Plant Protection Programs University of Missouri

Integrated Pest & Crop Management

Field Crop Disease Update - September 1, 2009

By Laura Sweets

Corn

Corn foliage diseases such as gray leaf spot, southern rust, common rust and even northern corn leaf blight are fairly common in fields across the state. These diseases have been described in earlier issues of this year's newsletter and it is too late in almost all cases to attempt to control them through the use of foliar fungicides. Fields with high levels of foliage diseases may be more prone to stalk rots so it would be prudent to check fields that have had foliage diseases for stalk rots and to plan on harvesting those fields as soon as possible.

Ear and kernel rots are covered in an article in this issue of the newsletter. Again fields with high levels of ear and kernel rots should be harvested as soon as possible and grain treated carefully especially if it is going into storage.

Soybean

Symptoms of sudden death syndrome (SDS) have come on strong over the last week to ten days. The last issue of the newsletter contained an article on this disease. I have received a number of questions about estimating the possible yield loss from SDS. This is extremely difficult to do. SDS typically occurs in pockets or irregular areas within a field. When severe, plants may be defoliated prematurely and pod abortion can occur. Thus yield loss on those severely affected plants would be high. Generally the foliage symptoms are very obvious and damage appears to be severe when only the upper one or two trifoliolates may actually be severely affected. Yield loss depends on the percent of the field affected and the severity of the disease on those plants showing symptoms. There is no easy formula for calculating yield loss from SDS.

Yellowing from Cercospora leaf spot and/or potassium deficiency continues to be a concern in many regions of the state. Beyond collecting soil samples from areas of fields showing extensive yellowing to determine actual potassium levels there is little that can be done about this disorder at this point in the season.

Bacterial blight and Septoria brown spot are the most common foliage diseases showing up. But neither appears to be particularly severe.

Wheat

As covered in detail in the August 19 issue of Integrated Pest & Crop Management Newsletter, wheat seed quality may be an issue this fall because of the high level of Fusarium head blight throughout the state. Certified seed would be a wise investment this fall. If carryover seed is used, thorough cleaning, germination testing and fungicide seed treating should be considered.

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Ear and Kernel Rots of Corn

By Laura Sweets

Corn harvest is 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 ear and kernel rots of corn could be problems this season. Diplodia ear rot, Gibb ear rot, Penicillium ear rot and *Aspergillus* species other than *Aspergillus flavus* have all been found on ears in the early dent stage of growth in fields in central Missouri.

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 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. Most corn fields in the state did get through silking and pollination in relatively good condition and have not been exposed to extended periods of hot, dry weather either during or after pollination. Therefore, the potential for *Aspergillus flavus* and aflatoxin should not be high in most of Missouri.

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. *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.

Little can be done to prevent or reduce the invasion of corn by fungi in the field. 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. 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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Pest of the Month: Corn Earworm

By Steven Kirk

The ***Helicoverpa zea*** moth and caterpillar is known by a number of names depending on what it's eating for dinner. It is most commonly known as the **'Corn Earworm,'** however it is also known as the '**Tomato Fruitworm,**' the '**Soybean Podworm,**' the '**Tobacco Budworm,**' the '**Cotton Bollworm,**' and the '**Vetchworm**.' It is a generalist feeder that dines on at least 16 cultivated plants and over a 100 wild host species. This pest can be found throughout the continental United States and has a global distribution.

The caterpillars (Figure 1) vary in color, ranging from a pale yellowish-green to red, to brown with lengthwise light and dark stripes. They are relatively long at around 2 inches each. The adult moths (Figure 2) are a whitish-buff color with irregular dark spots on the wings, and a span of 1½ inches.

The *Helicoverpa zea* pupa overwinters within an earthen cell 2 to 4 inches below the soil surface. They first emerge in April, and are later joined by migratory moths in June. The first-generation moths mate and the females lay their eggs on both cultivated and wild host plants. After the egg hatches, the larva feed for a short period of time on the foliage before attacking the fruit. Females on average lay around 1,000 eggs, but can lay anywhere from 500 to 3,000. The dome-shaped eggs are white when first laid and develop a reddish brown band before hatching.

The larvae feed for two to four weeks and molt four to five times. Once a larva is full-grown, it crawls down the host plant and pupates in the soil. The next generation of moths emerges within 10 to 25 days. There are two to three generations per year in Missouri. The first generation runs from April through June, the second through July, and the third from August through September.

The larva of the *Helicoverpa zea* moth feeds primarily on the fruit of its cultivated hosts: corn ears, tomatoes, cotton squares and bolls, grain sorghum seed heads, and soybean pods and seeds. *Helicoverpa zea* larva is probably the most destructive insect pest of both sweet corn and tomatoes. The moths prefer tomatoes over corn for laying their eggs after the corn silks have turned brown and dried. The larva can attack vegetable crops throughout most of the production season, but early planted spring crops avoid heavy pest pressure. Late spring crops and fall crops of favored hosts (such as sweet corn) can experience 100 percent fruit damage.

Figure 1. Helicoverpa zea larvae

Corn

On corn, first-generation larvae may feed within the tightly rolled leaves of the whorl-stage. This damage causes numerous ragged holes to appear after the leaves unfurl, similar to early season fall armyworm damage. The larvae also deposit wet, tan to brown waste droppings (or frass) between the whorl and the base of the leaves. Damage from second-generation larvae is more economically important because they feed on corn kernels around the tip of the ear. Since *Helicoverpa zea* larva are cannibalistic, usually only one or two larvae develop in the ear. Both the ear damage and larval frass also permit secondary disease pathogens to infect corn kernels and further reduce grain quality and yield. One of these pathogens, *Aspergillus flavus*, produces alfatoxin that is poisonous to both humans and livestock. Third generation larva can attack late-planted corn, but are usually found on other host plants. There is no recommended threshold for field corn in Missouri. Insecticide applications can be economically justified for sweet corn or late-maturing seed corn if an average of five corn earworm moths are found in pheromone traps per night when green silks are present in the field. This only applies to pheromone traps placed adjacent to production fields and not to the moth captures reported on the MU IPM Pest Monitoring Network website. Stop insecticide applications when 90 percent of the silks turn brown.

Tomatoes

On tomatoes, moths lay their eggs at night on leaves near green fruit at the outer edges of the plant. The larvae prefer to feed on the green fruit and usually do not enter ripe fruit. Damage

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Figure 2. Helicoverpa zea moth

consists of deep watery cavities near the stem end of the fruit. During its development, one larva may injure several fruit. Economic thresholds only apply to tomatoes plants that have green fruit. Look for an average of 1 infested plant (larvae or fresh feeding damage) per 40 plants or when any eggs are present on foliage.

Cotton

On cotton, the female moth typically deposits her eggs on young terminals, square bracts and flowers (inside or outside). Boll damage is generally accompanied by semisolid, moist frass deposited by the larvae around the irregular-shaped entrance hole. A single larva may consume as many as six to seven cotton squares and two to three bolls before completing its growth. The University of Missouri's threshold treatment recommendation on cotton applies only when 10 or more cotton bollworm eggs or larvae are found per 100 plants, or when square or boll damage reaches 5-10 percent.

Grain Sorghum

On grain sorghum, larvae can be found feeding on the seeds and flower stems late in the growing season. Plants are most vulnerable to injury during the bloom to milk stages, and larvae can heavily damage seed heads. An average of one larva per seed head can reduce yields by as much as 5 percent and two larvae per seed head can cause a 9-10 percent yield loss. Insecticide applications are recommended for grain sorghum when thresholds levels of *Helicoverpa* zea larva exceed 75 percent of the plants in the field, or when one or more larvae are found per seed head.

Soybean

On soybean, late-planted or double-cropped soybeans are most vulnerable to attack, especially in southern Missouri. Third generation larvae can damage leaves, stems and flowers but pods and seeds are especially vulnerable. When larval infestations coincide with pre-bloom, damage is limited to the foliage and is generally of little economic importance. However, infestations during peak flowering to early pod fill stages can delay seed production and lower yields. Once soybean plants begin to flower, rescue insecticide applications are recommended when *Helicoverpa zea larva* populations are more than one per row foot and 5 percent or more of the pods are damaged.

Corn earworm (CEW) is one of eleven insect pests currently monitored by the **IPM Pest Monitoring Network**. Nearly 20 pheromone traps located throughout 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 CEW monitoring season began in mid-April, there have been 39 CEW Pest Alerts sent to our subscribers from June 3 through August 27 due to potentially significant moth captures in pheromone traps. In the 2009 pest monitoring season, significant captures have occurred in 4 Missouri counties in 2 regions. There have been16 alerts at the Delta Center near Hayward in Pemiscot County (SE region), 15 alerts from Benton in Scott, County (SE), 6 from Bloomfield in Stoddard County (SE), and 3 at the Bradford Research and Extension Center in Boone County (Central region).

Individuals interested in pest management can sign up and receive Pest Monitoring alerts by e-mail 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.

At the site, fill in the required fields and then mark the boxes next to the insects you'd like to track and click submit. When pest captures reach significant numbers you will automatically be notified via email. 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

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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 Corn earworm and possible damage symptoms on corn and other crops as well as treatment recomendations follow this link:

http://extension.missouri.edu/xplor/agguides/pests/g07110.htm

Image citations:

Figure 1: Helicoverpa zea larva: R.L. Croissant, Bugwood.org

Figure 2: Helicoverpa zea moth: Clemson University - USDA Cooperative Extension Slide Series, Bugwood.org

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Soybean Aphids Present in Most Soybean Fields

By Wayne Bailey

The recent arrival of additional soybean aphids migrating into Missouri from more northern locations, the successful reproduction of aphids which arrived earlier this summer, the lack of beneficial insects in soybean fields, and cool temperatures favorable for aphid reproduction have resulted in infestations and increased numbers of soybean aphids in most Missouri soybean fields. In a survey conducted this past week, aphid numbers varied by region with numbers in most fields below the economic threshold number of 250 aphids or more per plant on plants in the R1 (flowering) through R5 (partial pod fill) stages of growth. Aphid numbers above the economic threshold have been reported from some soybean fields in east central Missouri around Montgomery City, in central Missouri in Callaway and surrounding counties, and to a lesser extent in southwest Missouri south of Nevada. Fewer problems with this pest have been reported from more northern counties where a majority of fields are in R5 or later stages of plant growth. Fields with potassium deficit soils often support higher numbers of aphids than those with no potassium deficit.

Producers are encouraged to scout individual fields to determine aphid numbers and plant growth stages. As previously stated, the economic threshold (the early warning population level at which treatment is justified) is 250 aphids or more per plant. The economic injury level (number of aphids per plant when the cost of control equals the yield loss from the aphid population) is 1006 aphids per plant. This difference in numbers allows for a 2-4 day period in which to treat an increasing population of aphids after the 250 level per plant has been reach and before economic loss has occurred. These threshold and economic injury levels are for soybean plants in the R1 to R5 stages of growth. Yields of 0 to 14 bushels/A may be protected when economic infestations of soybean aphids are treated at the R1 stage of plant growth and decreases with each increasing growth stage until a yield protection of 0 to 2.5 bushels/A is typically realized at the R5 stage of plant growth.

Questions often asked include (1) does it make sense to treat a soybean population before it reaches the 250 per plant threshold? The answer as reflected in numerous studies conducted in states north of Missouri is no. These multiyear studies show no yield advantage to treat soybean aphid populations on soybean before aphid numbers reaching or exceeding the established threshold of 250 aphids per plant in growth stages R1-R5.

Likewise, (2) producers often ask if aphids should be treated once soybean plants reach the R6 stage of growth (completion of pod fill)? Although some Canadian studies show a slight yield advantage to treat soybeans in the R6 stage of growth, no studies from the US show advantages to treating aphid infestations on R6 and later growth stage of soybean. A third question is (3) whether soil moisture conditions change the threshold. Soil moisture does affect yield loss from aphids with greater yield losses occurring in dry years and less yield loss occurring in wet years. Adequate soil moisture and adequate nutrient levels allow soybean plants to better compensate for the loss of plant juices which occur as aphid feed.

In summary:

- Multiple generations of aphids (20+) may be produced through the growing season in more northern states where aphids are present throughout the growing season.
- In Missouri, just a few generations are produced in most years after winged aphids typically migrate into the state during summer.
- Soybean aphids reproduce parthenogenically which means that female aphids give birth to only female aphids which are already pregnant when born. No males are needed for most generations.
- Populations of soybean aphid can double every 5-7 days when conditions are favorable.
- Soybean aphids damage plants by sucking plant juices from stems and leaf foliage.

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Soybean Aphids Present in Most Soybean Fields *continued from page 129*

- This insect prefers cool conditions and reproduces at an optimal rate when temperatures are around 78 degrees F.
- Numbers of this pest vary from field to field so each field should be individually scouted to determine average aphid numbers per plant and plant growth stage.
- Treatment is justified when the economic threshold of 250 or more aphids per plant is reached and the soybean plants are in the R1 to R5 stages of growth.

The following insecticides are recommended for use on soybean aphid infestations in soybean:

Common Name	*Trade Name*	*Rate of formulated material per acre*	*Additional Label Information*
esfenvalerate	***Asana XL**	5.8 to 9.6 fl. oz.	On foliage
cyfluthrin	***Baythroid XL**	2.0 to 2.8 fl. oz.	On foliage
bifenthrin	***Brigade 2EC**	2.1 to 6.4 fl. oz	On foliage
chlorpyrifos + gamma-cyhalothrin	***Cobalt**	13 to 26 fl. oz.	On foliage
carbofuran	***Furadan 4F**	1/2 pt (see note below**)	On foliage
zeta-cypermethrin	***Hero**	4.0 to 10.3 fl. oz.	On foliage
chlorpyrifos	***Nufos 4E**	1 to 2 pt.	On foliage
acephate	**Orthene 97**	3/4 to 1 lb.	On foliage
microencapsulated methyl parathion	***Penncap-M**	1 to 3 pt.	On foliage
permethrin	***Pounce 3.2 EC**	4.0 to 8.0 fl. oz.	On foliage
gamma-cyhalothrin	***Proaxis**	1.92 to 3.2 fl. oz.	On foliage
lambda-cyhalothrin	***Warrior**	1.92 to 3.2 fl. oz.	On foliage

***Designates a restricted-use pesticide. Use is restricted to certified applicators only.** Regardless of the formulation selected, read the label to determine appropriated insecticide rates, directions, precautions, and restrictions.

**Furadan 4F produced and labeled before 2009 season may still be used until Dec. 31, 2009

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The Missouri Corn Stalk Nitrate Test Challenge

By John Lory

Did you do a good job predicting nitrogen need for your corn crop last spring? Did you over apply? Under apply? Or get your rates just right? The stalk nitrate test is a powerful tool for assessing the fertilizer nitrogen decisions in a corn field.

Research from Iowa and other states has calibrated nitrate concentration in the corn stalk with the nitrogen status of the harvested corn crop. Nitrate concentrations above 2000 parts per million are indicative of a crop that had excess nitrogen; nitrate concentrations below 700 parts per million are indicative of plants that had marginal nitrogen supply (250-700 parts per million) or were clearly nitrogen deficient (<250 parts per million).

How to sample fields

- The window of opportunity for collecting samples is from ¼ milk stage to up to three weeks after black layer formation.
- Use a set of hand shears or loppers to remove an eight-inch segment of corn stalk from the corn plant. The top cut should be 14 inches above the ground; the bottom cut six inches above the ground.
- Get a stalk segment from at least 15 randomly selected plants from the field or subfield you are sampling.
- Place the samples in a paper bag for shipping to the lab for analysis. Do not freeze the sample. Samples held more than 24 hours before shipping should be refrigerated.

The Missouri Corn Stalk Nitrate Test Challenge

My program is working with the University of Missouri Soil Testing Laboratory to promote use of this test in Missouri. Typical analysis cost for the test is $12 per sample. We will analyze up to 10 samples from any Missouri farm at the MU lab at no cost if you submit the requested information on the following form when you submitted sample. Send samples to Attention Stalk Nitrate Test Challenge, 23 Mumford Hall, University of Missouri Soil Testing Lab, Columbia, MO 65211 or MU Delta Regional Soil Testing Lab, 147 State Hwy T, Portageville. MO 63873.

Visit the Corn Stalk Nitrate Challenge website at http://nmplanner.missouri.edu/tools/Stalk_Nitrate_Challenge.asp for more information and to download more copies of the reporting form.

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Form available on page 131

Stalk Nitrate Trial Data Form

Your Name: _____ Your phone # or email address: _____
Your address: _____
Field location (description or GPS coordinates at center of field): _____ _____
_____
Corn Variety: _____ Yield goal: _____ bu/A Planting date: _____
Winter cover/trap crop? (if yes, what crop?): _____
Crop(s) previous year: _____

Source of Nitrogen 1:
Fertilizer type _____ Date of Application: _____
Method of application: _____ Target N rate: _____ lbs/A
If surface applied: Incorporated (yes/no): _____ Days to incorporation: _____
N loss inhibitor used (yes/no) _____ Type used _____

Source of Nitrogen 2 (if needed):
Fertilizer type _____ Date of Application: _____
Method of application: _____ Target N rate: _____ lbs/A
If surface applied: Incorporated (yes/no): _____ Days to incorporation: _____
N loss inhibitor used (yes/no) _____ Type used _____

Source of Nitrogen 3 (if needed):
Fertilizer type _____ Date of Application: _____
Method of application: _____ Target N rate: _____ lbs/A
If surface applied: Incorporated (yes/no): _____ Days to incorporation: _____
N loss inhibitor used (yes/no) _____ Type used _____

Stalk Nitrate Sample Information: Date of sampling: _____
Number of stalks included: _____ Area represented by sample _____ Acres

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There will be **no analysis cost for your first 10 samples** if you provide the requested information. Discount may be available for more samples, contact me. Test cost typically is $12/sample.

SAMPLE HANDLING: Sample anytime from ¼ milk line to three weeks after black layer formation. Sample at least **15 stalks** from the sampling area. For each stalk remove the 8-inch section from six inches above the ground to 14 inches above the ground. Select representative plants and do not include heavily diseased or damaged plants. Place the sample in a paper bag (not plastic). Do not freeze sample. Refrigerate if samples are shipped more than one day after sampling.

Mail the sample plus this data sheet to: Missouri Soil Testing Lab, Attn: Stalk Nitrate Test Challenge, 23 Mumford Hall, University of Missouri, Columbia MO 65211 or MU Delta Regional Soil Testing Lab, 147 State Hwy T, Portageville. MO 63873. You must include a completed form with each sample to qualify for no-cost analysis.

Questions? Contact John Lory (LoryJ@missouri.edu; 573-884-7815).

Weather Data for the Week Ending August 31, 2009

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.	Aug 1 - Aug 31	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	76	58	84	46	66	-9	3.59	-0.50	2714	-57
St. Joseph	Buchanan	75	61	85	51	67	-8	7.69	+3.59	2646	-143
Brunswick	Carroll	77	58	86	48	67	-8	8.17	+3.97	2698	-128
Albany	Gentry	75	58	85	48	67	-7	5.77	+2.02	2567	-201
Auxvasse	Audrain	76	58	85	48	67	-8	3.46	-0.12	2694	-155
Vandalia	Audrain	77	57	86	47	67	-8	4.60	+0.60	2680	-160
Columbia-Bradford	Boone	77	58	85	50	66	-9	4.04	-0.14	*	*
Columbia-Jefferson Farm	Boone	77	59	85	50	67	-8	4.84	+0.68	2738	-207
Columbia-South Farms	Boone	76	59	84	50	67	-8	5.04	+0.86	2734	-210
Williamsburg	Callaway	78	57	87	49	67	-8	3.16	-0.80	2683	-119
Novelty	Knox	75	56	83	47	65	-9	6.59	+3.07	2442	-330
Linneus	Linn	76	58	86	48	66	-8	8.27	+4.42	2524	-186
Monroe City	Monroe	76	57	85	48	66	-9	6.67	+2.92	2585	-240
Versailles	Morgan	79	58	87	49	68	-8	4.78	+0.99	2874	-121
Green Ridge	Pettis	77	58	85	48	67	-5	2.90	-0.99	2746	-8
Lamar	Barton	79	59	90	47	68	-9	2.68	-0.76	2912	-209
Cook Station	Crawford	80	54	89	43	67	-9	2.01	-1.63	2678	-342
Round Spring	Shannon	81	56	88	45	68	-7	1.58	-1.75	2703	-175
Mountain Grove	Wright	78	57	85	44	67	-9	1.81	-1.17	2645	-207
Delta	Cape Girardeau	83	59	89	53	70	-7	3.57	+0.49	3018	-293
Cardwell	Dunklin	83	61	89	53	71	-8	3.75	+1.60	3338	-237
Clarkton	Dunklin	84	60	89	52	71	-7	1.74	-0.46	3234	-293
Glennonville	Dunklin	83	61	89	53	71	-7	2.26	+0.04	3273	-238
Charleston	Mississippi	84	60	90	53	72	-5	2.65	+0.09	3185	-110
Portageville-Delta Center	Pemiscot	84	62	89	54	73	-5	1.88	-0.36	3391	-134
Portageville-Lee Farm	Pemiscot	84	62	90	54	73	-5	2.87	+0.48	3405	-92
Steele	Pemiscot	85	62	92	55	73	-5	2.42	-0.29	3465	-56

* 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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