Integrated Pest & Crop Management

The First 40 Days are Critical for Grain Sorghum Health and Yield

By Allen Wrather

Grain sorghum was the sixth most valuable field crop grown in Missouri during 2009 following soybeans, corn, wheat, rice, and cotton. The value of this crop was about $30 million, but the value would have been greater if not for reduced yields caused by seedling diseases. Grain sorghum seedling diseases can be caused by several microorganisms that normally live in the soil on organic matter but can attack grain sorghum seedling roots especially when the soil is cold and wet and the soil pH is low. Seedling diseases cause dark red to black rotten areas to develop on grain sorghum roots. The leaves of diseased seedlings may wither or appear pale-green, and diseased plants will be smaller than healthy plants. Most sick plants die, and this causes thin stands, skips in rows, and occasionally entire fields or parts of fields must be replanted. Some sick plants may survive, and these are often weak and yield less than healthy plants. Farmers can help protect grain sorghum seedlings from seedling diseases by following a few simple guidelines.

1. Plant only when the soil temperature 4 inches deep has warmed up to about 65°F by 8:00 a.m. and plant only when at least 7 days of warm and dry weather are predicted immediately after planting.
2. Plant only high-quality seed that has a high germination rate.
3. Plant in fertile soils that have a pH of 6.0 to 6.5. Grain sorghum seedlings growing in soil with a pH less than 5.5 are more likely to be diseased.
4. Plant in well drained fields. Make sure field surface drainage is adequate to quickly eliminate excess water and enhance internal soil drainage by breaking hardpans with a ripper.
5. Have the seed treated with extra fungicides when grain sorghum is planted early in the season, in poorly drained fields, in clay soils, and certainly when planting in fields where seedling diseases have been a problem in previous years.
6. When planting no-till, equip your planter to move trash away from the row, so the sun can warm the soil around the seed faster.

Following these suggested procedures will give Missouri grain sorghum farmers a better chance of producing high yield and profit during 2011. More information is available at your University of Missouri Extension county office and is posted on the University of Missouri Delta Center web page (www.aes.missouri.edu/delta).

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In This Issue

Steps to Minimize Losses from Three Important Soybean Diseases

By Laura Sweets

When asked which soybean diseases consistently cause losses and which are most difficult to manage both producers and agri-business personnel in Missouri list Phytophthora root rot, soybean cyst nematode and sudden death syndrome. All three of these diseases are caused by pathogens that are present in the soil, all three are found in all soybean producing areas of the state and all three can be difficult to manage. Management options for these three diseases rely primarily on preventative measures since effective rescue treatments are not available. These three soybean diseases along with management options are described below. For additional information and color pictures please see the University of Missouri Extension bulletin IPM1002 *Soybean Diseases*.

Phytophthora Seedling Blight and Root Rot

Phytophthora seedling blight and root rot is caused by the soil-borne fungus *Phytophthora sojae*. This soil-inhabiting fungus can cause seed decay, preemergence or postemergence damping-off, seedling blight and root rot as well as mid- to late-season wilt and death of plants. *Phytophthora sojae* produces structures called oospores, which enable it to survive from year to year in crop residues or in the soil. In the spring, the oospores germinate to produce sporangia. When soils are flooded or saturated, the sporangia release zoospores, which are attracted to the growing soybean root tip, where infection occurs.

Phytophthora seedling blight and root rot is more severe in areas that are low or poorly drained, in compacted areas or in clay or heavy soils, but the disease can appear on plants growing in lighter soils or higher grounder if the soil remains wet after planting. Significant rain after planting favors the development of *Phytophthora* in all sites. A dry period after planting drastically reduces this disease. *Phytophthora* may occur at soil temperatures as low as 50 degrees F, but greatest root damage occurs when soil temperatures are 59 degrees F or above.

Numerous races of *Phytophthora sojae* have been identified based on their ability to overcome specific Rps genes or combinations of Rps genes in soybean varieties. The most recent Missouri survey found *Phytophthora sojae* in all soybean production areas of the state. When race determinations were done on the *Phytophthora sojae* isolates recovered from 21 counties throughout the state, fourteen different races were identified with no one race being predominant.

Management options for Phytophthora seedling blight and root rot:

1. Select varieties with either race-specific resistance, tolerance or a combination of race-specific resistance and tolerance, especially for use in fields with a history of *Phytophthora*. Race-specific varieties contain a single gene or combination of genes (i.e., Rps1c, Rps1d, Rps1k, Rps3a, etc.) that confer resistance to specific races of *Phytophthora sojae*. Tolerant varieties have a non-race specific, partial resistance and may also be called field-resistant varieties.
2. Plant in good seedbed conditions.
3. *Phytophthora* is more likely to occur in low, wet areas, poorly drained areas or compacted areas of a field. Tiling to improve drainage and taking steps to reduce or prevent compaction may help minimize disease problems.
4. Avoid the application of high levels of manure or fertilizer (KCl) just before planting.
5. Use an appropriate fungicide seed treatment. Products containing either metalaxyl or mefenoxam as an active ingredient are particularly effective against water mold fungi such as *Phytophthora sojae.* If high disease pressure is expected, the use of the higher rate of these seed treatment fungicides may be necessary.

Soybean Cyst Nematode (SCN)

The soybean cyst nematode, *Heterodera glycines*, is a serious problem throughout Missouri and in most soybean producing areas of the United States. Three different surveys for SCN in Missouri have shown that approximately 75% of the surveyed fields have detectable levels of SCN.

Symptoms of SNC range from no obvious symptoms to subtle differences in plant height and vigor or unexpected decreases in yield to severe stunting and discoloration of plants or dead plants. If plants are carefully dug up, females may be evident on the roots. The females appear as tiny (smaller than nitrogen-fixing nodules), whitish to yellow to brownish, lemon-shaped structures on the roots. Symptom expression may be more severe if plants are subjected to other stresses such as moisture stress, nutrient deficiencies, herbicide injury, insect damage or other diseases. The cysts are the bodies of the dead female nematodes. The cysts are actually protective egg cases that contain up to 250 SCN eggs. Eggs in cysts may survive in

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Steps to Minimize Losses from Three Important Soybean Diseases

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the soil for extended periods of time even in the absence of soybean crops.

Anything that moves cyst-infested soil can spread SCN, including machinery, animals, migratory birds, people, wind, water and soil peds associated with seed. Once in a field, SCN may take several years to build up to damaging levels. Unfortunately, once SCN is in a field it is likely to be there forever.

Management options for soybean cyst nematode:

1. Employ a program of soil sampling to identify problem fields and to determine the extent and severity of the problem within the field. For more detailed information on soil sampling for SCN refer to University of Missouri publication G4450, *Soybean Cyst Nematode: Diagnosis and Management* or the Plant Nematology Laboratory website http://soilplantlab.missouri.edu/nematode/
2. Select resistant varieties. Most commercial varieties with resistance to SCN have PI88788 as the source of SCN resistance. If PI88788 resistant varieties have been used in the same field for a number of years, that resistance source may not be performing as well as it initially did. If possible rotate to another source of resistance or at least to a different PI88788 variety.
3. Rotate to non-host crops.
4. Maintain good plant vigor.
5. Maintain good weed control.
6. Avoid spreading SCN from infested fields to uninfested fields by working uninfested fields first before moving equipment to infested fields.
7. Although several nematicides are labeled for use on soybeans, economic and environmental concerns limit their use.

Sudden Death Syndrome (SDS)

In Missouri, sudden death syndrome (SDS) has been a problem primarily in river bottom fields in the central and eastern portions of the state. However, the pathogen *Fusarium virguliforme* (formerly called *Fusarium solani* f. sp. *glycines*), appears to be present in soybean-producing areas throughout the state. In years when environmental conditions are favorable for infections and symptom development such as 2008 and 2009 and to a lesser degree in 2010, SDS may be found in most areas of the state.

SDS has been associated with maximum yield potential soybean production, that is, fields with optimum fertility, irrigation and lime applications. Field observations suggest that SDS is more likely to occur and to be more severe with high soil moisture, whether that is supplied by rainfall or irrigation. High soil moisture during vegetative stages of soybean growth seems to be most conducive to disease development. Because early-planted fields have a longer exposure to spring rainfalls than later-planted fields, seedlings in early-planted fields have an increased susceptibility to infection by the SDS pathogen. Later-planted fields in which soybean plants miss early spring rains may have lower levels of root infection and lower levels of SDS throughout the season. The onset of SDS symptoms is associated with wet conditions and below normal temperatures at or near bloom.

Management options for sudden death syndrome:

1. Select varieties that have performed well where SDS has been a problem.
2. Improve drainage in poorly drained fields and avoid compacting soils.
3. Stagger planting dates and delay planting until soils are warm and dry.
4. Rotate crops; avoid continuous soybean cropping.
5. Maintain good crop vigor and avoid crop stress, including soybean cyst nematode.
6. Harvest fields with SDS in a timely fashion.

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2011 Crop Insurance Highlights

By Ray Massey

The 2011 crop insurance year finds many farm-level crop insurance programs merging into what is called the "Common Crop Insurance Policy" or COMBO. COMBO is meant to simplify crop insurance choices. It has three plans that offer coverage previously contained in the Actual Production History (APH), Crop Revenue Coverage (CRC) and Revenue Assurance (RA) products. The table below indicates the changes.

Table 1. Common Crop Insurance Policy (COMBO)

2010 Policies	Common Crop
Actual Production History (APH)	Yield Protection
Crop Revenue Coverage (CRC)	Revenue Protection
Revenue Assurance with Fall Harvest Price Option (RA-HP)	Revenue Protection
Revenue Assurance without Fall Harvest Price Option (RA-BP)	Revenue Protection with Harvest Price Exclusion

Yield Protection pays indemnities when yield falls below a yield guarantee. Revenue Protection (with and without Harvest Price Exclusion) pays indemnities when revenue falls below a revenue guarantee. The guarantee can increase if the harvest price is above the projected price when Revenue Protection is purchased. The guarantee does not increase if the harvest price is above the projected price when Revenue Protection with Harvest Price Exclusion is purchased.

Under the Common Crop Insurance policy all projected prices are determined by commodity exchanges. This year's price protections are can be found in Table 2.

Other changes in crop insurance that might be of interest include the following.

- Organic crops now have a higher price protection than conventional crops.

Table 2. 2011 Price Protections

Crop	Price Protection
Corn	$6.01/bu
Soybean	$13.49/bu
Grain Sorghum	$5.87/bu
Cotton	$1.23/lb
Rice	$0.161/lb
Corn Organic	$10.75/bu
Soybean Organic	$24.25/bu

- In 2010, several counties in Missouri lost Group Risk Plans and Group Risk Income Plans. For those counties that still have Group Risk Income Plans there is a lot of discussion of the very high premiums being charged.
- The final planting date for corn in some southwestern MO counties (Barton, Lawrence, Jasper, McDonald, Christian, Newton, Dade, Barry, Greene) has changed from May 10 to May 15.
- Rice: The final planting date for rice has been moved from May 31 to May 25 and the end of the late planting date has been shortened to 15 days after the final planting date.
- Cottonseed: There is a new cottonseed endorsement. Previously, cotton farmers insured lint alone but now they can insure both lint and seed yield.

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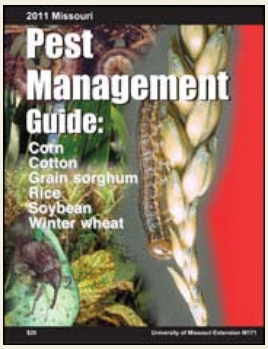

2011 PEST MANAGEMENT GUIDE

This publication contains over 200 pages of recommendations pertaining to the control of weeds, insects, and diseases in Missouri corn, cotton, grain sorghum, rice, soybean, and winter wheat. New this year are weed, insect, and disease control recommendations for cotton and rice in Missouri.

More information about M171 as well as a free PDF version of the publication can be found online at :

http://extension.missouri.edu/explorepdf/manuals/m00171.pdf *and*
http://weedscience.missouri.edu/extension/extension.htm

Updated Listing of Missouri Soil Testing Association Approved Labs

By Manjula Nathan

The Missouri Soil Testing Association (MSTA) Approval Program is designed to assure that results provided by participating public and private labs serving the citizens of Missouri agree with allowable statistical limits. This is accomplished by evaluating the soil testing laboratories in their performance through inter-laboratory sample exchanges and a statistical evaluation of the analytical data. Based on this premise, soil test results from MSTA approved labs will be accepted by the U.S. Department of Agriculture, Farm Service Agency (FSA) and Department of Natural Resources and Conservation Services (NRCS) in federally assisted cost share programs and nutrient management plans in the state of Missouri.

Beginning in 1999, MSTA combined its efforts with the North American Proficiency Testing Program (NAPT). In order to be approved by the Missouri State program, the participating labs should participate in all four quarter exchanges of the NAPT program and submit the MO State data release form each year to the NAPT coordinator. The NAPT coordinator in return sends soil test data from quarterly sample exchanges of the labs participating in MSTA program to the Missouri state coordinator. The MU Soil Testing Lab director serves as the state program coordinator and performs statistical analysis of the data as specified in the MSTA program. If a lab's results fall within the allowable limits, the lab will be placed on the Farm Service Agency's (FSA) list of approved labs. A lab that is not approved may re-apply after six months. An updated listing of Missouri State Approved Soil Testing lab list can be found at: http://soilplantlab.missouri.edu/soil/msta.aspx

List of Missouri State Approved Soil Testing Labs - Updated on February 7, 2011

• Custom Lab
204 C St.
Golden City, MO 64748
Telephone: 417-537-8337
Fax: 417-537-8337

• Delta Soil Testing Lab
University of Missouri
PO Box 160
Portageville, MO 63873
Telephone: 573-379-5431
Fax: 573-379-3383

• MU Soil and Plant Testing Lab
University of Missouri
23 Mumford Hall
Columbia, MO 65211
Telephone: 573-882-3250
Fax: 573-884-4288

• Perry Agricultural Lab
PO Box 418
State Highway 54 East
Bowling Green, MO 63334
Telephone: 573-324-2931
Fax: 573-324-5558

• Ag Source Belmond Labs
1245 Highway 69 N
Belmond, IA 50421
Telephone: 641-444-3384
Fax: 641-444-4361

• Ag Source Cooperative Services
106 N. Cecil Street
PO Box 7
Bonduel, WI 54107
Telephone: 715-758-2178
Fax: 715-758-2620

• Source Harris Laboratories
300 Speedway Circle #2
Lincoln NE 68502
Tel: 402-476-0300
Fax: 402-476-0302

• A&L Analytical Laboratories, Inc
2790 Whitten Road
Memphis, TN 38133
Telephone: 901-213-2400
Fax: 901-213-2440

• A&L Great Lakes Laboratory, Inc.
3505 Conestoga Drive
Fort Wayne, IN 46808
Telephone: 260-483-4759
Fax: 260-483-5274

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Updated Listing of Missouri Soil Testing Association Approved Labs

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• A&L Heartland Laboratory, Inc.
111 Linn St.
PO Box 455
Atlantic, IA 50022
Telephone: 901-213-2400
Fax: 901-213-2440

• Brookside Lab Inc.
308 S. Main St.
New Knoxville, OH 45871
Telephone: 419-753-2448
Fax: 419-753-2949

• Ingrams Soil Testing Center
13343 Fitschen Road
Athens, IL 62613
Tel: 217-636-7500
Fax: 217-636-7500

• Midwest Laboratories, Inc
13611 B St.
Omaha, NE 68144-3693
Telephone: 402-334-7770
Fax: 402-334-9121

• Mowers Soil Testing Plus Inc,
117 East Main St.
Toulon, IL 61483-0518
Telephone: 309-286-2761
Fax: 309-286-6251

• Servi-Tech Laboratories
1816 East Wyatt Earp Blvd.
Dodge City, KS 67801
Telephone: 620-227-7123
Fax: 620-227-2047

• SGS Belleville- Alvey Labs
1511 E Main
Belleville, IL 62222
Tel: 618-233-0445
Fax: 618-233-7292

• Spectrum Analytical
1087 Jamison Road
PO Box 639
Washington Court House, OH 43160
Telephone: 740-335-1562
Fax: 740-335-1104

• Ward Laboratories
4007 Cherry Ave.
PO Box 788
Kearney, NE 68848
Telephone: 308-234-2418
Fax: 308-234-1940

• Waters Agricultural Laboratories, Inc.
257 Newton Highway
PO Box 382
Camilla, GA 31730
Telephone: 229-336-7216
Fax: 229-336-0977

• Waters Agricultural Laboratories, Inc.
2101 Old Calhoun Road
Owensboro, KY 42301
Telephone: 270-685-4039
Fax: 270-685-3989

Note: Approval of soil analysis does not imply approval of fertilizer and limestone recommendations by the individual labs. The approval allows the clients to use the University of Missouri soil fertility recommendations as required by the federal and state agencies for cost share and nutrient management planning programs. In order to use the University of Missouri soil fertility recommendations and get meaningful results, it is recommended that the labs use the soil test procedures required by the MSTA program.

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Weed of the Month: Cutleaf Evening-Primrose

By Kevin Bradley

Pretty soon, we will start seeing fields filled with winter annual weeds, and one weed that you may encounter over the course of the next several weeks is cutleaf evening-primrose (*Oenothera laciniata* Hill).

Cutleaf evening-primrose is a winter annual or sometimes a biennial that is native to the U.S. and can be found throughout Missouri. I believe this weed has become especially prevalent in no-till corn and soybean fields in Missouri over the past several seasons. This plant derives its name from the tendency of most members of this family to close their flowers during the day but open them during the evening and on into the night.

Cutleaf evening-primrose seedlings have cotyledons that are kidney- or egg-shaped in outline with very short hypocotyls, which are the stems that occur below the cotyledons (Figure 1). Seedlings initially develop into a basal rosette of leaves (Figure 2). Young leaves have margins that are untoothed, but subsequent leaves have deeply toothed margins. Leaves often have hairs on top but not on the leaf undersides. Mature plants have leaves that are lanceolate in outline, are relatively narrow with a white midvein, and have deeply toothed margins. Cutleaf evening-primrose can either take on a prostrate or upright growth habit and at most will grow to about 3 feet in height (Figure 3). The stems are often reddish in color, hairy, and can be either simple or branched from the base. Leaves are arranged alternately along the flowering stems. Mature plants produce flowers that occur singly in the leaf axils, which is the region where the leaves attach to the stems. Individual flowers consist of four yellow or yellowish-red petals that are approximately ½ to 1 ¼ inches in diameter and are fused at their base, forming a long narrow tube (Figure 4). Individual flowers are attached directly to the stems (sessile), although because of the long fused tube it may not appear that way. As mentioned, flowers usually open only in low light situations (evening or night), and petals often fall off the plant within 24 hours of exposure to strong sunlight. The fruit is a capsule that is about ¾ to 1 ½ inches long and can be straight or curved (Figure 5). Capsules are hairy at first but become smooth with age. When the capsule matures, it splits open to expel the seeds within it. Research has shown that cutleaf evening-primrose seed can remain viable in the soil for several decades.

Figure 1. Cutleaf evening-primrose seedlings.

Figure 2. Cutleaf evening-primrose rosettes. Notice the deeply divided leaves and distinct midvein on each leaf.

Figure 3. A mature cutleaf evening-primrose plant. Mature plants can either take on a prostrate (like this one) or upright growth habit.

When applied alone, glyphosate (sold as Roundup, Touchdown, and a variety of other trade names) provides only moderate control of cutleaf evening-primrose, which may be one reason why this weed has become more prevalent in no-till crop production fields in Missouri.

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Weed of the Month: Cutleaf Evening Primrose

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Figure 4. Cutleaf evening-primrose flowers.

Effective control of this weed will only be achieved when glyphosate is mixed with an effective tank-mix partner like dicamba (sold as Clarity and a variety of other trade names, 2, 4-D, saflufenacil (in Sharpen, Op-till, and Verdict), and flumioxazin (in Valor, Valor XLT, and Envive). Other research has also shown that paraquat

Figure 5. Cutleaf evening-primrose seed capsules. These capsules split and expel many small seed when mature.

(Gramoxone Inteon) plus 2, 4-D or dicamba will also provide good control of this species. Applications should be targeted to plants that are in the rosette stage of growth, as plants become much more difficult to control as they mature and produce flowers.

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Correction: Commercial Seed Treatments and Transgenic Corn Bt Hyrbids Available for 2011

By Wayne Bailey

Table 2: 2011 Transgenic Corn Hybrids and Bt Traits

Comments: Management of several insect pests of corn may be accomplished by using corn hybrids which have been genetically engineered to produce Bacillus thuringiensis (Bt) and certain insect toxins. Bt hybrids events and their toxins target specific insect pests. Be sure to match these hybrids to the pests requiring control. Follow all refuse requirements associated with these Bt hybrids.

Product Trade Name	Events	Bt Protein	Insects Controlled or Suppressed
For above-ground Lepidopterous moths and caterpillars			
~~Agrisure Viptera~~	~~MIR 162 + Bt 11~~	~~Vip3A~~	~~Corn earworm, Western bean cutworm, black cutworm, fall armyworm, stalk borer~~
Agrisure CB/LL	Bt 11	Cry1Ab	European and Southwestern corn borers, fall armyworm, corn earworm, stalk borer
Agrisure GT/CB/LL	Bt 11	Cry1Ab	European and Southwestern corn borers, black cutworm, fall armyworm, corn earworm, stalk borer
Agrisure Viptera 3110	Bt 11 + MIR 162	Vip3A + Cry1Ab	European and Southwestern corn borers, black cutworm, fall armyworm, corn earworm, Western bean cutworm, stalk borer
Genuity VT Double Pro	MON 89034	Cry1A.105 + Cry2Ab	European and Southwestern corn borers, fall armyworm, corn earworm

Two corrections/adjustments have been made to 'Table 2: 2011 Transgenic Corn Hybrids and Bt Traits' from the February 20 (Volume 21, Number 2) edition of *Insect, Pest & Crop Management* Newsletter. Agrisure Viptera has been removed and Agrisure Viptera 3110 has added "+ MIR 162" to the 'Events' column. Contact Wayne Bailey at BaileyW@missouri or (573) 864-9905 for more information.

Weather Data for the Week Ending March 7, 2011

By Pat Guinan

Station	County	Weekly Temperature (°F)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	Mar. 1-Mar. 7	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	47	25	63	16	36	0	0.05	-0.37	*	*
St. Joseph	Buchanan	48	25	64	19	36	-2	0.15	-0.30	*	*
Brunswick	Carroll	49	29	60	25	39	+1	0.45	-0.03	*	*
Albany	Gentry	47	24	61	17	35	-1	0.06	-0.45	*	*
Auxvasse	Audrain	53	30	69	26	41	+2	0.82	+0.29	*	*
Vandalia	Audrain	52	31	69	27	40	+2	1.40	+0.80	*	*
Columbia-Bradford Research and Extension Center	Boone	54	30	69	25	41	+1	0.84	+0.30	*	*
Columbia-Jefferson Farm and Gardens	Boone	54	31	68	26	42	+2	0.83	+0.29	*	*
Columbia-Sanborn Field	Boone	54	32	67	28	43	+2	0.87	+0.31	*	*
Columbia-South Farms	Boone	54	31	68	26	42	+2	0.94	+0.40	*	*
Williamsburg	Callaway	54	31	70	23	41	+2	0.43	-0.12	*	*
Novelty	Knox	48	28	62	23	37	0	0.55	-0.02	*	*
Linneus	Linn	48	28	62	21	38	+1	0.58	+0.12	*	*
Monroe City	Monroe	50	30	63	25	39	+1	0.44	-0.16	*	*
Versailles	Morgan	56	32	71	26	43	+1	0.29	-0.23	*	*
Green Ridge	Pettis	53	31	67	25	41	+1	0.29	-0.34	*	*
Lamar	Barton	57	33	69	24	44	+2	0.01	-0.73	*	*
Cook Station	Crawford	59	30	68	20	43	+1	1.19	+0.48	*	*
Round Spring	Shannon	60	30	70	18	42	0	0.83	+0.13	*	*
Mountain Grove	Wright	56	33	65	24	43	+2	1.27	+0.50	*	*
Delta	Cape Girardeau	55	36	65	28	44	0	1.31	+0.57	*	*
Cardwell	Dunklin	56	38	70	30	46	0	2.01	+0.97	*	*
Clarkton	Dunklin	55	37	68	29	45	0	0.92	-0.05	*	*
Glennonville	Dunklin	56	39	67	31	46	+1	0.74	-0.20	*	*
Charleston	Mississippi	56	37	69	30	46	+2	1.05	+0.19	*	*
Portageville-Delta Center	Pemiscot	57	39	69	31	47	+2	1.16	+0.16	*	*
Portageville-Lee Farm	Pemiscot	57	39	71	31	47	+2	1.10	+0.12	*	*
Steele	Pemiscot	57	39	69	32	47	+1	1.29	+0.22	*	*

* 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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Insect Pest & Crop Management newsletter is published by the MU IPM Program of the Division of Plant Sciences Extension. Current and back issues are available on the Web at **http://ppp.missouri.edu/newsletters/ipcmindex.htm**. Mention of any trademark, proprietary product or vendor is not intended as an endorsement by University of Missouri Extension; other products or vendors may also be suitable.

Editor: Jessica Kohler (kohlerjl@missouri.edu).