Integrated Pest & Crop Management

Seed Decay and Seedling Blights of Corn

By Laura Sweets

Some years, early season stand establishment problems are widespread and, in some cases, severe-especially in early planted corn fields. The weather pattern during and immediately after planting is a major factor contributing to those problems. Corn which begins to germinate before periods of cold, wet weather in April or early May tends to show damage from saturated soils, cold soil temperatures, frost injury, herbicide injury, nitrogen deficiencies, seed decay and seedling blights. In some fields the seed decay and seedling blight may progress into crown decay resulting in even more severe stunting and yellowing of plants. If weather patterns are favorable for germination and emergence of corn and not as favorable for development of corn seed and seedling diseases, there will be a substantial reduction in seed decay and seedling blight problems in corn.

Corn planting has been moving along with weather delays in some areas of the state. The unusual fluctuations in weather conditions (near record highs one weekend followed by lows the next weekend) make it difficult to predict how severe corn seed decay and seedling blights will be this year.

Seed decay and seedling blights of corn are generally caused by soil-inhabiting fungi species such as *Pythium, Fusarium, Diplodia, Rhizoctonia* and *Penicillium*. These fungi may rot the seed prior to germination or cause preemergence or postemergence seedling blight. Affected seeds are usually discolored and soft and may be overgrown with fungi. Rotted seed may be difficult to find because they decompose very rapidly and because soil adheres fairly tightly to the decomposing seed.

With preemergence seedling blights, the seed germinates but the seedlings are killed before they emerge from the soil. The coleoptile and primary roots are usually discolored and have a wet, rotted appearance. With postemergence seedling blights, the seedlings emerge through the soil surface before developing symptoms. Seedlings tend to yellow, wilt and die. Discolored, sunken lesions are usually evident on the mesocotyl. Eventually the mesocotyl becomes soft and water soaked. The root system is usually poorly developed, and roots are discolored, water soaked and slough off. If the primary root system and mesocotyl are severely affected before the nodal or permanent root system has developed, the plants have little chance of surviving.

The *Pythium, Fusarium, Diplodia, Rhizoctonia* and *Penicillium* species which cause seed decay, seedling blight and crown decay are common in soils throughout the state. If conditions are favorable for germination and emergence, these fungi may not have the opportunity to invade seed, germinating seed or young seedlings so seed decay, seedling blights and crown rot will not be significant problems. On the other hand, conditions that are not favorable for germination and emergence, give these soil fungi more time to attack the seed and developing plants.

Continued on page 57

In This Issue

Aphid Populations Present in Wheat

By Wayne Bailey

Over the past few weeks, greenbug and bird cherry-oat aphid numbers have increased in some wheat fields in the state. There are five aphid species that can be commonly found at various times in Missouri wheat. These include the greenbug (*Schizaphis graminum* Rondani), bird cherry-oat aphid (*Rhopalosiphum padi* Linnaeus), corn leaf aphid (*Rhopalosiphum maidis* (Fitch)), English grain aphid (*Sitobion avanae* (Fabricius)), and occasionally the yellow sugarcane aphid (*Sipha flava* (Forbes)). Of these five aphid species, the greenbug and the bird cherry-oat aphid are the most damaging to Missouri wheat. These two important aphid species can cause direct feeding damage by sucking plant juices, but may also transmit barley yellow dwarf virus (BYD) in wheat. All five aphid species reproduce parthenogenically which means they produce several generations of living young, mostly females, which are pregnant when born without mating. Occasionally males will be produced, but several generations of aphids may occur without mating taking place. This type of reproduction allows for rapid increases in population levels over short periods of time. Typically greenbug aphids damage seedling wheat in the fall when they feed on plants and often transmit the barley yellow dwarf virus. In contrast, the bird cherry-oat aphid can damage plants in the fall by feeding and transmission of barley yellow dwarf and also during spring by feeding on plants that have reached head emergence. Although producers are encouraged to scout individual fields to determine greenbug and bird cherry oat aphid numbers at this time, most wheat fields in Missouri do not currently support aphid numbers requiring applications of insecticides.

Figure 1. Greenbug

Greenbug is a traditional pest of Missouri wheat and may cause severe damage. Although Greenbug migrate into the state each spring, they typically damage seedling wheat plants during fall and much less often during spring. They damage wheat in three ways which are by sucking plant juices, injecting a toxic saliva when feeding, and transmission of the barley yellow dwarf virus(BYD). Greenbug populations can change rapidly depending on weather conditions and the number of beneficial insects present. Thresholds for this aphid are based on the average number of aphids present per linear foot of row depending on plant height and stage of growth. Traditional economic thresholds for greenbug in Missouri wheat are as follows: treatment is justified if 50 or more aphids are present per linear foot of row in the seedling stage; 100 or more present during the 3- to 6-inch stage of growth, and 300 or more aphids when the plants reach 6- to 10-inches in height. Recent research in Missouri and other states suggest that these traditional thresholds may be too high and allow for more damage and subsequent yield loss than necessary. Additionally, the high market price of wheat justifies the use of lower economic thresholds than traditionally used. Other factors influencing economic thresholds include: variability in plant size, stand density when infestations occur, the variety of wheat under production, the number of aphids and amount of BYD virus present, spring growing conditions and the presence or absence of biological control agents such as ladybugs, parasitic wasps, and predators.

Based on the preceding information, the current recommendation for management of the greenbug in wheat is as follows: Scout several locations in the field to determine number of aphids present per linear foot of row. If the average number of greenbug per linear foot of row equal or exceed 50 to 100 on wheat plants 6-inches or less in height, then treatment may be justified. In wheat taller than 6-inches the economic threshold would be reached when 300 or more greenbug are present per linear foot of row. Producers should consider the number of beneficial insects present (examples: pink ladybugs and other species of ladybird beetles, parasitic wasps) and whether the wheat is under other stressors such as drought. The presence of high numbers of beneficial insects will increase the threshold and reduce the need for insecticides, whereas, the greater the stress on the plants, the lower the thresholds as stressed plants are less able to withstand aphid infestations. Wheat plants in the later stages of plant growth (taller) can withstand greater numbers of aphids than younger or shorter plants. The greenbug is generally found in colonies on leaf surfaces whenever present on the wheat plants.

Summary:

- Greenbug migrate into Missouri during early spring.
- Small pear-shaped aphid, 1/16-inch in length.

Continued on page 55

Aphid Populations Present in Wheat

continued from page 54

- Range in color from pale yellow to pale green with black legs, cornicles, and eyes.
- Exhibit a predominant dark green line running down the length of the back.
- Dark green line is the insect's digestive tract which can be seen through the somewhat transparent aphid body.
- Damage wheat by (1) feeding on plant sap, (2) injecting toxic saliva when feeding, and (3) transmit barley yellow dwarf virus.
- Economic threshold of 50 to 100 or more aphids present on wheat 6-inches or less in height during fall. In wheat over 6-inches in height the economic threshold would be 300 or more greenbug present per linear foot of row.
- Rarely causes damage in spring.

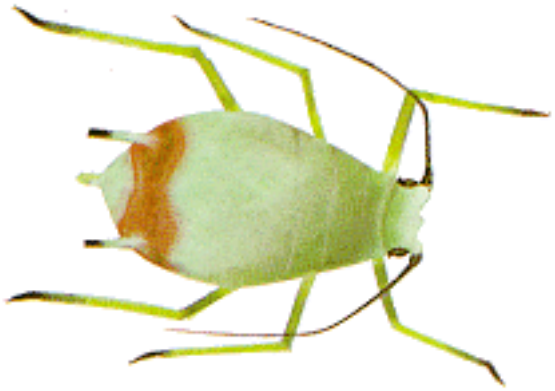


Figure 2. Bird cherry-oat aphid

Bird cherry-oat aphid is typically dark olive in color with a patch of rosy to reddish-orange color found on the back of the abdomen and surrounding the two cornicles (tail pipes). This is a medium size aphid which may look black in color at times. The antennae, eyes, tips of legs and cornicles are black in color. This insect is present in wheat in most years, but is often controlled by beneficial insects.

The bird cherry-oat aphid can transmit BYD, but because this aphid often attacks the wheat at boot to heading stages of growth, thresholds are based on numbers of aphids present per tiller. In general, if an average of 12-25 or more bird cherry-oat aphids are present per tiller from seedling to wheat head emergence treatment is justified. The lower threshold is appropriate if plants are under additional stressors such as severe drought. Feeding by this aphid may result in damage to the flag leaf with the head taking on a hooked appearance as it emerges. This aphid is capable of overwintering in wheat fields and may be present throughout the growing seasons of wheat. Bird cherry-oat aphids may occur singularly or in small groups over the entire plant and often move to ground level during periods of cold or windy weather.

Summary

- Medium sized aphid dark olive to black in color.
- Rosy to reddish-orange color found on back of abdomen and surrounding the cornicles.
- Antennae, eyes, tips of legs and cornicles are black in color.
- Damage wheat by (1) feeding on plant sap and (2) transmission of barley yellow dwarf virus.
- Economic threshold of 12-25 or more aphids present per tiller plant emergence up to head emergence.
- Bird cherry-oat aphids occur singularly or in small groups anywhere on wheat plants.
- Aphids may move to ground level in very cold or windy conditions.

The corn leaf aphid, English grain aphid, and yellow sugarcane aphid are rare to occasional problems of Missouri wheat. Their images have been included to assist with correct identification of aphids occurring in Missouri wheat fields.

Continued on page 56

Aphid Populations Present in Wheat

continued from page 55

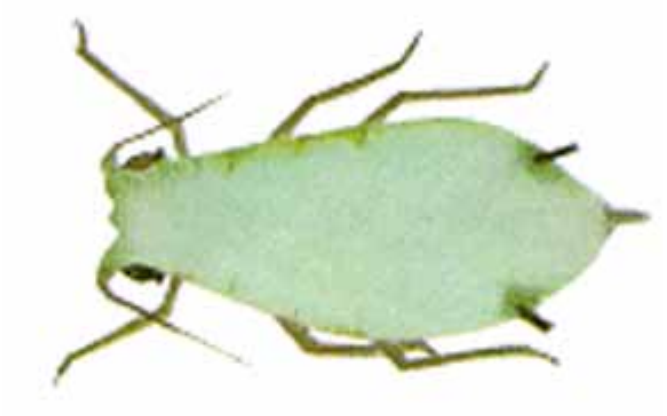


Figure 3. Corn leaf aphid

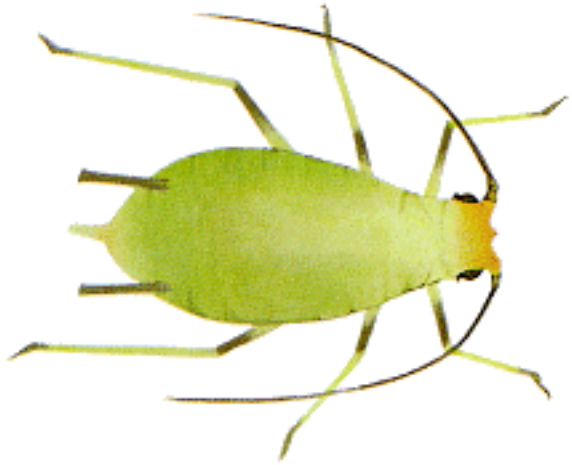


Figure 4. English grain aphid

Corn leaf aphids are bluish-green to black in color with black eyes, antennae, cornicles, and legs. They damage plants by removing plant juices resulting in increased plant stress. This aphid attacks corn, sorghum, wheat and other grasses. This aphid rarely reaches population levels in wheat to cause economic damage.

English grain aphids are bluish-green in color with brown head and eyes. Antennae, cornicles, and tips of legs are black in color. Antennae and legs are long in comparison to body size. This aphid species attacks wheat, barley and oats and causes increased plant stress by removal of plant sap. It often takes 100 aphids or more per linear foot of row to cause economic damage in wheat. English grain aphids rarely reach economically damaging levels due to being heavily parasitized.

Yellow sugarcane aphids are yellow in color with numerous spines covering the body. They also have two rows of black spots running down the length of their backs. Although not considered an economic pest in Missouri wheat, this aphid is a severe pest of sorghum and sugarcane in the Southern United States. Main hosts include sugarcane, sorghum, johnsongrass, and dallisgrass. The occasional infestations of this aphid in Missouri wheat often occur when winged aphids move to wheat from sorghum and various grasses. This aphid is not considered an economic pest in Missouri.

Table 1. 2011 Insecticide Recommendations - Wheat

Common Name	Trade Name	Rate of formulated material per acre	Placement	REI Hours	Pre-Harvest Interval Days
cyfluthrin	*Baythroid XL	1.8 to 2.4 fl oz	foliage	12	30 (grain) 3 (grazing or forage)
dimethoate	Dimethoate 4EC	13/4 pt	foliage	48	35 (grain)
methomyl	*Lannate SP	1/4 to 1/2 lb	foliage	48	7 (grain) 10 (grazing or forage)
zeta-cypermethrin	*Mustang Max	3.2 to 4.0 fl oz	foliage	12	14 (grain. forage, hay)
microencapsulated methyl parathion	*Penncap-M	2 to 3 pt		48	15 (harvest or grazing)
chlorpyrifos	*Nufos 4E	1/2 to 1 pt	foliage	24	28 (grain or straw) 14 (forage or hay)
zeta-cypermethrin + chlorpyrifos	*Stallion	5.0 to11.75 fl oz bird cherry-oat aphid) 9.25 to 11.75 fl oz (greenbug)	foliage	24	28 (grain or straw) 14 (forage or hay)

Continued on page 57

Aphid Populations Present in Wheat

continued from page 57

Table 1. Insecticide Recommendations - Wheat (Cont'd)

Common Name	Trade Name	Rate of formulated material per acre	Placement	REI Hours	Pre-Harvest Interval Days
chlorpyrifos		(bird cherry-oat aphid) 9.25 to 11.75 fl oz (greenbug)			14 (forage or hay)
cyfluthrin	*Tombstone Helios	1.8 to 2.4 fl oz	foliage	12	30 (grain) 7 (grazing)
lambda-cyhalothrin	*Warrior II with Zeon	1.28 to 1.92 fl oz	foliage	24	30 (grain, hay, straw)
Seed Treatments					
imidacloprid	Gaucho	See product label	Commercially on seed		
thiamethoxam	Cruiser	See product label	Commercially on seed		

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 directions, precautions, and restrictions.

Wayne Bailey
BaileyW@missouri.edu
(573) 864-9905

Seed Decay and Seedling Blights of Corn

continued from page 53

Numerous other factors also contribute to early season corn establishment problems. Insect damage, nutrient imbalances, herbicide injury, soil conditions and environmental factors, especially saturated soil conditions and oxygen deprivation, may also cause or contribute to early season corn establishment problems. Corn seedling blights are more severe in wet soils, in low lying areas in a field or in soils that have been compacted or remain wet for an extended period of time. Low soil temperatures (50-55°F) and wet soil conditions especially favor Pythium seed decay and seedling blight. Disease severity is also affected by planting depth, soil type, seed quality, mechanical injury to seed, soil crusting, herbicide injury or other factors which delay germination and emergence of corn.

Planting high quality seed into a good seedbed when soil temperatures are above 50°F will help minimize these early season problems. Virtually all field corn seed comes with a fungicide seed treatment. Hopper box treatments can be used to supplement the existing seed treatment.

Laura Sweets
SweetsL@missouri.edu
(573) 884-7307

Forage of the Month: Tall Fescue

By Rob Kallenbach

Tall Fescue *(Festuca arundinacea Schreb.)*

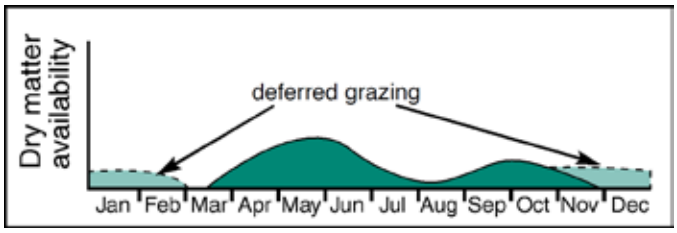
Tall fescue is one of the most popular grasses in the United States. It is grown on more than 34 million acres nationwide. Because of its hardiness and adaptability, it is used for several purposes, including silage, hay, pasture and erosion control. Tall fescue is most nutritious in early spring and again in autumn. In addition, tall fescue has a waxy leaf surface that helps it retain its forage quality through winter better than any other perennial grass. As a result, many producers stockpile tall fescue for deferred grazing in winter.

There are also many negatives associated with tall fescue. This cool-season grass does not provide a quality habitat for wildlife. In addition, most tall fescue is infected with an endophyte, a fungus that produces compounds that are toxic to cattle. If cattle eat tall fescue that carries the endophyte, they exhibit reduced weight gains and reduced milk yields as well as a number of more serious illnesses such as fescue foot. Although endophyte-free tall fescue does not have this problem, it does not persist as well as tall fescue that contains an endophyte. There are new varieties of tall fescue that contain nontoxic endophytes. These varieties are reported to give good livestock performance and persist longer than endophyte-free types.

Tall fescue

Origin: Europe
Adaptation to Missouri: Statewide
Growth habit: Rhizomatous, nearly sod-forming, perennial bunchgrass.
Blade: Rolled in bud shoot, ribbed and somewhat rough top surface, glossy lower surface, prominent midrib and veins, margins scabrous.
Sheath: Round, generally smooth, split, large.
Ligule: Truncate, membranous, up to 1/10th inch long.
Auricles: Small, short, pubescent.
Seed head: Contracted panicle.
Fertilization: 40 to 60 lb N/ acre mid-August for fall or stockpile pasture. In spring, 40 to 60 lb N/ a cre after the first grazing or harvest. If pasture is lacking, follow with another 40 lb N/ acre after the second grazing . Phosphorus and potassium to soil test.
Timing of production: Produces 70 percent of its growth between April 1 and June 15.
When to begin grazing: When the grass reaches 6 to 8 inches in height.
When to cut for hay: Late vegetative to early boot stage.
Lowest cutting or grazing height: 3 to 4 inches

Yield distribution of tall fescue in Missouri.



Rob Kallenbach
KallenbachR@missouri.edu
(573) 884-2213

Scout Now for Diseases in South Missouri Wheat

By Allen Wrather

South Missouri wheat fields should be scouted now to determine if a fungicide should be applied to the foliage. Most wheat growing in south Missouri will be at the split-boot stage of growth the week before or after Easter, and that is the stage of growth fungicides should be applied if needed. A fungicide applied at the split-boot stage of grow will help protect wheat leaves and heads from most late season yield-robbing wheat diseases such as leaf and stem rust, leaf and glume blotch, powdery mildew, and tan spot. These diseases will not develop in all wheat fields so each field must be scouted separately to determine if a fungicide is needed. Dr. Laura Sweets published an excellent review of information about wheat diseases and the fungicides for protecting wheat against these diseases in this newsletter last week. Her review included a comparison of how well the labeled fungicides protect wheat against each disease.

Some of the fungicides labeled for application to wheat up to the time wheat begins to bloom include Headline (BASF), Twinline (BASF), Quadris (Syngenta), Quilt (Syngenta), and Stratego (Bayer). A complete list of fungicides labeled for foliar application to wheat is shown on pages 163 to 172 in the online University of Missouri Extension publication M171 titled, "2011 Missouri Pest Management Guide: Corn, Cotton, Grain Sorghum, Rice, Soybean, and Winter Wheat." One application of one of these fungicides at the split-boot stage of wheat growth will help protect the wheat from most yield-robbing diseases this spring.

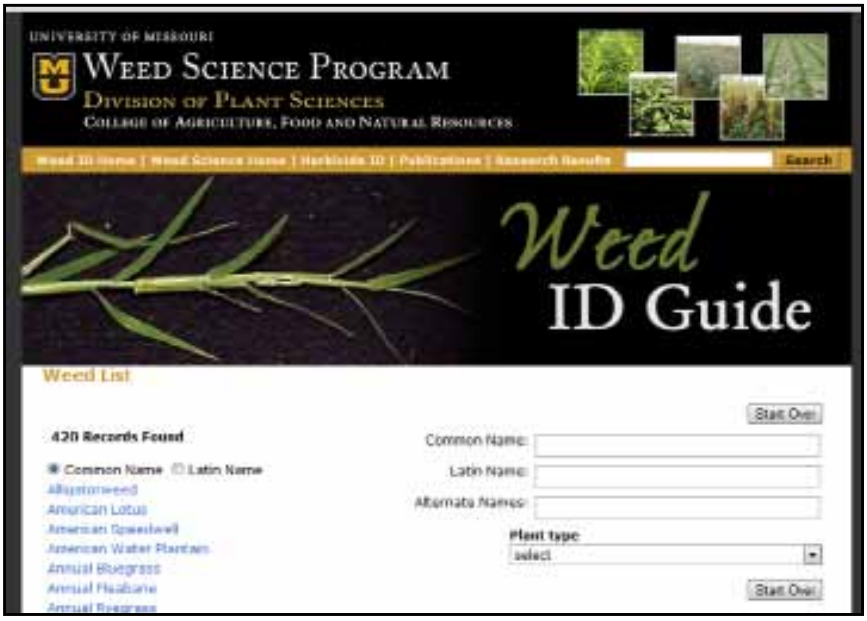
More information about wheat disease management in Missouri is available at your county MU Extension office and is posted at http://extension.missouri.edu/explorepdf/agguides/pests/ipm1022_Pp17-26.pdf. Following these suggested procedures will give farmers a better chance of producing high wheat yields and profits in 2011.

Allen Wrather
WratherJ@missouri.edu
(573) 379-5431

New Weed ID Website Now Online!

By Kevin Bradley

A new weed identification website is now available from the University of Missouri Weed Science program at http://weedid.missouri.edu. This website contains about 350 different plant species that could be encountered as a weed of field and horticultural crops, pastures, lawns, gardens, non-crop, or aquatic areas in Missouri and surrounding states. One of the newest features of the website is a keying system that allows users to identify an unknown plant after they have selected the appropriate characteristics from a series of drop-down boxes. Simply select grass or broadleaf weed from the home menu and give this keying system a try for yourself. Or, if you have some idea as to what your weed species might be, you can simply type all or part of the common or scientific name into the appropriate text box and the database will narrow down the possibilities for you. We hope you find this site useful and will send us any feedback that will help us to continue to improve this site in the future. Comments and questions pertaining to the site can be sent directly via e-mail to bradleyke@missouri.edu.



Kevin Bradley
bradleyke@missouri.edu
(573) 882-4039

Weather Data for the Week Ending April 19, 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.	Apr. 1-Apr. 19	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	64	43	80	36	52	-2	3.33	+1.51	128	+100
St. Joseph	Buchanan	63	42	77	35	52	-3	1.60	-0.56	130	+90
Brunswick	Carroll	64	44	77	38	53	-2	2.09	+0.16	130	+86
Albany	Gentry	61	42	75	36	51	-3	3.39	+1.18	112	+85
Auxvasse	Audrain	69	44	81	38	55	0	1.93	-0.38	153	+109
Vandalia	Audrain	69	43	79	38	55	+1	1.71	-0.65	140	+107
Columbia-Bradford Research and Extension Center	Boone	70	43	80	37	55	-1	1.66	-0.82	157	+96
Columbia-Jefferson Farm and Gardens	Boone	69	44	80	38	56	0	1.79	-0.69	167	+105
Columbia-Sanborn Field	Boone	70	46	80	39	57	0	2.22	-0.28	184	+114
Columbia-South Farms	Boone	69	44	80	38	56	0	2.08	-0.40	167	+105
Williamsburg	Callaway	71	44	87	39	57	+2	1.58	-0.80	174	+131
Novelty	Knox	59	42	73	36	51	-4	2.27	+0.13	106	+69
Linneus	Linn	61	42	75	37	51	-3	2.43	+0.41	115	+81
Monroe City	Monroe	64	43	74	37	53	-3	2.18	-0.01	124	+78
Versailles	Morgan	73	46	85	39	58	0	2.10	-0.69	204	+119
Green Ridge	Pettis	68	43	78	38	56	0	2.27	+0.04	164	+114
Lamar	Barton	71	46	80	39	59	+2	2.05	-0.40	203	+117
Cook Station	Crawford	75	44	87	37	61	+4	1.63	-0.81	219	+129
Round Spring	Shannon	76	41	88	31	59	+3	2.07	-0.42	196	+122
Mountain Grove	Wright	72	45	83	36	58	+2	2.37	-0.19	194	+137
Delta	Cape Girardeau	70	48	83	39	60	+1	4.20	+1.78	203	+90
Cardwell	Dunklin	74	51	86	43	63	+3	3.15	+0.47	245	+95
Clarkton	Dunklin	73	50	85	40	62	+2	3.02	+0.76	232	+91
Glennonville	Dunklin	72	51	84	42	62	+2	3.29	+1.14	240	+94
Charleston	Mississippi	71	50	83	43	61	+3	4.72	+2.21	227	+111
Portageville-Delta Center	Pemiscot	73	52	86	43	63	+3	3.78	+1.16	254	+104
Portageville-Lee Farm	Pemiscot	74	52	85	45	63	+3	4.41	+1.79	260	+114
Steele	Pemiscot	74	52	87	43	64	+4	2.73	+0.08	255	+108

* 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.

Weather Data provided by Pat Guinan
GuinanP@missouri.edu
(573) 882-5908

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