Integrated Pest & Crop Management

Evaluate Winter Wheat Seed Quality Prior to Planting

by Laura Sweets

Fusarium head blight or scab was widespread, and in some fields severe, this season especially in southeastern Missouri and some areas of northeastern Missouri. The fungus which causes this disease may infect kernels and can affect stands if infected seed is planted. Bacterial streak (leaf symptom) and black chaff (head symptom) were also a problem in scattered fields throughout the state. The bacterium which causes this disease is seedborne. If wheat is going to be saved for seed, this is certainly a year to pay careful attention to the quality of seed being saved.

Bacterial streak and black chaff are names for the same bacterial disease which produces symptoms on both leaves and heads. Water-soaked lesions may develop on young leaves. These develop into reddish brown to brownish black streaks on the leaves. Glumes and awns sow brown-black blotches or streaks. Black chaff may be confused with glume blotch. Symptoms may not be evident on individual kernels but the bacterial pathogen is can be seedborne. Since seed treatment fungicides are not effective against this bacterial pathogen, seed from fields which had bacterial streak and black chaff should not be used for planting.

Fusarium head blight or scab infection may result in shriveled and shrunken kernels, lightweight bleached or tombstone kernels or kernels that have a pinkish cast or discoloration. Lots with high levels of scab may have lower germination rates. The fungus that causes scab can also cause a seedling blight of wheat. If scab infected seed is used for planting, seedling blights and stand establishment problems may occur. Management of Fusarium seedling blight is through the planting of disease-free seed or a combination of thoroughly cleaning the seed lot, having a germination test run, adjusting the seeding rate to compensate for germination rate and using a fungicide seed treatment effective against seed-borne Fusarium or scab.

Because scab can decrease germination, a germination test may be especially useful in determining if a particular lot should be used for seed. The minimum germination rate for certified seed is 85% germination. It is possible that lower germination rates might be successfully used for seed if the seeding rate is adjusted to compensate for the low germination rate. But this can be risky, especially if weather conditions at and after planting are not favorable for germination and emergence. Fungicide seed treatments can provide some benefit but they cannot resurrect dead seed.

If seed from a field that had Fusarium head blight or scab is being considered for use as seed this fall, it is important to get an accurate germination test and use this information in deciding whether or not to use the lot for seed, whether the seeding rate will need to be increased and whether or not to apply a seed treatment fungicide.

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Evaluate Winter Wheat Seed Quality Prior to Planting - continued

by Laura Sweets

Before submitting a sample for a germination test it is important to thoroughly clean the seed. The wheat seed should be cleaned to remove small and damaged seed and to eliminate weed seeds. With the amount of scab is some lots this year, thoroughly cleaning a lot may clean out 25-30% of the seed in the lot. But a thorough cleaning will give more reliable germination test results and removing small and damaged seed will not only aid in crop establishment it will also provide a more uniform wheat seedling stand. Removing small and damaged seed will also increase the thousand-kernel weight (TKW), which serves as a measure of seed quality. Wheat seed lots with TKW values greater than 30 grams tend to have increased fall tiller number and seedling vigor.

The next step is to perform a germination test. Germination tests can either be completed at home or by sending a sample to the Missouri Seed Improvement Association or the Missouri Department of Agriculture.

A home test can be performed by counting out 100 seeds and placing them in a damp paper towel. Place the paper towel into a plastic bag to conserve moisture and store in a warm location out of direct sunlight. After five days, count the number of germinated seeds that have both an intact root and shoot. This will give the grower an estimate of % germination. It is important to choose random seeds throughout the entire seed lot and conduct at least five 100 seed counts.

The Missouri Seed Improvement Association performs germination tests. The test requires one pound of seed and costs $14.25. For details email MOSEED@AOL.com or check the Missouri Seed Improvement Association web site at http://www.moseed.org/ (see lab services then fees and forms for details on submitting samples).

The State Seed Control Laboratory at the Missouri Department of Agriculture also performs germination tests. The test requires one pint to one quart of seed. From June 1 through August 31 tests are free but between September 1 and November 1 there is a $12.00 fee per sample and a limit of four samples per farmer. Information and a submission form can be obtained on the Missouri Department of Agriculture web site, http://mda.mo.gov/plants/seed/ and then clicking on Submitting Seed Service Samples.

If germination is below 85% it is important to increase the seeding rate to compensate; however seeding any wheat with a germination test below 80% would not be recommended.

The next step is to decide whether a fungicide seed treatment is necessary. A number of fungicides are labeled for use as seed treatment fungicides on winter wheat. These seed treatment fungicides protect germinating seed and young seedlings from seedborne and soilborne pathogens. Seed treatment fungicides will not improve germination of seed that has been injured by environmental factors and will not resurrect dead seed. A correct assessment of the cause of poor seed quality or poor germination rates is the first step in deciding if a seed treatment fungicide is necessary.

Fungicide seed treatments for winter wheat are included in the 2013 Pest Management Guide: Corn, Grain Sorghum, Soybean and Winter Wheat, Extension Publication M171. Printed copies of this bulletin are available from the Extension Publications Distribution Center, 2800 Maguire Blvd., Columbia, MO, 573-882-7216.

Goss's Bacterial Wilt and Leaf Blight of Corn

by Laura Sweets

After several years of speculation about the occurrence of Goss's bacterial wilt and leaf blight of corn in Missouri, the disease has been officially confirmed from a corn leaf sample from Holt County, Missouri. Corn plants in the field showed symptoms suggestive of Goss's bacterial wilt. When the leaf sample was submitted to the University of Missouri Plant Diagnostic Clinic, there was very pronounced bacterial streaming from affected tissues. The sample tested positive on the immunostrip test for Clavibacter michiganensis subsp. michiganensis, the causal agent of bacteria canker in tomato. This test will also react with other species of Clavibacter including the one which causes Goss's wilt. The sample was negative on the ELISA test for the Stewart's wilt bacterium. Using a selective media, C. michiganensis nebraskensis was isolated from the infected tissue. Bacterial cultures were submitted to the University of Minnesota Plant Disease Clinic and personnel there used PCR and sequencing to confirm the identification of the bacterium.

Goss's bacterial wilt and leaf blight of corn is caused by the bacterium Clavibacter michiganensis subsp. nebraskensis. The disease was first reported from Dawson County in Nebraska in 1969. Over the next ten or so years it was identified in adjacent states. Since about 2006 there has a resurgence of the disease in Nebraska and it has been reported in many of the Corn Belt states.

The bacterial pathogen can cause two main types of symptoms, a leaf blight and a systemic wilt. The leaf blight phase of the disease is the most common. Initially water-soaked streaks may appear in leaf tissue. These water-soaked areas develop into lesions that are gray to light green to light yellow in color, have wavy, irregular edges and run parallel to leaf veins. Small, irregular, dark green to black water-soaked spots (often called freckles) occur within the lesions. Bacterial exudate or ooze may dry on the diseased leaf tissue. This dried exudate will appear shiny or glistening in sunlight. The presence of "freckles" within the lesions and dried bacterial exudate within the lesions are diagnostic features of Goss's leaf blight.

The leaf blight phase of the disease might be mistaken for Stewart's bacterial wilt or northern corn leaf blight. The lesions caused by Stewart's bacterial wilt are very similar to those caused by Goss's wilt and leaf blight. However, the appearance of freckles or dried bacterial exudate on the lesion surface are good indications that it is Goss's wilt rather than Stewart's wilt. Also Stewart's wilt is spread by the corn flea beetle so the presence of flea beetle feeding scars on leaves would suggest Stewart's wilt. Stewart's wilt has not been very prevalent in Missouri the last few years. Northern corn leaf blight lesions may have a water-soaked appearance initially. Lesions tend to be tan to brown to almost bleached in color and have slightly more defined or regular lesion margins or edges than the lesions of Goss's leaf blight. Northern corn leaf blight lesions may have distinct clumps of mold growth on the dead tissue which could be mistaken for the freckles of Goss's wilt. Older lesions of both Goss's wilt and Stewart's wilt may be colonized by secondary fungi so fungal growth within or over lesions in not a reliable diagnostic feature.

Lesions of various ages

Goss's leaf blight

Leaf lesions may expand and kill large portions of the canopy. Severe browning and death of leaves may be confused with leaf scorch associated with drought or hot, drying winds. Goss's leaf blight lesions develop along the margins of the leaves of within the leaves while leaf scorch tends to begin at the leaf tip and move towards the base of the leaf.

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Goss's Bacterial Wilt and Leaf Blight of Corn - continued

by Laura Sweets

Yield losses will vary depending on susceptibility of the hybrid, timing of infection (infection early in the season may result in higher yield losses) and environmental conditions during the remainder of the growing season.

The wilt phase of the disease is less common and occurs when the bacteria infects the vascular system of the plant. When the bacteria move into the water-conducting tissues, the xylem tissues will be discolored and then plants will wilt and die. Stalks will exhibit a slimy, stalk rot.

The bacteria which causes Goss's wilt and leaf blight survives in infested corn debris on or near the soil surface. It may be spread by wind-driven, rain, splashing rain and heavy rains associated with hail storms. Infection may be primarily through wounds caused by hail, wind, rain, wind-blown sand or soil, or possibly machinery. Development of the disease is favored by warm, wet and humid conditions. Outbreaks may be found after a hail storm or rain storm with strong winds which would wound plants and spread the bacteria.

There are no rescue treatments for Goss's wilt and leaf blight. Management strategies focus on preventative measures and include planting resistant hybrids, rotating crops, controlling weeds and managing residues. Hybrids range in sensitivity from very resistant to very susceptible. If Goss's wilt and leaf blight have been a problem, check ratings of hybrids and try to find hybrids with some level of resistance. Because the bacterium that causes the disease survives on corn residue and debris, severe infestations are more likely to occur when corn follows corn. Rotation to soybean or other broadleaf crops will help reduce the problem. Fields with a reduced-tillage system may also be at greater risk and in those fields hybrid selection, crop rotation and weed control become even more important. Finally, weedy grasses such as barnyard grass, green foxtail, and shattercane can be hosts for the bacterial pathogen. Good weed control of grassy weeds can help reduce inoculum and lower the risk of the disease.

If you suspect Goss's bacterial wilt may be present in a corn field and want to have the field diagnosis confirmed, you can submit a sample to the University of Missouri Plant Diagnostic Lab (for information visit the website—http://plantclinic.missouri.edu/). For the $15.00 fee samples will be checked for symptoms and microscopically examined for bacterial streaming. For the remainder of the 2014 season, samples suspected of having Goss's wilt will be further tested by culturing and serological testing with no additional charges. After December 31, 2014, normal fees for culturing and serological testing will be charged.

Freckles and dried droplets of bacterial ooze in lesion

Freckles in older lesion

Stalk rot

High Numbers of Small Grasshoppers Present throughout Missouri

by Wayne Bailey

Numerous grasshoppers are currently present in grass pastures, waterways, field borders and many soybean and corn fields throughout most areas of the state. As grasses and other field border vegetation begin to mature and dry, grasshoppers will continue to move into crop fields to feed on green vegetation. Dry field conditions found in some areas of Missouri will favor grasshopper survival by reducing the threat from various viral pathogens that typically reduce grasshopper numbers in most years. The economic thresholds for grasshoppers vary depending on the commodity or non-cropland areas requiring insecticide applications for effective grasshopper management. Approximately 100 plus species of grasshoppers are found in Missouri, although only 5-7 species are common in field crops. As with most insects, the larger the grasshoppers grow the more foliage and other plant materials they consume. Damage from both nymph and adult grasshoppers is often seen as very ragged feeding wounds located from leaf edges inward into the body of the leaf. Grain damage is often found on the tips of corn ears, on sorghum (milo) heads, and the pods of soybean. As fall approaches new plantings of alfalfa and wheat may be at risk from grasshoppers and cricket damage.

Economic threshold information and labeled insecticides are listed in the following commodity tables.

SITE: NON-CROPLAND AREAS - GRASSHOPPERS 2014

Comments: Control grasshoppers when they are small by applying spot treatments to hatching sites in non-cropland areas. Treatment in these areas is justified when grasshopper numbers reach or exceed 15 grasshoppers per square yard.

Common Name	Trade Name	Rate of formulated material per acre	Placement	Pre-harvest Interval (days)
esfenvalerate	*Asana XL	2.9 to 5.8 fl oz	Broadcast	
Beta-cyfluthrin	*Baythroid XL	2.6 to 2.8 fl oz	broadcast	
zeta-cypermethrin	*Mustang MAXX	2.8 to 4.0 fl oz	Broadcast**	12
acephate	Orthene 75S	2 oz to 2 2/3 oz of soluable powder	Broadcast	
Gamma-cyhalothrin	*Proaxis			24
carbaryl	Sevin XLR Plus	1 to 3 pt	Broadcast	
lambda-cyhalothrin	*Warrior II	1.28 fl oz	Broadcast	24

***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.

SITE: GRASS PASTURES - GRASSHOPPERS 2014

Comments: Control grasshoppers when they are small by applying spot treatments to hatching sites in grass pastures. Treatment in these areas is justified when grasshopper numbers reach or exceed 7 grasshoppers per square yard.

Common Name	Trade Name	Rate of formulated material per acre	Placement	Pre-harvest Interval (days)
Beta-cyfluthrin	*Baythroid XL	2.6 to 2.8 fl oz	Broadcast	0(grazing or forage)
zeta-cypermethrin	*Mustang MAXX	3.2 to 4.0 fl oz	Broadcast	0(forage, hay), 17(straw)
carbaryl	Sevin XLR Plus	1 to 4 pt	Broadcast	14(harvest or grazing)
lambda-cyhalothrin	*Warrior II	1.28 to 1.92 fl oz	Broadcast	0(grazing or forage), 7(hay)

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SITE: ALFRALFA - GRASSHOPPERS 2014

Comments: Control grasshoppers when they are small by applying spot treatments to hatching sites in non-cropland areas. Treatment in these areas is justified when grasshopper numbers reach or exceed 15 grasshoppers per square yard.

Common Name	Trade Name	Rate of formulated material per acre	Placement	Pre-harvest Interval (days)
beta-cyhalothrin	*Baythroid XL	2.0 to 2.8 fl oz	broadcast	0 (forage, hay)
chlorpyrifos + gamma-cyhalothrin	*Cobalt	7 to 13 fl oz	broadcast	7 (graze, hay)
dimethoate	Dimethoate	see product label	broadcast	10 (harvest, graze)
chlorpyrifos	*Lorsban Advanced	1/2 to 1 pt	broadcast	7 (graze, hay)
gamma-cyhalothrin	*Proaxis	2.56 to 3.84 fl oz	broadcast	1 (forage) 7 (hay)
zeta-cypermethrin	*Mustang MAXX	2.8 to 4.0 fl oz	broadcast	0 (forage, hay)
carbaryl	Sevin XLR Plus	1 to 3 pt	broadcast	7 (harvest, grazing)
zeta-cypermethrin + chlorpyrifos	*Stallion	9.25 to 11.75 fl oz	broadcast	7 (cutting, graze)
cyfluthrin	*Tombstone	2.8 to 4.0 fl oz	broadcast	7(forage, graze, hay)
lambda-cyhalothrin	*Warrior II	1.28 fl oz	broadcast	1 (forage) 7 (hay)

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SITE: FIELD CORN - GRASSHOPPERS 2014

Comments: Control grasshoppers when they are small by applying spot treatments to hatching sites in field borders and grass waterways. Treatment in CORN field is justified when 7 or more grasshoppers per square yard are present and foliage is being severely damaged. After pollen shed, control may be necessary if grasshoppers are damaging foliage above ear zone. Dimethoate should not be applied to corn during pollen-shed.

Common Name	Trade Name	Rate of formulated material per acre	Placement	REI Hours	Pre-harvest Interval (days)
esfenvalerate	*Asana XL	5.8 to 9.6 fl oz	foliage	12	21 (grain)
cyfluthrin	*Baythroid XL	1.6 to 2.8 fl oz	foliage	12	21 (grain or fodder) 0 (green forage)
bifenthrin	*Brigade 2EC	2.1 to 6.4 fl oz	foliage	12	30 (grain, fodder, graze)
chlorpyrifos + gamma-cyhalothrin	*Cobalt	7 to 13 fl oz	foliage	24	21 (grain or ears) 14 (graze or silage haravest)
deltamethrin	*Delta Gold 1.5EC	1.0 to 1.5 fl oz	foliage	12	21 (grain, fodder) 12 (cut forage or graze)
alpha-cypermethrin	Fastac EC	2.7 to 3.8 fl oz	foliage	12	30 (grain, stover) 60 (graze)
dimethoate	Dimethoate 4E	1 pt	foliage	48	28 (grain) 14 (forage)
zeta-cypermethrin + bifenthrin	*Hero	2.6 to 6.1 fl oz	foliage	12	30 (grain, stover, graze) 60 (forage)
chlorpyrifos	*Lorsban Advanced	1/2 to 1 pt	foliage	24	21 (grain, ears ,forage, fodder)
chlorpyrifos	*Lorsban 4E	1/2 to 1 pt	foliage	24	21 (grain, ears, forage, fodder)
zeta-cypermethrin	*Mustang MAXX	2.8 to 4.0 fl oz	foliage	12	30 (grain, stover) 60 (forage)
chlorpyrifos	*Nufos 4E	1/2 to 1 pt	foliage	24	21 (grain or ears)
microencapsulated methyl parathion	*Penncap-M	2 to 3 pt	foliage	48	12 (grain, forage, graze)
gamma-cyhalothrin	*Proaxis	2.56 to 3.84 fl oz	foliage	24	Do not graze livestock
zeta-cypermethrin + chlorpyrifos	*Stallion	9.25 to 11.75 fl oz	foliage	24	30 (grain, stover, graze) 60 (forage)
cyfluthrin	*Tombstone Helios	2.1 to 2.8 fl oz	foliage	12	21 (grain or fodder), 0 (forage)
lambda-cyhalothrinn + chlorantraniliprole	*Voliam xpress	6.0 to 9.0 fl oz	foliage	24	1(forage) 7 (hay)
lambda-cyhalothrin	*Warrior II	1.28 to 1.92 fl oz	foliage	24	21 (grain), 1 (graze, forage) 21 (treated feed or fodder)

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SITE: SOYBEAN - GRASSHOPPERS 2014

Comments: Treat when defoliation reaches 30% before bloom, 20% bloom to pod fill, or when 5% to 10% of pods are damaged.

Common Name	Trade Name	Rate of formulated material per acre	Placement	REI Hours	Pre-harvest Interval (days)
esfenvalerate	*Asana XL	5.8 to 9.6 fl oz	Broadcast	12	21 (grain) do not feed
beta-cyfluthrin	*Baythroid XL	2.0 to 2.8 fl oz	Broadcast	12	21 days, do not feed
chlorpyrifos + gamma-cyhalothrin	*Cobalt	7 to13 fl oz	Broadcast	24	30 (grain) do not feed
deltamethrin	* Delta Gold	1.5 to 1.9 fl oz	Broadcast	12	21 (grain) do not graze, feed
dimethoate	Dimethoate 4EC	1 pt	Broadcast	48	5 (feed, graze)
chlorpyrifos	Lorsban Advanced	1/2 to 1 pt	Broadcast	24	30 (grain) do not graze, feed
lambda-cyhalothrin + thiamethoxam	*Endigo ZC	3.5 to 4.5 fl oz	Broadcast	24	30 (grain) do not graze, feed
Imadicloprid + cyfluthrin	*Leverage	2.8 fl oz	Broadcast	12	21 (grain)
chlorpyrifos	*Lorsban 4E	1/2 to 1 pt	Broadcast	24	30 (grain) do not graze, feed
zeta-cypermethrin	*Mustang MAXX	3.2 to 4.0 fl oz	Broadcast	12	21 (grain) do not feed
chlorpyrifos	*Nufos 4E	1/2 to 1 pt	Broadcast	24	30 (grain) do not graze, feed
acephate	Orthene 97	1/4 to 1/2 lb	Broadcast	24	21 days, do not feed to livestock
lambda-cyhalothrin	*Proaxis	3.2 to 3.84 fl oz	Broadcast	24	30 (grain) do not feed, graze
carbaryl	Sevin XLR Plus	1 to 3 pt	Broadcast	12	14 (graze, harvest) 21 (seed)
chlorpyrifos + zeta-cyhalothrin	*Stallion	5.0 to 11.75 fl oz	Broadcast	24	28 (grain)
cyfluthrin	*Tombstone	2.0 to 2.8 fl oz	broadcast	12	45 (feed) 60 (green forage)
lambda-cyhalothrin	*Warrior II	1.6 to 1.92 fl oz	Broadcast	24	30 (grain) do not feed

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SITE: GRAIN SORGHUM (MILO) - GRASSHOPPERS 2014

Comments: Control grasshoppers when they are small by applying spot treatments to hatching sites in field borders and grass waterways. Treatment in crop field is justified when 7 or more grasshoppers per square yard are present.

Common Name	Trade Name	Rate of formulated material per acre	Placement	REI Hours	Pre-harvest Interval (days)
cyfluthrin	*Baythroid XL	2 to 2.8 fl oz	grain head, foliage	12	14 (grain or graze)
chlorpyrifos + gamma-cyhalothrin	*Cobalt	7 to 13 fl oz	grain head, foliage	24	30 (grain, forage, fodder, hay, or silage)
gamma-cyfluthrin	*Declare	1.02 to 1.54 fl oz	grain head, foliage	24	30 (grain)
deltamethrin	*Delta Gold 1.5EC	1 to 1.5 fl oz	grain head, foliage	12	14 (grain, cut or graze forage)
dimethoate	Dimethoate 4E	1/2 to 1 pt	grain head, foliage	48	28 (grain) 14 (forage)
Alpha-cypermethrin	*Fastac EC	3.2 to 3.9 fl oz	grain head, foliage	12	14 (grain, stover) 45 (forage)
chlorpyrifos	*Lorsban Advanced	1/2 to 1 pt	grain head, foliage	24	30 (grain, forage, fodder, hay, or silage)
chlorpyrifos	*Lorsban 4E	1/2 to 1 pt	grain head, foliage	24	30 (grain, forage, fodder, hay, or silage)
zeta-cypermethrin	*Mustang MAXX	3.2 to 4.0 fl oz	grain head, foliage	12	30 (grain, stover) 45 (forage)
chlorpyrifos	*Nufos 4E	1/2 to 1 pt	grain head, foliage	24	30 (grain, forage, fodder, hay, or silage)
	*Stallion	9.25 to 11.75 fl oz	grain head, foliage	24	30 (grain, stover) 45 (forage)
cyfluthrin	*Tombstone Helios	2 to 2.8 fl oz	grain head, foliage	12	14 (harvest or graze forage)
lambda-cyhalothrin	*Warrior II	1.28 to 1.92 fl oz	grain head, foliage	24	30 (grain), 7 (graze) 30 (straw fed to livestock)

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Weather Data for the Weekly Period August 20-26, 2014

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.	August 1-26	Departure from long term avg.	Accumulated Since Apr 1	Departure from long term avg.
Corning	Atchison	90	73	94	66	81	+6	7.64	+4.41	2860	+170
St. Joseph	Buchanan	90	74	92	69	82	+7	4.32	+0.83	2725	+49
Brunswick	Carroll	92	72	95	69	82	+7	4.64	+1.04	2858	+143
Albany	Gentry	89	72	92	69	80	+5	7.77	+4.63	2633	-3
Auxvasse	Audrain	95	72	97	70	82	+8	3.58	+0.54	2709	-39
Vandalia	Audrain	93	72	96	69	82	+7	4.42	+0.97	2649	-55
Columbia-Bradford Research and Extension Center	Boone	94	71	97	68	82	+7	2.25	-1.43	2704	-113
Columbia-Capen Park	Boone	97	69	99	67	81	+4	2.85	-0.76	2727	-188
Columbia-Jefferson Farm and Gardens	Boone	96	72	99	70	83	+8	3.08	-0.59	2786	-38
Columbia-Sanborn Field	Boone	96	75	98	72	84	+7	3.06	-0.65	2943	+23
Columbia-South Farms	Boone	95	73	97	70	83	+8	3.06	-0.64	2756	-64
Williamsburg	Callaway	98	71	101	68	83	+8	2.17	-1.25	2737	+42
Novelty	Knox	89	71	92	68	80	+5	5.74	+2.85	2513	-142
Linneus	Linn	90	72	92	70	81	+7	4.95	+1.70	2609	-9
Monroe City	Monroe	92	72	94	68	81	+6	6.16	+3.14	2618	-95
Versailles	Morgan	97	73	99	70	83	+7	4.36	+1.15	2920	+32
Green Ridge	Pettis	95	72	96	70	82	+9	3.76	+0.84	2761	+37
Lamar	Barton	98	72	100	69	84	+6	1.16	-1.53	2959	-44
Cook Station	Crawford	99	69	103	66	82	+5	1.44	-1.58	2801	-90
Round Spring	Shannon	98	66	100	64	80	+5	1.04	-1.80	2694	-74
Mountain Grove	Wright	97	70	100	67	83	+7	1.53	-0.88	2670	-63
Delta	Cape Girardeau	94	71	96	66	82	+4	3.20	+0.78	2876	-310
Cardwell	Dunklin	94	73	97	71	83	+4	1.46	-0.48	3192	-257
Clarkton	Dunklin	97	73	99	71	83	+4	1.36	-0.51	3121	-277
Glennonville	Dunklin	94	74	98	73	84	+5	2.82	+0.99	3173	-210
Charleston	Mississippi	94	74	96	72	83	+6	2.21	+0.08	3152	-62
Portageville-Delta Center	Pemiscot	95	75	97	74	84	+5	2.37	+0.52	3272	-151
Portageville-Lee Farm	Pemiscot	95	75	96	73	84	+5	2.03	+0.18	3287	-114
Steele	Pemiscot	94	74	98	72	83	+4	2.19	+0.24	3201	-230

‡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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