

Integrated Pest & Crop Management

IPM Publications, Information You Can Use: IPM1027: Best Management Practices for Nitrogen Fertilizer in Missouri

By Steven Kirk

There are many variables important to Missouri crop producers when it comes to the application of nitrogen fertilizers. Among them are the timing, rate and method of application of nitrogen, as well as the source and the use of additives, which can vary widely across the state and often between neighbors. A successful nitrogen management program aims to deliver enough nitrogen fertilizer to the crop in order to optimize yield and profitability while minimizing losses to water and air. With nitrogen, economic success and environmental success overlap almost completely. Everyone wants the nitrogen to end up in the crop.

IPM1027: Best Management Practices for Nitrogen Fertilizer in Missouri, authored by Peter Scharf, *Extension Nutrient Management Specialist*, and John Lory, *Extension Environmental Nutrient Management*, is intended to describe crop production practices that have the greatest potential for success in dealing with the complexities of managing nitrogen fertilizer. This publication is a vital tool designed to provide crop producers and fertilizer applicators with the information needed to make sound nitrogen management decisions.

The best management practices (BMPs) presented in this publication are identified as sound practices from an economic, production and environmental standpoint. Included in this manual are the BMPs for the best time and rate to apply nitrogen in order to minimize losses and ensure adequate availability to the crop during critical growth periods. Also included is detailed information on choosing a nitrogen fertilizer source as it relates to timing, application methods and placement, and the use of additives, as well as managing nitrogen from manure, along with the BMPs needed to promote the efficient nitrogen uptake.

The MU Plant Protection Programs publishes a series of IPM manuals and guide sheets that focus on a wide variety of topics important to individuals engaged in making sound pest management decisions and improving crop yields. From 'Weed Management Systems for Environmentally Sensitive Areas (IPM1018)', to 'Crop Nutrient Deficiencies and Toxicities (IPM1016)', IPM guidesheets offer something for everyone involved in pest management; from crop production, to landscape maintenance, to homeowners to hobby gardeners.

IPM publications are free to view online: (<http://ppp.missouri.edu/ipm/pubs.htm>) and copies can be printed for your convenience. Print copies of most IPM publications can be purchased for a nominal fee. To order copies of our IPM publications online go to: (<http://extension.missouri.edu/publications/order.aspx>). To order print copies by phone with a credit card, call: 573-882-7216 or 800-292-0969.

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Missouri New Herbicide Label Update for 2010

By Kevin Bradley

I. Corn

Callisto Xtra is a new premix from Syngenta that contains Callisto (mesotrione) + atrazine and is labeled for postemergence application at 20 to 24 ounces per acre in field, seed, silage, sweet corn and also in yellow popcorn. The 20 ounce rate of Callisto Extra contain 2 ½ ounces of Callisto and ½ lb of atrazine.

Capreno is a new premix from Bayer CropSciences that contains Laudis (tembotrione) plus thiencazzone, a new ALS-inhibiting herbicide. Capreno is labeled for postemergence use in corn at 3 ounces per acre and should provide broad-spectrum control of a variety of grass and broadleaf weeds.

Corvus is a new prepackaged herbicide mixture from Bayer CropSciences that contains the Balance Flexx product plus thiencazzone, a new ALS-inhibiting herbicide. Corvus is designed to be a one-pass preemergence herbicide that can be applied from burndown up to the V2 growth stage in corn. Corvus can be applied at rates ranging from 3 2/3 to 5 2/3 fluid ounces per acre depending on soil type. Corvus should provide good control of a variety of annual grass and broadleaf weeds like giant foxtail, common ragweed, lambsquarters, nightshade, and waterhemp. Tank-mixing this product with atrazine will increase control of tougher weeds like cocklebur, giant ragweed, and morning glory.

Integrity is a new premix from BASF that contains Sharpen (saflufenacil) and Outlook (dimethenamid-P). Integrity is labeled for preemergence use in field corn, silage, and popcorn at 10 to 16 ounces per acre depending on soil type. Integrity will provide a relatively broad spectrum of grass and broadleaf weed control but at these rates is designed as a set-up for a planned 2-pass program containing a postemergence herbicide application.

II. Soybean

Flexstar GT is a new prepackaged mixture from Syngenta that contains fomesafen (Flexstar) and glyphosate. Flexstar GT is expected to receive a label for use in soybeans by the 2009 growing

season. Flexstar GT will be formulated as a 3.29 SL and contains 2.63 pounds of glyphosate acid and 0.66 pounds of fomesafen per gallon of product. Flexstar GT will be labeled at rates ranging from 3 to 3.75 pints per acre in Missouri. At the 3 pint per acre rate, Flexstar GT will deliver 1 pound of glyphosate acid per acre and ¼ lb. fomesafen. This product is intended to provide postemergence control of glyphosate-resistant weeds in soybean like waterhemp.

OpTill is a new prepackaged mixture from BASF that contains saflufenacil (Sharpen) and imazethapyr (Pursuit). OpTill is labeled for preplant to preemergence applications in soybean at 2 ounces per acre and is also recommended to be applied in combination with methylated seed oil and ammonium sulfate.

Prefix now has a postemergence label for use in soybeans. Prefix may be applied at 2 to 2 1/3 pints per acre from cracking up to the third trifoliate stage in soybean. Prefix will provide very little control of emerged weeds but will provide residual control of a variety of weeds that may emerge throughout the season like waterhemp. In Roundup Ready soybean, Prefix can be tank-mixed with a glyphosate product to control weeds that are present at the time of the application. Crop oil concentrate should not be added as a spray adjuvant as this will increase the likelihood of crop injury.

Sharpen (saflufenacil) is a new product from BASF labeled for early preplant to preemergence application in soybeans. Sharpen is a 2.85 lb ai/gal product and is labeled for use at 1 fluid ounce per acre in combination with methylated seed oil and ammonium sulfate. Sharpen is a PPO-inhibitor that has activity on broadleaves only and will primarily be utilized in burndown situations with glyphosate. Sharpen has good foliar activity on horseweed, and will be a good partner with glyphosate for the control of glyphosate-resistant horseweed biotypes. There is no preplant interval for Sharpen applications prior to soybean planting, so if you have a need for a 2,4-D replacement

in your burndown, Sharpen would be a good fit.

Tackle is a new prepackaged herbicide mixture from Cheminova that contains Pursuit (imazethapyr) plus glyphosate. Tackle is recommended for use at 32 ounces per acre and can be applied in either preemergence or postemergence in Roundup Ready soybeans.

III. Grass Pastures and Hay

Chaparral is a new herbicide from Dow AgroSciences that had a limited launch in Missouri in 2009. Chaparral is a prepackaged mix of Milestone (aminopyralid) plus metsulfuron (Cimarron, Ally, Escort, others). Chaparral will be a 61.95% extruded granule product that contains 85% aminopyralid and 15% metsulfuron. The maximum rate of Chaparral will be 3.3 ounces of product per acre but it is unlikely that this rate will be suitable for most applications in Missouri as this rate provides the equivalent of 7 fluid ounces of Milestone per acre and 0.5 ounces of Cimarron per acre. This rate of Cimarron can cause significant injury to fescue, especially when applied in the spring. For general weed control, Chaparral will be labeled at 2 to 2.5 ounces per acre.

For more information on all of these products, visit our website <http://weeds.cimarron.com/> and click on the "Field Research Results" tab.

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Deadline Looms for 2010 Nutrient Management Assistance

Source: John Lory

COLUMBIA, Mo.— Permitted animal feeding operations now can apply for cost-share funds as they face new nutrient management standards in 2010.

Operations have until Jan. 29 to apply to programs offered through the USDA Natural Resources Conservation Service for incentives to help pay for new nutrient management plans.

“Given the economic hardship that’s out there in agriculture — particularly with animal feeding operations — this is an opportunity to get a quality plan written for less,” said John Lory, University of Missouri Extension environmental nutrient management specialist. “For some poultry operations the cost might be around \$3,000, but if you’re talking about a large dairy the cost might be nearer to \$10,000, and that’s a lot of extra money to set aside.”

The Environmental Quality Incentives Program (EQIP) provides financial assistance to help develop environmentally friendly management for cropland, grassland, pastureland, non-industrial private forestland or other agricultural lands.

The NRCS program creates a comprehensive plan that accounts for everything from the generation, collection

and storage of nutrients to handling, land treatment and actual nutrient management of that animal feeding operation, said Darlene Johnson, an NRCS resource conservationist.

Last year, Missouri farmers received \$17 million through EQIP, although there were more than \$70 million in eligible applications.

“We had well over four times the amount of requests than money available last year, which is typical, but if you don’t come in and sign up you have no chance to get part of that,” Johnson said. “We also recommend you not wait until the Jan. 29 deadline to come in, because making sure everything is in order can take some time.”

More than 550 permitted animal feeding operations exist in Missouri, and most will need new plans to meet requirements in the next year.

“The reality that many permitted facilities will need new plans is just now registering with farmers, so this short deadline might slip by unnoticed,” Lory said. “We want them to understand that if they haven’t had a plan written in the last year, the likelihood is that they’ll have to get a new one in 2010.”

Lory noted an NRCS Comprehensive Nutrient Management Plan (CNMP) would meet or exceed the new technical standards for nutrient management plans on all permitted operations. He also encourages smaller unpermitted farms with less than 1,000 head to consider applying for this opportunity.

“One important thing is that NRCS will provide the incentive payment to the farmer and he can choose a planner to write the plan from a list of qualified Technical Service Providers,” he said. “With the increased regulatory and environmental scrutiny taking place, the best way to be fully prepared is to have a plan.”

Visit your local NRCS office for more information and to sign up for EQIP before Jan. 29. For more information on the Missouri EQIP program, see <http://www.mo.nrcs.usda.gov/programs/eqip/eqip10.html>.

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Nutrient Management Course Will Focus on the New DNR Nutrient Management Standard

By John Lory

On February 2-3, 2010 there will be a nutrient management course focused on the new Missouri Department of Natural Resources (DNR) Nutrient Management Technical Standard for concentrated animal feeding operations (CAFOs).

The new Nutrient Management Technical Standard defines the protocols that permitted animal feeding operations need to use to determine manure application rates and defines conditions where manure applications are restricted. The standard also defines the record keeping and monitoring requirements for manure storages and land application of manure.

The course will provide detailed presentations and discussion on how to interpret and use the new Nutrient Management Technical Standard. Topics will include phosphorus loss assessment including the phosphorus index, plant available nitrogen calculations and other protocols outlined in the new standard.

The course instructors will include faculty from University of Missouri and representatives from Missouri DNR. We have applied for 12 continuing education units (CEU’s) for CAFO and Wastewater operators and for 2.5 Soil and Water CEU’s and 9.5 Nutrient Management CEU’s for certified crop advisors.

The course will be held at the University of Missouri Research and Extension Center at Bradford Farm near Columbia MO. Cost of the course is \$185 and includes two lunches. Call Shane Ferguson at 573-884-6311 to register. Pre-registration is required before Tuesday January 26, 2010,

More information about the course including a tentative agenda is available at the website <http://nmplanner.missouri.edu/training/index.asp#advanced>.

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University of Missouri Plant Diagnostic Clinic Report - 2009

By Simeon Wright

The Plant Diagnostic Clinic was established in 1965 and handles samples submitted for plant disease, insect, and weed identifications, as well as management recommendations. The clinic supports county extension specialists and receives samples directly from other agencies, businesses and private citizens throughout the state. Most clinic operations are handled by clinic staff, however other MU Division of Plant Science faculty assist when needed. Samples are diagnosed by visual observation or microscopic examination. When necessary, samples are also diagnosed by culturing plant tissues, limited ELISA serological testing, the BIOLOG bacterial identification system, and PCR. Use of ELISA and PCR testing methods is generally dependent on sufficient sample volume.

In 2009, we had a 25% increase in sample submissions to the diagnostic clinic over the previous year. Most samples were submitted through the mail while some were personally delivered to the clinic or submitted digitally by email. Samples were submitted from 87 Missouri counties. Approximately 80% of the samples were received between May and September.

The diagnostic clinic receives many types of plant samples in addition to agronomic crops (fig. 1). Corn, soybeans and wheat were the primary agronomic crop samples we received (fig. 2). Significant numbers of the following agronomic samples were received and are described below:

Corn samples were most frequently submitted with gray leaf spot (*Cercospora zeae-maydis*). Many samples also had common rust (*Puccinia sorghi*), and a few had Southern rust (*Puccinia polysora*). Other common submissions included Diplodia ear rot, Northern corn leaf blight (*Exserohilum turcicum*), anthracnose leaf blight (*Colletotrichum graminicola*) and herbicide injuries. Early in the season, several samples were submitted with Pythium and Fusarium root rot and seedling blight. We also received a few samples with Stewart's wilt (*Erwinia stewartii*), common smut (*Ustilago maydis*), Physoderma brown spot (*Physoderma maydis*), and Northern corn leaf spot (*Bipolaris zeicola*). Additional samples with foliar symptoms consistent with viruses were tested using ELISA serological testing methods (Agdia Inc., Elkhart IN) and were positive for corn stunt Spiroplasma, maize mosaic virus, maize dwarf mosaic virus, barley stripe mosaic virus, and barley yellow dwarf-rpv.

Some of the most common soybean submissions this year were bacterial blight (*Pseudomonas savastanoi* pv. *glycinea*), Septoria brown spot (*Septoria glycines*), Cercospora leaf blight/leaf spot (*Cercospora kikuchii*), and herbicide injury issues. Some anthracnose (*Colletotrichum* sp.), sudden death syndrome (*Fusarium virguliforme*), sunburn, and Phomopsis pod and stem blight were also received. The first brown stem rot (*Cadophora gregata*) submission to the MU diagnostic clinic in several

years was confirmed by PCR at University of Minnesota from NE Missouri. We also observed that many of the plants diagnosed with specific diseases had poor root systems that appeared to be due to compacted and saturated soils.

Many of the wheat samples submissions were for virus testing. The diagnostic clinic tested samples for wheat streak mosaic virus, soilborne wheat mosaic virus, wheat spindle streak mosaic virus and two strains of barley yellow dwarf virus. While all viruses were detected from samples, barley yellow dwarf was detected most frequently. Other samples were diagnosed with bacterial stripe (*Xanthomonas campestris* pv. *translucens*), powdery mildew (*Erysiphe graminis* f. sp. *tritici*), Septoria leaf blotch (*Septoria tritici*) and scab (*Fusarium graminearum*).

We welcome your submissions to the plant diagnostic clinic. In addition to providing a diagnosis in a written report, science-based management information is included. The sample fee is \$15 for most samples, with additional fees for certain tests. More information on the University of Missouri Plant Diagnostic Clinic, fees and services are available at: <http://soilplantlab.missouri.edu/plant/index.htm> For additional questions about sample submission, you can also contact the lab at plantclinic@missouri.edu or 573-882-3019.

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Visit our Web site at ppp.missouri.edu

Figure 1. Plant sample submissions in 2009

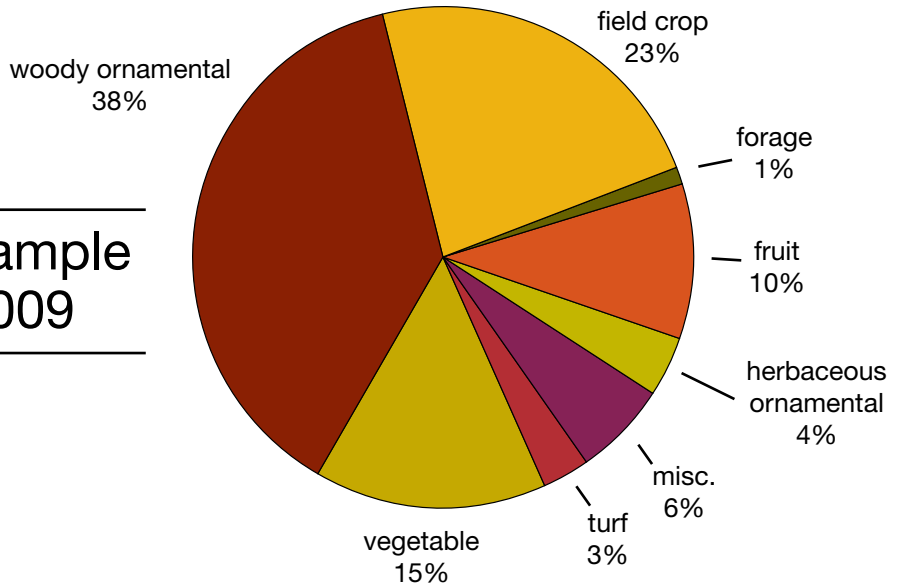
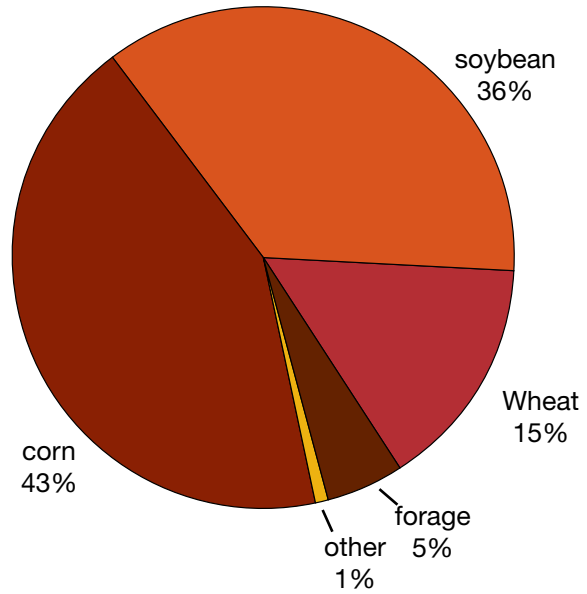


Figure 2. Agronomic sample submissions in 2009



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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 – Jan 4, 2010

- 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

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

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

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

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

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

Fax: 620-227-2047

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

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

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

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

• Ag Source Cooperative Services
106 N. Cecil Street
PO Box 788
Bonduel, WI 54107
Telephone: 715-758-2178
Fax: 715-758-2620

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

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

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Missouri Soil Testing Association Approved Labs

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• A&L Canada Laboratories, Inc
2136 Jetstream Road
London, ON N5V 3P5
Canada
Telephone: 519-457-2575
Fax: 519-457-2664

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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Weather Data for the Week Ending January 5, 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.	Dec 1- Dec 31	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	15	-4	35	-16	7	-18	0.62	-0.60	*	*
St. Joseph	Buchanan	16	2	34	-8	9	-19	0.79	-0.68	*	*
Brunswick	Carroll	18	2	34	-10	10	-18	1.80	+0.10	*	*
Albany	Gentry	15	-5	35	-20	6	-20	0.94	-0.43	*	*
Auxvasse	Audrain	21	5	34	-4	13	-16	2.83	+0.40	*	*
Vandalia	Audrain	20	4	35	-7	12	-17	3.48	+1.06	*	*
Columbia-Bradford	Boone	22	5	34	-5	13	-18	2.73	+0.44	*	*
Columbia-Jefferson Farm	Boone	22	6	35	-4	14	-17	2.32	+0.04	*	*
Columbia-South Farms	Boone	22	6	34	-4	14	-17	2.73	+0.44	*	*
Williamsburg	Callaway	24	6	35	-2	15	-15	3.44	+0.87	*	*
Novelty	Knox	17	0	33	-10	9	-19	1.72	-0.25	*	*
Linneus	Linn	18	0	33	-9	9	-18	1.46	-0.09	*	*
Monroe City	Monroe	20	2	33	-7	11	-19	2.58	+0.37	*	*
Versailles	Morgan	24	7	36	-4	15	-18	2.33	-0.06	*	*
Green Ridge	Pettis	21	4	34	-9	13	-17	2.76	+0.59	*	*
Lamar	Barton	24	11	35	2	18	-15	1.38	-1.24	*	*
Cook Station	Crawford	27	11	37	1	19	-15	1.72	-1.51	*	*
Round Spring	Shannon	31	14	39	3	22	-11	2.67	-0.30	*	*
Mountain Grove	Wright	26	10	35	-1	18	-14	2.01	-1.47	*	*
Delta	Cape Girardeau	31	16	43	6	23	-12	5.99	+1.88	*	*
Cardwell	Dunklin	33	21	46	11	27	-11	7.88	+3.36	*	*
Clarkton	Dunklin	32	19	44	8	26	-12	7.24	+3.24	*	*
Glennonville	Dunklin	32	20	45	9	26	-12	7.29	+3.44	*	*
Charleston	Mississippi	31	18	43	8	24	-13	4.91	+1.01	*	*
Portageville-Delta Center	Pemiscot	32	20	46	10	26	-12	5.47	+1.12	*	*
Portageville-Lee Farm	Pemiscot	32	20	45	10	26	-11	5.02	+0.67	*	*
Steele	Pemiscot	34	22	48	11	28	-10	5.52	+0.82	*	*

* 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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