many of these fungi produce dark or black mold growth, the color of the mold growth can range for dark or black to olive green or even pink to white.

These secondary fungi tend to develop on senescing plant tissues, primarily leaf, stalk and husk tissue, but under favorable conditions can cause infection of the kernels. Infected kernels might show a black discoloration.

It is possible that these sooty molds or secondary fungi could contribute to stalk deterioration or stalk rot. Lodging could become a problem in these fields, especially if there are high winds or strong storms before harvest.

Grain from fields with high levels of sooty molds should be treated with care if it is stored. Grain should be thoroughly cleaned to remove lightweight, damaged or broken and moldy kernels. Grain should be stored at the proper moisture content and temperature and checked on a regular basis during storage.

Aspergillus flavus is evident as greenish-yellow to mustard yellow, felt-like growth on or between kernels, especially adjacent to or in insect damaged kernels. *Aspergillus flavus* is favored by high temperatures and dry conditions, so Aspergillus ear rot is typically associated with drought stress. The fungus survives in plant residues and in the soil and spores are spread by wind or insects to corn silks where the spores initiate infection.

An additional concern with ear and kernel rots of corn is the possibility of mycotoxin production. Mycotoxins are naturally produced chemicals that in small amounts may be deleterious to animal or human health. *Aspergillus* and *Gibberella* are most frequently involved in cases of mycotoxin contamination in Missouri corn. The presence of molds or their spores does not necessarily mean that mycotoxins will be produced. Circumstances that favor mold growth may allow production of mycotoxins in some situations, but frequently mold growth occurs with little or no mycotoxin production. Once formed, mycotoxins are stable and may remain in grain long after the fungus has died. In general, swine and poultry are more susceptible than ruminants to mycotoxin-induced health problems. In cases where mycotoxin problems are suspected, a sample should be submitted to a qualified laboratory for mycotoxin analysis. Table 1 below gives the acceptable levels of aflatoxin in corn intended for various uses as established by the United States Food and Drug Administration.

Table 1. Present acceptable levels of aflatoxin in corn used for food and feed as established by the United States Food and Drug Administration (FDA) are as follows:

1. Corn containing no more than 20 ppb of aflatoxin when destined for food use by humans, for feed use by immature animals (including immature poultry) and by dairy animals, or when the intended use is unknown.
2. Corn containing no more than 100 ppb aflatoxin when destined for breeding beef cattle, breeding swine or mature poultry (e.g. laying hens).
3. Corn containing no more than 200 ppb aflatoxin when destined for finishing swine (e.g. 100 lbs. or greater).
4. Corn containing no more than 300 ppb aflatoxin when destined for finishing (i.e. feedlot) beef cattle.

Little can be done to prevent or reduce the invasion of corn by fungi in the field. These ear and kernel rots tend to be more severe on ears with insect, bird, hail or other physical damage. Ears well covered by husks and maturing in a downward position usually have less rot than ears with open husks or ears maturing in an upright position. However, if ear and kernel rots developed in the field, it is important to harvest the field in a timely manner and to store the grain under the best possible conditions. Both *Penicillium* and *Aspergillus* can continue to develop on corn in storage if the grain is not stored at proper moisture content and temperatures. These two fungi can cause serious storage mold problems.

Adjust harvest equipment for minimum kernel damage and maximum cleaning. Before storing grain, clean bins thoroughly to remove dirt, dust and any grain left in or around bins. Thoroughly clean grain going into storage to remove chaff, other foreign material and cracked or broken kernels. Dry grain to 15% moisture as quickly as possible and monitor grain on a regular basis throughout storage life to insure moisture and temperature are maintained at correct levels. Protect grain from insects.

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Soybean Podworm Continue to Cause Damage to Soybean

By Wayne Bailey

Many Missouri soybean producers are once again experiencing problems with soybean podworm (corn earworm) in soybean. Soybean podworm numbers have gradually increased in Missouri soybean fields over the past 5 years. Although podworm traditionally has been a major pest of soybean in many southern and eastern states and an occasional pest of soybean in Missouri's "Bootheel" counties and other counties bordering Arkansas, in 2010 and 2011 economic infestations of podworm expanded their range into more northwestern and north central counties of Missouri. Most fields experiencing problems with this pest in both years were planted after June 1.

In 2011, soybean podworm problems have been found mainly on late planted and double crop soybean fields. In some fields, flowers were fed upon by larvae earlier in the season with much defoliation and pod damage now occurring. These late planted fields are more attractive to migrating moths as females prefer to lay eggs in fields where soybean plant canopies remain open. Wind direction and the intensity of moth flights during moth migration help determine the location and intensity of developing podworm larval infestations. Similar to 2010, a majority of soybean podworm damaged fields are located in the southeastern, western, and some north central counties of Missouri. However, soybean podworm infestations may occur anywhere in the state if field conditions and soybean growth stages are attractive to soybean podworm moths.

Moth identification is difficult as they vary in color, but tend to be tan with a yellow to light green tint. Moths are relatively large with approximately 1-1.5-inch wing spans. Eggs are laid singularly on several field crops, although silks of late planted field corn and sweet corn are most attractive to ovipositing moths as are soybean fields prior to closure of plant canopies. Each female may lay an average of 1000 (500 to 3000) white to cream colored, somewhat transparent, dome shaped ribbed eggs. Eggs display brown bands just prior to hatch with larvae emerging in 2-10 days depending on field temperatures. Larvae initially feed on foliage and sometimes soybean flowers, but prefer to feed on pod walls and consume seeds as larvae approach maturity (1 to 1.5 -inch in length). Larvae grow through five worm stages and change in color with age. Newly hatched larvae are yellowish-white in color with second and third instar larvae changing to yellowish-green. Later instars found feeding on soybean pods can range in color from green to yellow to tan or reddish brown. Regardless of color, they will generally display several dark longitudinal stripes running the length of their bodies and numerous black bumps with protruding hairs will be present on the top and sides of their bodies. In addition, this insect has four pairs of abdominal prologs (middle of larva) and one pair of anal prologs (back end of larva). Green cloverworm, which is also green in color, can be differentiated by possessing three pairs of abdominal prologs. When disturbed, soybean podworm larvae often roll into tight balls until the threat passes, whereas, green cloverworm larvae often thrash about violently when disturbed. There are typically two or three generations of soybean podworm (corn earworm) produced in Missouri, annually, with second and third generation larvae being most damaging to soybean.

Traditionally a pest during periods of hot, dry conditions when beneficial insect numbers are reduced, this pest also may flourish whenever field conditions and/or farming practices reduce beneficial insect numbers. In most years, a fungal pathogen (*Nomuraea rileyi*) will substantially reduce numbers of podworm before they are able to cause substantial damage to soybean and before they mature and pupate in the soil. This beneficial fungal pathogen is often present early in the season in soybean fields where the pathogen also attacks the larvae of green cloverworm. If green cloverworm numbers are few early, then the presence of the fungal pathogen late in the season is reduced and survival of soybean podworm larvae is increased. Another factor that may allow podworm populations to increase to economic levels is the application of early season foliar insecticides and fungicides. In most years, these types of pesticide applications may have minor impact on potential soybean podworm numbers. However, if soybean podworm moth flights are heavy within the state during July and August, soybean canopies are still open, and the fungal pathogen is reduced by spraying of foliar insecticides and fungicides, then the potential for severe damage to soybean pods by podworm is greatly increased. To reduce the risk of

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podworm damage soybean producers are encouraged follow these recommendations when possible.

• Plant early and use narrow row spacings, which result in quick plant canopy closure.

• Do not spray unnecessary insecticide and fungicide foliar applications resulting in reduced numbers of biological control agents.

• Fields in which plant stressors such as nutrient deficiency, low pH, and drought are limited will typically experience reduced problems with this soybean pest.

The most effective methods of determining whether podworm populations are elevated is through monitoring of soybean podworm moth flights during June–August and frequent scouting of soybean fields throughout the season, but especially during flowering and pod fill growth stages. Scouting during these periods of plant growth should occur at least twice per week as podworm larvae can quickly cause extensive damage to flowers and pods when larval number are elevated. Direct observation of soybean plants, use of a shake sheet between rows, and even sweep nets samples are all methods used to determine podworm numbers. Direct observation and shake sheet samples will provide the best estimate of larval numbers. Typically a white cloth or paper is spread between soybean rows. A 1 foot section of plants are grasped on each side of the shake cloth and vigorously shaken over the cloth. Dislodged larvae can be identified and counted. Although economic thresholds are variable for this pest, in Missouri we use an economic threshold of 1 or more larvae present per plant or 1 or more larvae present per foot of row to be an action level where control is justified. If most larvae are 1 to 1.5

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CORN EARWORM / SOYBEAN POD WORM - *Helicoverpa zea (Boddie)*

Comments: Treat when defoliation reaches 30% prebloom or 20% from bloom to pod fill or when larval numbers exceed one per foot of row and 5% or more of pods are damaged. Heavy populations may cause excessive defoliation and pod loss.

Common Name	Trade Name	Rate of formulated material per acre	Placement	REI Hours	Pre-Harvest Intervals Days
esfenvalerate	***Asana XL**	5.8 to 9.6 fl oz	foliage	12	21 (grain) Do not graze or feed livestock
cyfluthrin	***Baythroid XL**	1.6 to 2.8 fl oz	foliage	12	45 (grain, feeding dry vines) 15 (green forage)
bifenthrin	***Brigade 2EC**	2.1 to 6.4 fl oz	foliage	12	18 (grain)
chlorpyrifos + gamma-cyhalothrin	***Cobalt**	19 to 38 fl oz	foliage	24	30 (grain) Do not graze or feed livestock
lambda-cyhalothrin + thiamethoxam	***Endigo ZC**	2.5 to 3.5 fl oz	foliage	24	30 (grain) Do not graze or feed livestock
zeta-cypermethrin +	***Hero**	2.6 to 6.1 fl oz	foliage	12	21 (grain) Do not graze or feed livestock
methomyl	***Lannate SP** ***Lannate LV**	1/4 to 1/2 lb 3/4 to 1 1/2 pt	foliage	48	14 (grain) 3 (forage) 12 (hay)
Imidacloprid + cyfluthrin	***Leverage 2.7**	3.8 fl oz	foliage	12	45 (grain, feeding dry vines) 15 (green forage)
chlorpyrifos	***Lorsban Advanced**	1 to 2 pt	foliage	24	28 (grain) Do not graze or feed livestock
zeta-cypermethrin	***Mustang Max**	2.8 to 4.0 fl oz	foliage	12	21 (grain) Do not graze or feed livestock
chlorpyrifos	***Nufos 4E**	1 to 2 pt	foliage	24	28 (grain) Do not graze or feed livestock
carbaryl	**Sevin 4F**	1 to 3 pt	foliage	12	21 (dry grain or hay) 14 (graze or forage)
spinosad	**Tracer Naturalyte**	1.5 to 2 fl oz	foliage	4	28 (grain) Do not graze or feed livestock
cyfluthrin	***Tombstone Helios**	1.6 to 2.8 fl oz	foliage	12	45 (grain, feeding dry vines) 15 (green forage)
lambda-cyhalothrin	***Warrior II with Zeon**	0.96 to1.60 fl oz	foliage	24	30 (grain) Do not graze or feed livestock

***Designates a restricted-use pesticide. Use is restricted to certified applicators only. Read the label to determine appropriated insecticide rates. Be sure to follow all label directions, precautions, and restrictions.**

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inches in length then control may not be necessary as larvae of this size will soon stop feeding and pupate.

If control of podworm is justified, select from the list of labeled pesticides on page 151. For optimal control of soybean podworm larvae use sufficient water with pesticide to provide good coverage of foliage.

Additional information is available in University of Missouri Extension Guide Sheet G7110 "Corn Earworm in Missouri." Excellent images of corn earworm are available in Guide Sheet G7110 or at the Iowa State University entomology photo gallery (www.ent.iastate.edu/imagegal)

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Frogeye leaf spot pathogen resistant to strobilurin fungicide found in southeast Missouri

By J. Allen Wrather

A crop consultant working in southeast Missouri recently examined a soybean field that had many plants infected with frogeye leaf spot, and the field had previously been treated with a strobilurin fungicide. The fungicide should have stopped development of frogeye, but had not. The consultant sent frogeye leaf spot-affected soybean leaves from this field to be tested for strobilurin fungicide resistance by Dr. Carl Bradley at the University of Illinois. Dr. Bradley isolated the pathogen from 10 different leaves and tested each for sensitivity to strobilurin fungicide. He learned that the isolates collected from four leaves were sensitive to strobilurin fungicides, but the isolates from six leaves were resistant to strobilurin fungicides. This is the first confirmed finding in Missouri of this pathogen that is strobilurin resistant. Farmers and consultants should observe soybean fields that have been treated with a strobilurin fungicide to determine if frogeye leaf spot is present and still spreading. If so, plants in the field could be treated with a fungicide other than strobilurin to stop the spread of this disease. Current research results show that application of a fungicide to soybean plants at or past the R6 growth stage, when seeds are full sized, will not be as beneficial to yield as an application made at the R3 or R5 growth stages.

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Recommendation for Control of Stored Grain Insects

By Wayne Bailey

BEFORE HARVEST

1. SANITATION. Thoroughly clean all grain residues from bins. Remove all residues from areas around the bins and any nearby feed bunks or feed storage areas. Remove all grain residues from combines, trucks, and augers. These residues will be the main sources of insect infestations for farm stored grain. This is a very important part of a good grain management program and can prevent many stored grain insect problems.

2. RESIDUAL SURFACE SPRAYS TO EMPTY BIN. After all debris and grain residues have been removed, a residual insecticide should be sprayed to the entire inside of the bin. This insecticide should also be applied around the exterior and to all areas where residues were removed. Spray all surfaces until wet; usually one gallon will cover 1,000 square feet. Use a course spray at a pressure of at least 30 psi. Insecticides are most effective if temperatures are 60F or higher. The labeled effective compounds are:

a. Beta-Cyfluthrin (**Tempo SC Ultra - 0.27 to 0.54 fl oz per 1 gallon of Water**) for application to empty bin surfaces only, <u>not</u> to grain.

b. Chlorpyrifos-methyl and deltamethrin (**Storcide II – 1.8 fl oz per 1 gallon of water**) Warning-<u>This insecticide should only be applied from outside the bin using automated spray equipment.</u> Do not enter the bin until all sprays have dried.

c. Malathion (**Malathion 5E - several products by various formulators, check specific application rates.**) The efficacy of this product is questionable although labeled. Some stored grain insect populations, such as In-

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dian meal moth, have developed resistance to this insecticide. **Note: Malathion 5 E not labeled for rice.**

AT HARVEST GRAIN PROTECTANTS

3. PROTECTANTS FOR APPLICATION TO GRAIN. If grain is to be held in storage into the summer months of the year following harvest or longer, then a grain protectant applied at harvest is recommended. Formulated sprays, drips or dusts are typically applied to moving grain stream as it goes into storage vessel.

a. Chlorpyrifos-methyl + deltamethrin (**Storcide II**) – dilute labeled rate of Storcide II in 5 gallons of water and apply formulated spray into grain stream. Five gallons of formulated spray applied to 1,000 bushel of grain.

Storcide II rates per 1,000 bushel of grain crop are as follows:

Barley	**9.9 fl oz per 1,000 bushels;**
Oats	**6.6 fl oz per 1,000 bushels;**
Rice	**9.3 fl oz per 1,000 bushels**
Sorghum	**11.6 fl oz per 1,000 bushels**
Wheat	**12.4 fl oz per 1,000 bushel**

b. Pirimiphos-methyl (**Actellic 5E – 9.2 to 12.3 fl oz per 5 gallons of water per 30 tons of grain (approximately 1071 bu.**). Note: labeled for corn and sorghum only.)

c. Malathion (**Malathion 6% Dust – 10 lbs/1,000 bushels of grain.**) Insecticide dust best applied through dust applicator into grain stream. Labeled for barley, corn, oats, rye, and wheat. Malathion not labeled for use on rice.

4. SURFACE TREATMENTS OR TOPDRESSING AFTER BIN FILL IS COMPLETE. Fill bins only to height of side walls and level grain prior to applying surface or top-dress insecticide treatments.

a. Bacillus thuringiensis (**Biobit HP and Dipel DF – 1 lb/ 10-20 gal/1,000 square feet**). Most often used for Indian meal moth larval control. See label for specific instructions and target pests.

b. Diatomaceous earth (**Insecto at 4 lbs/1,000 square feet and Protect-It at 40 lbs/1,000 square feet if grain not previously treated with this protectant**). See label for specific instructions and target pests.

c. Pirimiphos-methyl (**Actellic 5E – 3.0 fl oz per 2 gallons of water per 1,000 square feet of grain surface**. Note: Labeled for corn and sorghum only.)

5. GRAIN FUMIGANTS. Recommend use of commercial pest control specialist when using grain fumigants for stored grain insect control.

a. Aluminum Phosphide (phosphine gas - restricted use) (**Phostoxin, Fumitoxin, Phoskill, Phosteck, Phosfume Weevil-cide – see specific labels for rates of pellet or tablet use**).

MONITORING FOR INSECT PESTS IN STORED GRAIN

Bins should be monitored every one to two weeks when grain mass temperature is above 60F and every two to four weeks when grain temperature is below 60F. Monitoring is best achieved using plastic tube traps which are inserted into the grain mass for a certain period of time and then retrieved (see trap label for specific instructions). This type of trap will attract insects and help determine the kind and number of insects present in the grain mass. Be sure to cool grain mass in fall to 60F or less to prevent insect activity. In the spring the grain mass should be warmed to average outside temperatures to prevent condensation and subsequent moisture damage to grain in contact with bin walls.

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Weather Data for the Week Ending September 5, 2011

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.	August 1-31	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	85	66	96	50	76	+3	4.94	+0.97	3327	+423
St. Joseph	Buchanan	85	66	96	51	75	+3	6.60	+2.33	3209	+308
Brunswick	Carroll	86	67	96	49	75	+3	3.68	-0.77	3272	+333
Albany	Gentry	84	64	96	47	74	+2	4.81	+1.12	3149	+285
Auxvasse	Audrain	91	65	101	51	77	+5	1.75	-1.94	3311	+350
Vandalia	Audrain	92	64	103	49	77	+5	0.56	-3.35	3247	+315
Columbia-Bradford Research and Extension Center	Boone	89	64	98	51	76	+3	2.39	-1.87	3283	+236
Columbia-Capen Park	Boone	90	64	101	49	76	+2	3.08	-1.18	3308	+160
Columbia-Jefferson Farm and Gardens	Boone	89	66	99	52	77	+4	2.29	-1.98	3379	+326
Columbia-Sanborn Field	Boone	89	68	99	53	78	+4	3.12	-1.14	3552	+404
Columbia-South Farms	Boone	89	66	99	52	77	+4	2.52	-1.79	3364	+315
Williamsburg	Callaway	92	64	102	47	77	+5	1.83	-2.22	3309	+399
Novelty	Knox	86	64	97	50	74	+3	2.27	-1.29	3043	+168
Linneus	Linn	85	64	96	49	74	+3	2.15	-1.82	3102	+283
Monroe City	Monroe	91	64	103	47	77	+6	1.28	-2.59	3179	+258
Versailles	Morgan	89	66	98	50	76	+2	5.24	+1.54	3569	+456
Green Ridge	Pettis	88	66	99	50	76	+4	5.50	+2.03	3401	+474
Lamar	Barton	92	67	104	50	79	+4	3.21	-0.12	3698	+451
Cook Station	Crawford	88	62	96	48	75	+2	4.50	+1.04	3356	+233
Round Spring	Shannon	87	60	94	48	73	0	5.18	+1.90	3250	+257
Mountain Grove	Wright	87	64	96	50	75	+2	3.80	+0.85	3335	+371
Delta	Cape Girardeau	90	64	98	58	77	+2	2.08	-0.96	3629	+194
Cardwell	Dunklin	90	65	97	54	77	+1	2.22	+0.09	3958	+249
Clarkton	Dunklin	92	65	101	54	78	+2	2.14	-0.04	3875	+220
Glennonville	Dunklin	89	66	97	54	77	+1	2.40	+0.15	3868	+231
Charleston	Mississippi	90	67	98	59	78	+3	1.36	-1.21	3766	+317
Portageville-Delta Center	Pemiscot	91	69	99	57	79	+3	1.26	-0.90	4018	+342
Portageville-Lee Farm	Pemiscot	91	68	98	58	79	+3	0.80	-1.51	3990	+343
Steele	Pemiscot	90	67	98	56	78	+2	1.95	-0.62	4071	+396

‡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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