



Extension Agronomy

eUpdate

06/16/2022

These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy eUpdate Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Kathy Gehl, 785-532-3354 kgehl@ksu.edu, or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 dpeterso@ksu.edu.

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1. Use the Mesonet Animal Comfort Tool to monitor livestock conditions this summer

Summer brings the heat, often amplified by humidity. With recent rains across the state, much of it in drought-stricken regions, there is no shortage of higher moisture in the air. When we factor in warmer-than-normal temperatures, especially at night, heat stress can rapidly develop in humans and animals alike. The Kansas Mesonet has an [Animal Comfort Tool](#) that helps track heat stress values at each location throughout the state.

When heat stress develops with hot, sunny, and humid conditions, increased proactive steps are required to avoid potential illness. This is compounded when heat stress values remain elevated for long periods of time. Of special importance is the animal's ability to recover at night. Recent record high temperatures overnight prevent the body from recovering from the previous day's heat and can compound the next day's stress if not mitigated.

Actual animal response to temperature stress will depend on a number of factors not accounted for in the index. Those include, but are not limited to: age, hair coat (winter vs summer; wet vs dry), health, body condition, micro-environment, and acclimatization. However, despite some of these unknowns, producers can evaluate the environmental conditions to livestock by using the Kansas Mesonet Animal Comfort tool.

Users can access this tool from the main Mesonet page by selecting from the drop-down menu on the top left of every page, Agriculture, and then Comfort Index (Figure 1). Also, users can access the tool directly from this link: <http://mesonet.k-state.edu/agriculture/animal/>

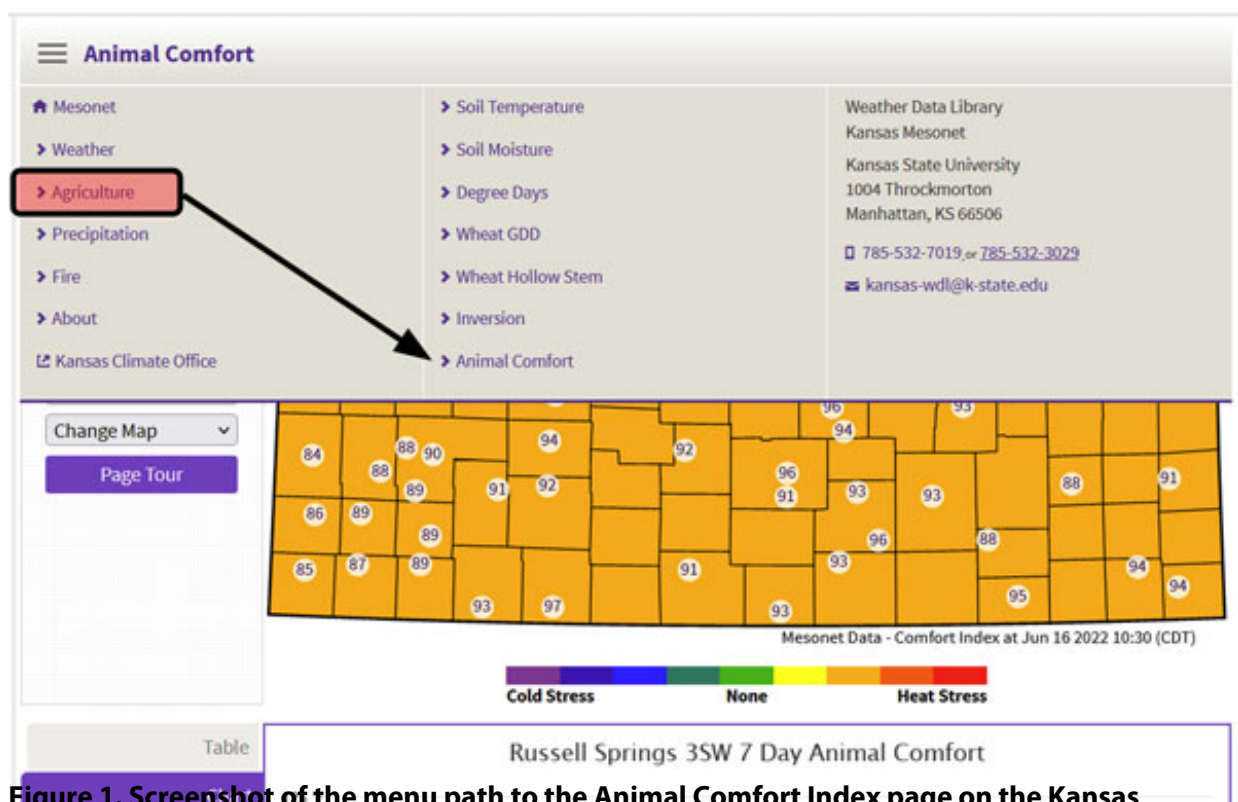


Figure 1. Screenshot of the menu path to the Animal Comfort Index page on the Kansas Mesonet.

Understanding the Comfort Index

Building on the Comprehensive Comfort Index produced at University of Nebraska, this tool illustrates the impact of both extremes of hot and cold. The index is unique in that it includes, in addition to air temperature and relative humidity, effects of wind speed and solar radiation. Data from beef and dairy cattle was used in the development and validation of the index. The map indicates where current conditions fit on the scale.

Using the “Resources” tab on the webpage, users can learn more about the index, scale, and resulting potential impact (Figure 2). This also describes the colors used on the map and chart. In addition, users can examine the Nebraska publication if they would like to review the actual calculations.

Heat and cold stress level categories for the cattle comfort advisor:

Comfort level	Map indicator	Index Value, °F	General Interpretation
Heat Danger		> 105	Animal deaths may exceed 5%
Heat Caution		> 95 to 105	Decreased production, 20% or more Reduced conception , as low as 0%
Heat Caution		> 85 to 95	Decreased production, 20% or more Reduced conception , as low as 0%
Comfortable		77 to 85	
Comfortable		32 to 77	
Comfortable		15 to 32	
Cold Caution		< 15 to -20	18 to 36% increase in dry matter intake
Cold Danger		< -20 to -40	
Cold Danger		< -40	

Figure 2. Cattle comfort ranges. Graphic from Kansas Mesonet.

Tracking conditions

A particularly useful resource is the 7-day graph found under the “Chart” tab. This allows producers to monitor how conditions have fluctuated over the past week (Figure 3). Daily peaks can be expected each afternoon when temperatures are the warmest with peak solar radiation. Values then fall during the, usually cooler, overnight hours. Since stress impacts can be cumulative, having this feature allows producers to evaluate management requirements. This is especially a concern during warm overnights when values don’t drop below higher stress levels.

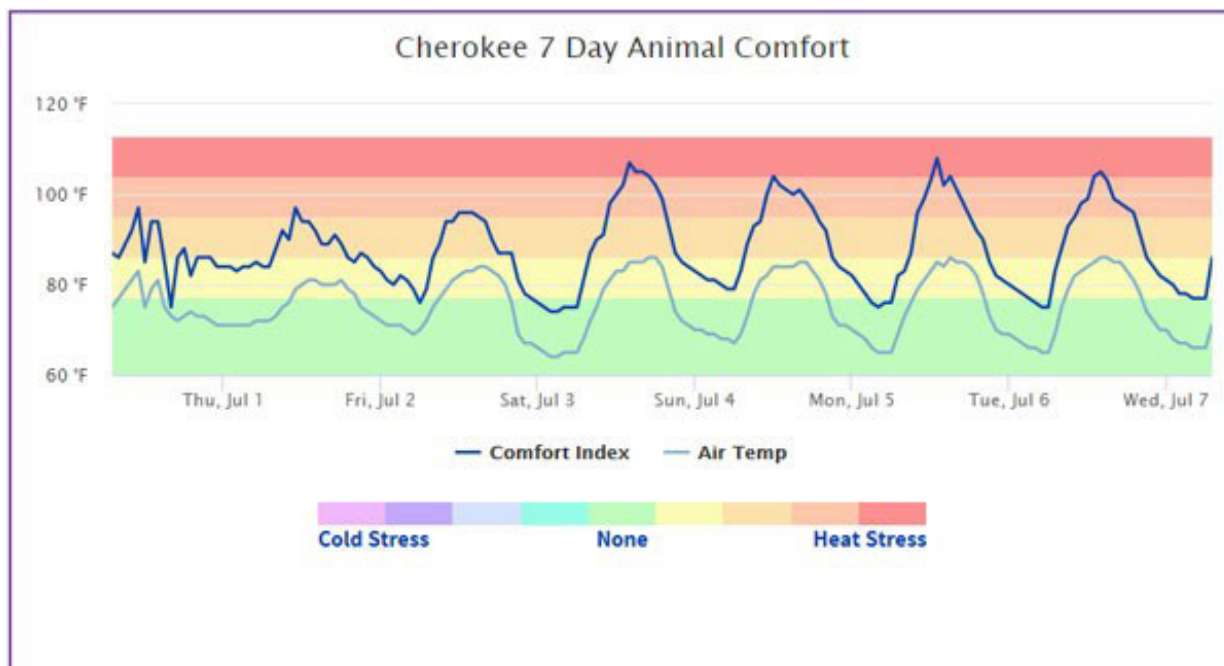


Figure 3. Animal Comfort index history at Cherokee County Mesonet station, near Columbus, KS. Graphic from Kansas Mesonet.

Accessing Historical Data

Unfortunately, since this information is calculated on an hourly basis, we do not keep a running archive of Animal Comfort that can be easily downloaded. From the "Download" tab, with the desired station selected, you can download the last week's worth of data for that location. This is the same data that is displayed on the graph (Figure 3). If the data desired is outside the window of the last seven days, send an email request to Kansas-wdl@ksu.edu or one of the authors. We will pull the data and re-calculate the Animal Comfort for you.

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2. Herbicide applications and high temperatures

Summer temperatures have arrived, with high temperatures over 100°F in parts of Kansas. If you are planning herbicide applications, here are some things to consider when applying herbicides during hot weather.

1. **Heat or drought stress slows plant growth processes.** This is especially important for systemic herbicides such as glyphosate and grass-killing herbicides like clethodim (Select) or quizalofop (Assure). As temperatures increase above 85°F, many plants begin to slow or stop metabolic processes that move herbicides throughout the plant. Notable exceptions to this rule are HPPD-inhibiting herbicides like Callisto or Balance Flexx. Palmer amaranth plants are able to overcome applications of these herbicides when applied at high temperatures (90°F and greater).

Management: In general, applying systemic herbicides early in the morning, after plants have had a chance to recover from heat stress, will give the best chance for the herbicide to reach the active site and effectively kill weeds.

2. **Leaves change in response to heat.** In order to prevent water loss, plant cuticles become waxier in response to heat or drought stress. The greater wax content makes it more difficult for water-based spray solutions to penetrate the plant. In addition, the leaf angle of many plants changes in response to heat or drought stress (Figure 1). Often, this results in less herbicide contacting the leaf surface to enter the plant.



Figure 1. Velvetleaf usually changes leaf angles at night, but the leaves on these plants are vertical in response to high temperatures. Photo by Sarah Lancaster, K-State Research and Extension.

Management: Using maximum labeled rates of herbicides and surfactants can help get more spray solution into the plant, increasing effectiveness. Spraying during the cooler parts of the day will reduce the impact of altered leaf angle.

- 3. Crop response to foliar applied, non-translocated herbicides is greater in hot temperatures.** When applied in hot, humid conditions, contact herbicides, such as Cobra, Liberty, or Reflex will likely result in greater foliar injury to crops, but also greater weed control (Figure 2).



Figure 2. Contact herbicides such can cause bronzing of soybean leaves when applied post-emergence. Photo taken one week after an application that included flumiclorac (Resource, Perpetuo, others). Photo by Sarah Lancaster, K-State Research and Extension.

Management: If possible, postpone application of these herbicides if temperatures are over 90°F. If weed size requires immediate herbicide application, reduce the rate of herbicide and adjuvant, and apply later in the day, when the air temperature will decrease after application.

4. **Herbicide volatility increases with high temperatures and low humidity.** Herbicides in group four, such as dicamba and 2,4-D are prone to volatility, which means the herbicide becomes a vapor and can move long distances with slight breezes. Volatility of these herbicides increases as temperature rise above 60°F and is greatest at temperatures above 90°F.

Management: Avoid applying these herbicides when temperatures are over 90°F. This may occur during morning or late afternoon hours, when temperature inversions are likely to occur. Herbicides should not be sprayed during inversions, when small spray droplets can become trapped in a layer of cooler air near the earth's surface. Use larger spray droplets to reduce evaporation, which can be accomplished by reducing spray pressure or increasing nozzle orifice size.

The use of trade names is for clarity to readers and does not imply endorsement of a particular product, nor does exclusion imply non-approval. Always consult the herbicide label for the most current use

requirements.

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3. How to condition grain for seed

If you would like to save part of this year's wheat crop back to use as seed on your own acreage first make sure it is allowable, as mentioned in an article in the [June 9, 2022 issue of the Agronomy eUpdate](#). While most wheat varieties are protected by Plant Variety Protection which allows for keeping seed to plant on your own acreage, additional licensing and/or marketing restrictions may apply to some varieties referred to as Certified Seed Only (CSO), which removes this allowance. This includes all varieties carrying the Clearfield and/or the CoAxiom technology for herbicide resistance, as well as many conventional wheat varieties. Consult your seed dealer for varieties that are not allowed to be planted back.

If saving the seed for your own use is allowable, you then have to decide whether to just use the wheat as bin-run seed or have it cleaned and conditioned.



Using bin-run grain as seed

With the drought-stress and heat-stress that the wheat suffered during much of the critical spring growing period in Kansas, the kernels of this year's crop may well be small and shriveled, with light test weights – although some of the cooler and moister conditions experienced late May could have alleviated some of this issue. This was discussed in the June 9 article mentioned above.

Likewise, in-season crop management decisions can impact the next crop's seed quality and viability. For example, spraying in-season foliar fungicide after the flag leaf is fully emerged can improve the harvested seed test weight, even in conditions of low disease pressure. Likewise, if weeds such as feral rye or jointed goatgrass were visible at harvest, these could be harvested together with the wheat seed and become a much greater issue next season. Thus, when selecting a field from which grain will be kept as seed, it is important to consider how the field was managed. Preference should be given to fields with appropriate agronomic management where foliar fungicides were sprayed, weeds were properly controlled, and there were no obvious signs of nutrient deficiencies.

Using this wheat as bin-run seed without cleaning or conditioning would be the least expensive approach in terms of up-front costs, of course. Bin-run seed always has the potential to be contaminated with weed seed, and to have higher amounts of small and light-test-weight seed than conditioned seed. This year, those disadvantages may be even more of a problem than usual, resulting in a crop with below-average vigor and yield potential.

Cleaning and conditioning the grain for seed

There are several steps you can take to condition the wheat from this year's crop for use as seed. One of the first things to do is make sure the grain is aerated in the bin. High-moisture weed seeds and foreign material can quickly heat up wheat in the bin, and reduce the potential seed quality of the grain. Wet grain can also harbor insects.

Cleaning the grain is important if it will be used for seed, and should be done as soon as possible after harvest. That way, you can determine if you have enough seed to meet your needs. Cleanout may be especially high this year to get acceptable seed quality.

At a minimum, wheat should be cleaned with a 5/64 screen. It would be best to use a 5.5/64 or 6/64 screen. This may clean out more wheat than you'd like if the kernels are small and shriveled, but using small kernels as seed can cause vigor problems and reduce yield potential of the subsequent crop.

An air/screen cleaner is the most common piece of seed cleaning equipment. If operated properly, an air/screen cleaner will remove all the weedy annual brome species, such as cheat and downy brome, from wheat. Recent K-State research conducted for 3 years in 27 locations demonstrated an average yield gain of about 2 bushels per acre resulting from air screening the seed as compared to using bin-run seed straight. Gravity tables are excellent at sorting out the test weight difference in a lot of seed, but really depend on the air/screen cleaner to do the bulk of the cleaning job by first removing the trash, small seed, and weed seed. The gravity then separates seeds that have similar width, but slightly different densities. The same multi-year and multi-location research mentioned above demonstrated an additional yield gain of 2 bushels per acre when seed was cleaned in a gravity table as compared to air-screen only. In between the air/screen and gravity table, some facilities will use a length grader to separate jointgrass and or buckwheat, because they are similar in width to wheat.

Having the wheat cleaned with an air/screen cleaner (and possibly a length grader if there is

jointgrass or buckwheat contamination) is the most important step to take. A gravity table is a good piece of secondary equipment to help raise the test weight, if that is a concern.

If there was rye or Italian ryegrass in the field, the wheat should not be planted back. In that case, it's best to sell the wheat and take advantage of the current cash market for grain, then buy new seed.

Germination tests and seed treatments

Producers should have the seed tested for germination by a reputable laboratory. Home germination tests are not as accurate and reliable. The standard germination test will test for maximum seed germination potential under normal conditions. An Accelerated Aging germination test will test for seed vigor under stressful conditions and will reveal weaker seeds. More information on germination testing is available in a companion article in this eUpdate issue.

If there was loose smut present in the field, producers should have the seed treated with a fungicide seed treatment if they choose to keep that wheat for seed. This should either be applied by a professional seedsman or with an auger-based system on-farm. Drill box treatments do not do an adequate job of coverage.

Summary

Producers should plant the best quality seed possible this fall to get good emergence, early season vigor, and yield potential. It makes no sense to plant poor quality seed that will just create more problems next season. Certified seed is the best option, but keeping their own seeds can also result in good performance next season provided that the seed is coming from a well-managed field and is well cleaned and conditioned. If purchasing certified seed, producers should order their seed as soon as possible.

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4. Conducting home germination tests on this year's wheat seed

Some producers may be anxious this year to find out the germination percent of the wheat they harvest, to see if it will make suitable seed. If they do a home germination test too soon after harvest, they may be shocked at the low germination percent – unless the test is done correctly. That's because wheat has a post-harvest dormancy requirement (some varieties more so than others). Even high-quality seed will not germinate at its maximum capacity right after harvest in most cases. This post-harvest dormancy is important to help decrease the chances of pre-harvest sprouting in case harvest is delayed due to weather conditions or other reasons.

To get around that, for the first several weeks after harvest it's important to make sure the wheat is pre-chilled before taking a germination test. Any reputable seed lab will do that on a routine basis. Producers testing their seed at home should also pre-chill the wheat by planting it and putting it in the refrigerator at about 40 degrees for 5 days. If the seed is not pre-chilled, producers should wait a month and a half after harvest before testing for germination.

There is some difference among varieties regarding how long their post-harvest dormancy requirement is – so much so that some varieties are more prone to pre-harvest sprouting. Hard white wheats with poor sprouting tolerance, for example, have almost no summer dormancy requirement. They will germinate almost as soon as the seed is harvested. Other varieties have a relatively long summer dormancy requirement, and may not germinate well for five or six weeks after harvest unless the seed is pre-chilled. By Labor Day, all varieties will have lost their summer dormancy and should germinate unless the seed is defective in some way.

If there is any question about the viability of the seed, it is well worth the cost to have the seed tested for germination by a certified seed laboratory. This is especially true in areas where there was freeze damage, severe drought or heat stresses during grain filling, a rain delay at harvest, or wheat head scab.

Home testing: Doing it correctly

If producers want to test their seed for germination at home, it needs to be done correctly to be of value.

- Place two moistened paper towels (on top of each other) on a flat surface. The towels should not have free water in them.
- Arrange fifty (50) seeds on the towels leaving approximately an inch border around the edges.
- Place two more moistened towels over the seeds.
- Make a ½ to ¾ inch fold at the bottom of the four paper towels. This will keep the seed from falling out.
- Starting on one side, loosely roll the paper towels toward the other side (like rolling up a rug) and place a rubber band around the roll(s).

Place the roll in a plastic bag. Seal, but not completely, so as to keep moisture in but still allow some air into the bag.

For newly harvested seed:

- Place the bag upright in the refrigerator for 5 days and then remove and place upright at room temperature for an additional 5 to 7 days.
- Remove the sample from the bag and unroll the towels.
- Count and record the number of healthy seedlings (adequate root and shoot development and NOT overtaken by disease.)

For carryover seed, or after September 1:

- Place the bag upright at room temperature for 5 to 7 days.
- Remove the sample from the bag and unroll the towels.
- Count and record the number of healthy seedlings (adequate root and shoot development and NOT overtaken by disease).

To calculate the germination percentage: divide the number of healthy seedlings by the number of seeds tested and multiply by 100.

Example: 42 healthy seedlings X 100 = 84% germination

50 seeds tested

This may be repeated more times for each sample in order to obtain more accurate results, testing up to 400 seed. If the seed will be treated with a fungicide seed treatment prior to planting, the test should be performed after the seed treatment is applied because it can increase the germination percentage.

Testing by a certified lab

Having your seed professionally tested for germination is always a good practice, but with the severe drought and heat stress on the wheat crop in many areas this year, it is highly recommended.

To have an official germination test on the seed, send a two-pound sample to:

Kansas Crop Improvement Association
2000 Kimball Ave.
Manhattan, KS 66502

A germination test for non-members of KCIA will cost \$19.00 and a sample submittal form can be printed off from the KCIA website: www.kscrop.org/seed-lab.html

Other seed quality tests are also available and are listed on the submittal form.

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5. Cut-off dates approaching for XtendiMax, Engenia, and Tavium applications

Farmers planning to apply XtendiMax, Engenia, or Tavium to their dicamba-resistant soybean have about two weeks remaining to make those herbicide applications. These are the only dicamba-containing products labeled for over-the-top use in dicamba-resistant soybean and cotton. One of the requirements added to these labels in 2021 was a cut-off date for applications. **The last day these products can legally be applied to soybean is June 30.** The cut-off date for cotton is July 30.



For more detailed information, see the “2022 Chemical Weed Control for Field Crops, Pastures, and Noncropland” guide available online at <https://www.bookstore.ksre.ksu.edu/pubs/CHEMWEEDGUIDE.pdf> or check with your local K-State Research and Extension office for a paper copy. The use of trade names is for clarity to readers and does not imply endorsement of a particular product, nor does exclusion imply non-approval. Always consult the herbicide label for the most current use requirements.

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6. Early summer control of sericea lespedeza using herbicides

Sericea lespedeza is a major invasive species of concern on rangeland, pasture, and some CRP acres in Kansas. This Category C noxious weed infests over 658,000 acres in Kansas (Figure 1). Category C noxious weeds are those that are well established and known to exist in large or extensive populations. Control efforts should be directed at reducing or eliminating new infestations as well as using approved control methods on established populations.

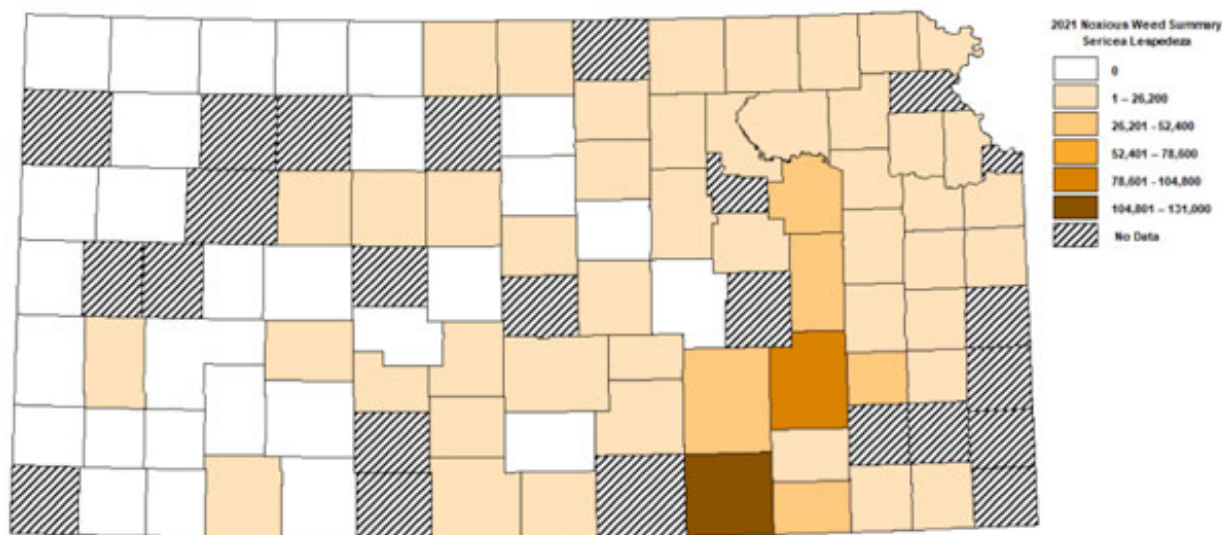


Figure 1. Distribution of sericea lespedeza in Kansas. Source: [2021 Kansas Noxious Weed Survey](#)

Sericea lespedeza is a perennial legume with trifoliate leaves. The leaves are club or wedged shaped (Figure 2). Plants are usually about 3 feet tall, but can grow to several feet in height under ideal conditions. Plants will start to bloom in August with white to cream-colored flowers with a purple throat. Most seed production occurs in September.



Figure 2. Trifoliate, wedge-shaped leaflets of sericea lespedeza. Photo by Walt Fick, K-State Research and Extension.

June is a good time for control of sericea lespedeza using herbicides. At this time, sericea lespedeza is in a vegetative growth stage (Figure 3) and is rapidly growing. By the end of June plants will begin to branch and become woodier.



Figure 3. Vegetative growth stage of sericea lespedeza. Photo by Walt Fick, K-State Research and Extension.

Chemical control options

The most effective herbicides to treat sericea lespedeza during the vegetative growth stage are Remedy Ultra (triclopyr) and PastureGard HL (triclopyr + fluroxypyr). Broadcast applications of Remedy Ultra at 1 to 2 pints/acre and PastureGard HL at 0.75 to 1.5 pints/acre should be applied in spray volumes of 10 to 20 gallons/acre. Another herbicide option would be Surmount (picloram + fluroxypyr) at 2 pint/acre. Surmount is a restricted-use pesticide and would be a good choice if you are wanting to treat roughleaf dogwood or blackberry at the same time. Once sericea starts to branch, metsulfuron-containing herbicides such as Escort XP (0.5 to 1 oz/acre) can be effective.

For spot application, mix 0.5 fl oz PastureGard HL per gallon of water or use a 1% solution of Remedy Ultra in water. Aerial applications of these products should be done with a minimum spray volume of

3 gallons per acre. Higher volumes, e.g. 5 gallons per acre, will generally be more effective.

There are no grazing and haying restrictions for livestock and lactating grazing animals following use of Remedy Ultra and PastureGard HL. There is a 14-day waiting period prior to hay harvest using these two herbicides. If Surmount is used, there is no waiting period before grazing all livestock, except for lactating dairy animals (14-days before grazing). Surmount also requires a 14-day waiting period prior to hay harvest. There are no grazing or haying restrictions following application of Escort XP.

As a noxious weed in Kansas, sericea lespedeza needs to be controlled. Sericea lespedeza has a tremendous seed bank that helps reestablish stands.

Herbicide treatments will need to be repeated every 2 to 4 years to keep this invasive species in check. Initial treatments should reduce dense stands to the point where spot treatment can be used in future years. Left untreated, sericea lespedeza will dominate a site, greatly reducing forage production and species diversity.

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7. Farmers invited to participate in multi-state on-farm research survey

A working group of multiple U.S. universities headed by Kansas State University have partnered to conduct a multi-state assessment of farmers' approaches to on-farm research, including its importance and willingness to participate.



We ask if farmers would take a few minutes of their time to complete a short survey by July 1, 2022. The survey is online and will take approximately 5 minutes to complete. Farmer's responses/information are voluntary and will be recorded anonymously.

Understanding farmers' perceptions of on-farm research is vital for the long-term success of policy tools and initiatives to promote field-scale agronomic research on working lands. The information from this study will also be critical in helping to shape future Extension programming efforts. Farmers are encouraged to consider being part of this process.

Follow [this link to access the survey](#).

Questions about the survey can be directed to Carlos Pires at 785-770-6335 or carlospires@ksu.edu.

We appreciate your time and participation!

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8. Kansas Ag-Climate Update for May 2022

The Kansas Ag-Climate Update is a joint effort between our climate and extension specialists. Every month the update includes a brief summary of that month, agronomic impacts, relevant maps and graphs, 1-month temperature and precipitation outlooks, monthly extremes, and notable highlights.

May 2022: Water supply significantly increased in the eastern region of Kansas

Statewide average temperature in May was 0.8°F above normal, with an average temperature of 64°F across the state (Fig. 1). Central and western Kansas had the larger temperature departures, which made the drought conditions worse in May. From a climate perspective, the entire wheat season (October 2021 to May 2022) was the warmest since 2017.

Climatologically, May has the highest precipitation amount of any month, with a 30-year average of 4.3 inches in Kansas. This May was wetter than usual across the state (1.3 inches higher than normal) -- especially in the central and eastern portions of the state (3 inches higher than normal in the east) (Fig. 1). Still, when considering the 8-month accumulated precipitation (October to May) for wheat growth, crop-season precipitation was the driest since 2018. This certainly has the potential to affect wheat grain yields this year.

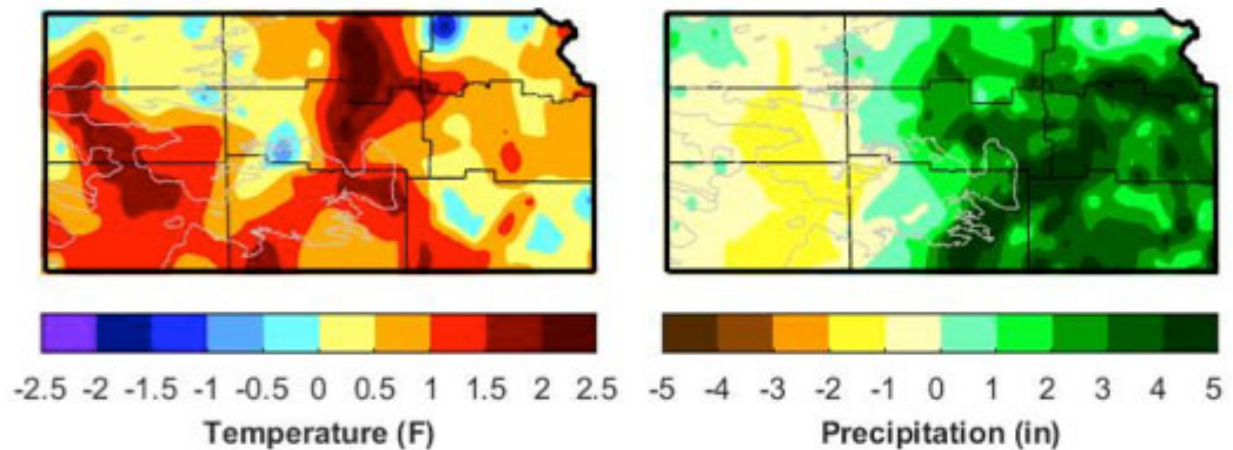


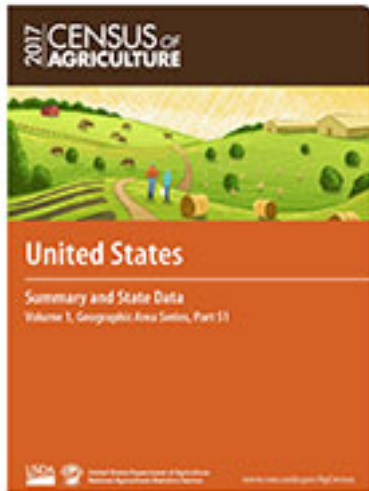
Figure 1. Departures from normal temperature (°F) and precipitation (inches) for May 2022.

View the entire May 2022 Ag-Climate Update, including the accompanying maps and graphics (not shown in this short summary), at <http://climate.k-state.edu/ag/updates/>

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9. Sign up and be counted in the 2022 Ag Census

The last day to sign up for the 2022 Census of Agriculture is June 30, 2022. If you have never received a census and are new to National Agricultural Statistics Service surveys, [sign up to be counted](#) today. You do not need to sign up if you received the 2017 Census of Agriculture or already receive other NASS surveys.



[2017 Census of Agriculture](#)

Key Dates for 2022 Census of Agriculture:

- June 30, 2022 – sign up ends
- November 2022 – census mails out
- February 2023 – response deadline
- Spring/summer 2024 – data release

The Census of Agriculture is a complete count of U.S. farms and ranches and the people who operate them. Even small plots of land - whether rural or urban - growing fruit, vegetables or some food animals count if \$1,000 or more of such products were raised and sold, or normally would have been sold, during the Census year. This can include hobby farms with livestock, such as chickens or horses, or crops growing in the backyard or on a rooftop. The Census of Agriculture, taken only once every five years, looks at land use and ownership, operator characteristics, production practices, income and expenditures.

The data informs policy and program decisions that directly impact producers, their operations, industries, and communities. A complete count, with every producer getting and taking the opportunity to be represented in this data, is vital. For America's farmers and ranchers, the Census of Agriculture is their voice, their future, and their opportunity.

On the [NASS Ag Census webpage](#), producers can also access frequently asked questions, explore past and current Ag Census data, access tools to help spread the word about the upcoming Ag Census, learn about Ag Census special studies, and more.

USDA Farm Service Agency, Kansas State Office
785-539-3531