Issue 1016

K-STATE Research and Extension

Extension Agronomy

eUpdate

08/15/2024

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. Final irrigation of the growing season - Timing is everything

This year has been challenging for irrigators as we started the year with extremely low levels of profile water in most places, highly variable precipitation, and periods of above-normal temperatures. As we look towards the end of the irrigation season, producers have an opportunity to improve their water productivity by properly timing their final irrigation application. This is an important decision as an early termination of irrigation can result in reduced grain yield, primarily through reductions in the kernel weight yield component. Conversely, a late termination of irrigation results in unnecessary pumping and energy consumption, increases the risk of soil compaction at harvest due to increased soil water content, and increases the risk of water loss from the soil profile through drainage over the winter.

With the goal of matching available water to crop needs while avoiding excess, it is important to understand crop water use requirements late in the growing season. Table 1 shows anticipated water use from various growth stages until physiological maturity for corn, grain sorghum, and soybeans. It is important to note that this is total water use that could come from multiple sources, including precipitation, irrigation, and stored soil water.

Table 1. Anticipated water use for corn, grain sorghum, and soybeans at various growth stages.

Crop	Growth stage	Approximate days to maturity	Water use to maturity (inches)
Corn	Blister	45	10.5
	Dough	34	7.5
	Beginning dent	24	5
	Full dent	13	2.5
	Black layer	0	0
Grain sorghum	Mid-bloom	34	9
	Soft dough	23	5
	Hard dough	12	2
	Black layer	0	0
Soybeans	Full pod	37	9
	Beginning seed	29	6.5
	Full seed	17	3.5
	Full maturity	0	0

Adapted from K-State MF2174, Rogers and Sothers

Research in western Kansas has shown the importance of keeping the management allowable depletion limited to 45% during the post-tassel period. In other words, maintaining available soil

water contents above 55%. By knowing anticipated water use from a given growth stage and the remaining soil water in the profile, producers can add just enough irrigation water to meet that demand and maintain profile available soil water content above 55% while adjusting for any precipitation that may be received.

By closely following the growth and development of the crop, one can know when physiological maturity, i.e., the black layer in corn or sorghum, has been reached. At that point, water use for the production of grain yield has ceased, and additional irrigation is certainly unnecessary.

Termination based on calendar dates

Traditionally, many producers have used a fixed calendar date to determine their final irrigation. Long-term studies conducted by Freddie Lamm at the Northwest Research-Extension Center at Colby show the potential problems in this approach. Table 2 shows silking, maturity, and irrigation termination dates for a long-term study in corn. For this study, the irrigation termination date for maximum grain yield varied from August 12 to September 21. This is a significant departure from a general rule of thumb using Labor Day as a termination date. As shown, using a fixed date on the calendar without regard to crop progress, soil water status, or ET demand would have resulted in both forfeited yield and wasteful pumping across this timeframe.

Table 2. Silking, maturity, and irrigation termination dates for a long-term study in corn.

Year	Date of Anthesis	Date of Maturity	Irrigation Season Termination Date For		
			80% Max Yield	90% Max Yield	MaxYield
1993	20-Jul	30-Sep	5-Aug	5-Aug	15-Aug
1994	20-Jul	15-Sep	5-Aug	15-Aug	15-Aug
1995	20-Jul	29-Sep	5-Aug	13-Aug	18-Aug
1996	20-Jul	3-Oct	17-Jul	17-Jul	29-Aug
1997	23-Jul	1-Oct	23-Jul	23-Jul	27-Aug
1998	20-Jul	28-Sep	20-Jul	20-Jul	24-Aug
1999	23-Jul	6-Oct	24-Jul	13-Aug	20-Sep
2000	12-Jul	20-Sep	14-Sep	20-Sep	20-Sep
2001	16-Jul	29-Sep	30-Jul	22-Sep	22-Sep
2002	22-Jul	30-Sep	4-Aug	30-Aug	7-Sep
2003	22-Jul	23-Sep	3-Aug	3-Aug	18-Aug
2004	19-Jul	28-Sep	8-Aug	21-Aug	27-Aug
2005	20-Jul	28-Sep	2-Aug	9-Aug	29-Aug
2006	17-Jul	25-Sep	30-Jul	13-Aug	13-Aug
2007	18-Jul	19-Sep	14-Aug	21-Aug	28-Aug
2008	24-Jul	10-Oct	31-Jul	6-Aug	27-Aug
Average	**19-Jul**	**27-Sep**	**2-Aug**	**13-Aug**	**28-Aug**
Standard Dev.	**3 days**	**6 days**	**13 days**	**19 days**	**13 days**
Earliest	**12-Jul**	**14-Sep**	**17-Jul**	**17-Jul**	**12-Aug**
Latest	**24-Jul**	**10-Oct**	**14-Sep**	**21-Sep**	**21-Sep**

* *Estimated dates are based on the individual irrigation treatment dates from each of the different studies when the specified percentage of yield was exceeded.*

Consequences of excess late-season irrigation

In the silt-loam soils common in western Kansas, water drainage out of the soil profile starts to occur when the profile water content rises above 60% available soil water. The rate of drainage loss increases rapidly with increasing water content. Late-season irrigation in excess of crop water use results in increased accumulation of water in the profile, which is subject to drainage losses. A survey of irrigated corn fields was conducted in 2010 and 2011 (Figure 1). Fields were surveyed after corn harvest across three east-west transects in western Kansas.

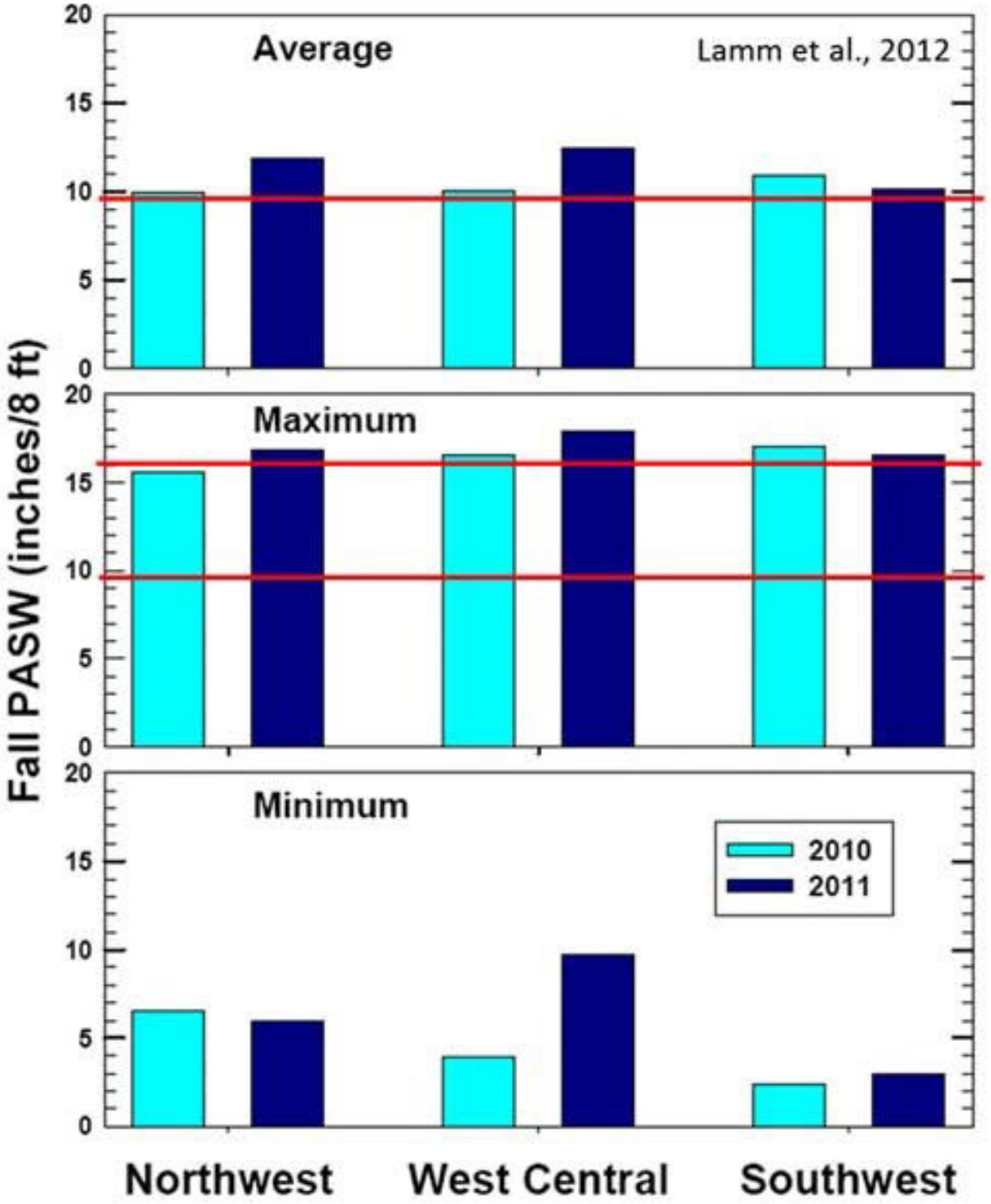

Figure 1. Results from a 2-year survey of irrigated corn fields. Fields were surveyed after harvest across three east-west transects in western KS.

The line at 9.6 inches of plant-available soil water (PASW) denotes the approximate water content where drainage losses would start to occur. On average, most producer fields were near this level of soil water storage indicating a good management strategy as drainage losses had been minimized while yet maintaining adequate soil water to complete grain fill.

Producer fields near the minimum observed values likely did not have adequate soil water to ensure maximum grain yields. The most concerning scenario, however, is the fields at the upper end of soil water values such as the maximum observation. The red line at 16 inches PASW represents field capacity, the point at which free drainage and significant water losses from the profile would occur. In the wettest producer fields, in all three regions, significant amounts of free drainage and water loss would have been occurring at the time of crop maturation and harvest.

Timing of the final irrigation:

1. Determine crop growth stage and anticipated remaining water use
2. Determine soil water status in the field by probe or calibrated soil sensor technology
3. Determine the irrigation strategy necessary to meet remaining crop water use while maintaining soil water content at or above 55% (limit depletion to 45%).
4. Be ready to make adjustments based on changes in ET demand, precipitation, etc.

Additional information, including a step-by-step procedure, can be found in the publication **MF2174**: "**Predicting the final irrigation for corn, grain sorghum, and soybeans**" - http://www.bookstore.ksre.ksu.edu/pubs/MF2174.pdf

Special Note: Much of the data in this article was collected by Freddie Lamm, Irrigation Engineer at the Northwest Research-Extension Center at Colby. Freddie passed away in May 2022, just months short of completing his 43rd year of irrigation research at the NWREC. A tribute to Freddie's career can be found at: https://newprairiepress.org/cgi/viewcontent.cgi?article=8336&context=kaesrr

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2. Cereal rye control in wheat

Cereal rye can provide excellent weed suppression as a cover crop; however, it should be handled carefully. Cereal rye can be introduced into a wheat field (Figure 1) by contamination of harvest or seed conditioning equipment, dry fertilizer spreaders, or drills. Seeds and pollen can also be moved by wind or other natural means.

Cereal rye is very similar to wheat in terms of life cycle, growth requirements, and appearance. There are a few features that distinguish rye from wheat. First, cereal rye is generally taller than winter wheat, and the seed heads are usually longer and thinner. Other differences require a closer look. The ligule of cereal rye does not have a fringe of hairs (winter wheat does), and cereal rye does not have prominent auricles (winter wheat does). Cereal rye seeds are longer than wheat seeds and usually shaded more yellow or green rather than red.

Figure 1. Cereal rye growing in a wheat field. Photo by Sarah Lancaster, K-State Research and Extension.

Chemical control in wheat is limited to herbicide-tolerant varieties (discussed later in this article). Because there are few herbicide options in crops, preventing the introduction of cereal rye into wheat fields is critical. Cleaning equipment and planting weed-free seed are two important

measures. Control during other phases of the crop rotation is also important. For example, letting rye emerge during a fallow phase of the rotation and applying glyphosate and/or atrazine. Hand rouging has long been used to remove cereal rye from wheat.

Herbicide-tolerant wheat varieties

Clearfield wheat varieties allow the use of Beyond (imazamox). Imazamox is more effective on other cool-season grass weeds, and only provides suppression of cereal rye. If you choose a Clearfield variety, be sure to spray before rye tillers and use a nitrogen fertilizer (up to 50% of the spray solution). Two applications (fall and spring) will provide better control than a single application.

CoAXium wheat varieties allow the use of Aggressor (quizalofop). Quizalofop provides excellent control of cereal rye. In studies at Great Bend control was 94% or greater with 10 or 12 fl oz of Aggressor applied with either NIS or MSO in fall or spring. Quizalofop is a Group 1 herbicide that only controls grasses.

In both systems, cereal rye control will be reduced if applications are made when temperatures are below 40F during the week following application.

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3. Sorghum (sugarcane) aphids: A declining threat in Kansas

Sorghum (formerly sugarcane) aphids continue to decline as a threat to grain sorghum in Kansas. Although late-planted sorghum remains at higher risk of colonization, region-wide biological control is now effectively maintaining populations below the economic threshold in the vast majority of fields, regardless of planting date, and reducing the number of migrant aphids arriving.

Thorough field scouting may reveal a few small 'nuclear' colonies on lower leaf surfaces and perhaps the occasional larger, established colony, but infestations heavy enough to require treatment remain rare and most likely caused by imprudent insecticide applications targeting other pests.

Identification of sorghum aphid

Several aphid species on sorghum could be confused with sorghum aphids, especially when the aphids are small. The sorghum aphid has a smooth body with a light-colored head and light-colored legs with dark feet. They have very short, cornicles (tail pipes) with no shading at the base of them, as on the corn leaf aphid. Corn leaf aphids are blue-green at cooler temperatures but can be pale to yellowish green in hot weather. However, in both cases, they have dark patches around the base of the cornicles and a more rectangular body.

1. sorghum aphid

2. corn leaf aphid nymph

3. corn leaf aphid nymph

4. English grain aphid (note long cornicles, antennae longer than the body)

5. sorghum aphid

6. yellow sugarcane aphid (note bristles on body)

Scouting for sorghum aphid

Early detection is key to managing this pest, but treatments should be based on established thresholds. The aphids tend to be distributed in patches, and a few heavily infested plants will not cause yield loss. Applying insecticides too soon can disrupt biocontrol that would otherwise control the aphids and create a need for repeated applications.

Plants are vulnerable to infestation by SCA at any growth stage, but Kansas sorghum is most at risk from boot stage onward. The ability of sugarcane aphids to overwinter on Johnsongrass and re-sprouted sorghum stubble represents challenges to the management of this pest in more southerly regions.

Issues arising from sorghum aphid in Kansas are likely to become increasingly uncommon with each passing year, as biological control by natural enemies like lady beetles (Fig. 1B) and lacewings usually provide adequate control during early establishment of aphid colonies (Fig. 1A). It is best practice to scout late-planted fields, as these are more susceptible to yield loss as they afford the aphids a bigger window to build to damaging levels late in the season. Also, prioritize fields that were planted to susceptible varieties. Be sure to contact your seed dealer for information on hybrid tolerance to sorghum aphids.

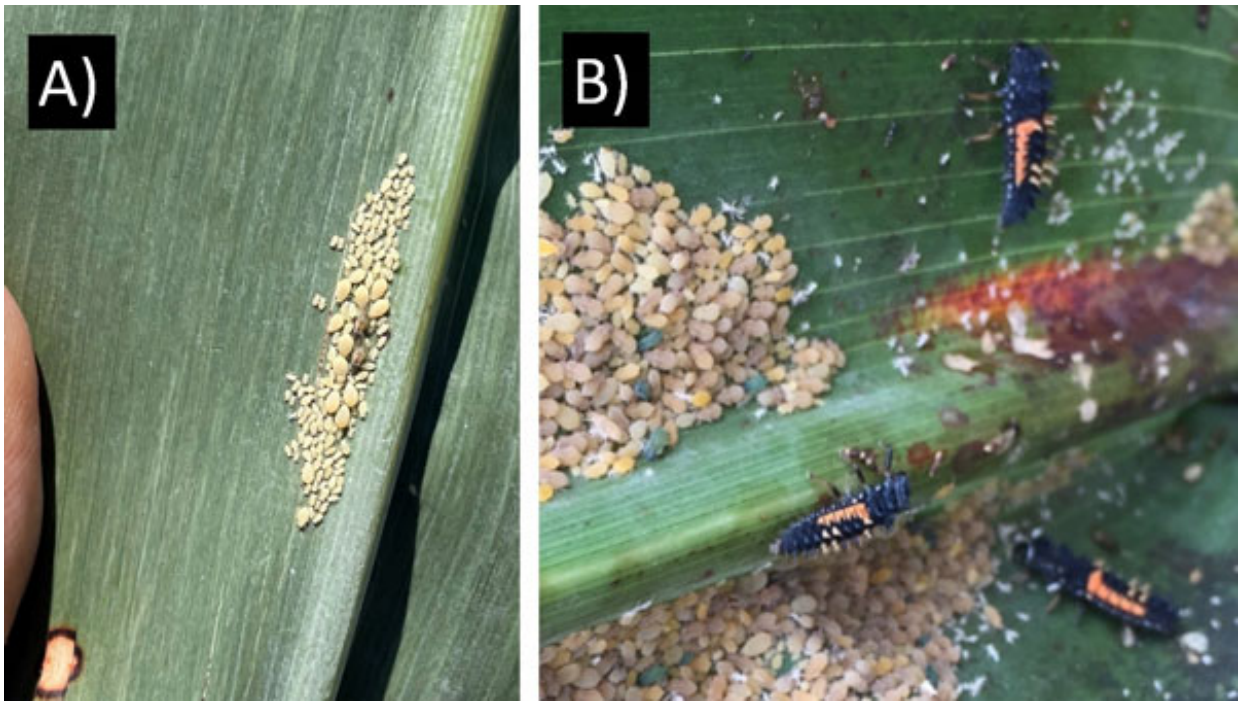

Figure 1. A) Newly established aphid colonies, and B) one of many natural enemies, larvae of the lady beetle Harmonia axyridis**, feeding on aphid colonies.**

Sampling method

- Once a week, walk 25 feet into the field and examine plants along 50 feet of row:

- If honeydew is present, look for SCA on the underside of a leaf above the honeydew.
- Inspect the underside of leaves from the upper and lower canopy from 15–20 plants per location.
- Sample each side of the field and sites near Johnsongrass and tall mutant plants.
- Check at least 4 locations per field for a total 4 locations per field for a total of 60-80 plants.

If no aphids are present, or only a few wingless/winged aphids are on upper leaves, repeat this sampling method once a week.

If sorghum aphids are found on lower or mid-canopy leaves, begin scouting twice a week. Use the same sampling method, but be sure to include % plants with honeydew. Estimate the % of infested plants with large amounts of sorghum aphid honeydew (shiny, sticky substance on leaf surface) to help time foliar insecticides for sorghum aphid control on sorghum (Table 1).

Table 1. SCA Thresholds

Growth Stage	Threshold
Pre-Boot	20% plants infested with localized area of heavy honeydew and established aphid colonies
Boot	20% plants infested with localized area of heavy honeydew and established aphid colonies
Soft dough	30% plants infested with localized area of heavy honeydew and established aphid colonies
Dough	30% plants infested with localized area of heavy honeydew and established aphid colonies
Black Layer	Heavy honeydew and established aphid colonies in head *only treat to prevent harvest problems **observe pre-harvest intervals

A free sorghum aphid scouting guide is available to download here:
https://www.myfields.info/sites/default/files/page/ScoutCard%20KSU%20v05312017.pdf

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4. Kansas Wheat Variety Guide 2024 is now available

Variety selection is one of the most important decisions that a grower can make to ensure success on their farm. Now is the time for wheat producers across Kansas to review yield data and decide which varieties they will plant in the fall. Although yield is always a top priority, disease and insect resistance, along with appropriate agronomic traits, can buffer against crop losses. In addition, genetic resistance to diseases and insect pests can be the most effective, economical, and environmentally sound method for control.

The Kansas Wheat Variety Guide 2024 (formerly called *Wheat Variety Disease and Insect Ratings*) from K-State Research and Extension has been released for this year. It includes information on agronomic characteristics, disease, and pest resistance, as well as profiles that highlight some more common or new varieties in Kansas.

This year's updates include the addition of varieties AP Prolific, Kivari AX, KS Bill Snyder, and KS Mako, along with updated disease, insect, and agronomic ratings for several other varieties.

Ratings in this publication represent results from field and greenhouse evaluations by public and private wheat researchers at multiple locations over multiple years.

An electronic version of the *Kansas Wheat Variety Guide 2024* publication MF991 can be found here: https://www.bookstore.ksre.ksu.edu/pubs/MF991.pdf

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5. Introducing the new Kansas State Climatologist website

The Office of the Kansas State Climatologist, hosted by Kansas State University's Agronomy Department, has launched an enhanced version of its website. This platform is an integrated, comprehensive resource for Kansas citizens, particularly oriented toward state agencies, farmers, and stakeholders. It provides reliable climate information to support agricultural and environmental decision-making.

Website Overview

The website, accessible at climate.ksu.edu, is structured to deliver accurate, up-to-date climate data, forecasts, and end-user products. Its user interface allows for easy navigation through various sections, ensuring visitors can quickly find the information they need.

Key Features

1. Climate data and climate forecasts: The site offers detailed weekly and monthly climate reports, including temperature, precipitation, and drought conditions. We also provide outlook information for temperature, precipitation, drought, quantitative precipitation forecasting, and radar maps. This information is crucial for understanding current climate conditions and near-future climate patterns and preparing for climate-smart decision-making.

2. Agricultural and water insights: Kansas farmers can access valuable data on crop progress, soil moisture status, crop thermal heat units, and water supply (precipitation) percentiles related to a 30-year normal, which are essential for optimizing agricultural practices. This section provides insights into the impact of climate on water resources, helping farmers manage their irrigation and water usage more effectively.

3. Products: The website hosts a variety of specialized climate products, including climatology reports, extreme weather information, and ENSO (El Niño-Southern Oscillation) status updates that influence climate in the Great Plains. We also provide historical observation data (1951-2023) and projection climate data (2015 to 2100). These accessible resources are designed to help end-users understand long-term climate patterns and their potential impacts on the environment and agriculture.

4. Useful Links:

- The 'Old Climate Site' links to our previous site. The Kansas Mesonet will continue to maintain this website, and all tools will remain available through this link.
- The 'Kansas Mesonet' section links to a network of 85 automated weather stations across the state, providing real-time weather data. This network is valuable for farmers and researchers, offering detailed information on local weather conditions.
- We also include useful links that may facilitate users to effectively navigate information.

5. Data Requests: End-users can request specific climate data and access historical climate information, ensuring they have data for users' planning and management decisions.

Summary

The enhanced Kansas State Climatologist website is to provide a useful and informative tool for Kansas farmers and stakeholders, offering a wealth of climate data and resources to support informed climate decision-making. By providing accurate and timely information, the website helps users navigate the challenges posed by changing climate patterns and optimize their agricultural practices. Visit climate.ksu.edu to explore the full range of features and resources available.

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6. 2024 Kansas Soybean Yield and Value Contest

All soybean farmers in Kansas are encouraged to enter their competitive soybean crop into the Kansas Soybean Yield Contest. The statewide Kansas Soybean Value Contest, which analyzes protein, oil, and other soybean qualities, is also open for entries. Strong participation across the state provides a snapshot of growing conditions in each region and allows friendly competition among peers.

The Kansas Soybean Association has implemented important date changes for the 2024 contests, including an expedited postmark-by date of November 15 and revisions to the announcement timeline. Results are expected to be released mid-December, followed by official winner recognition at the inaugural Kansas Soybean Celebration on January 31 in Salina.

Yield contest districts are determined by region, tillage method, and irrigation status, with 18 districts in consideration. No-till on the Plains supplies additional awards in the no-till categories. Farmers may enter multiple categories but only one entry per field.

Eligible fields must consist of at least five contiguous acres as verified by the Farm Service Agency, GPS printout, or manual measurement. A non-relative witness, either Kansas State Research and Extension personnel or a specified designee, must be present at harvest and should ensure that the combine grain hopper is empty prior to harvest. Official elevator-scale tickets with moisture percentage and foreign matter included must accompany entries to be considered.

The Kansas Soybean Commission sponsors a monetary prize for the top three finishers in each district, as well as an additional $1,000 for the overall dryland and irrigated winners and any who top the 114.3 bushel-per-acre record. The amounts per district are that the first place receives $300, the second receives $200, and the third receives $100.

Individuals looking to submit a value contest entry should send a 20-ounce sample, which Ag Processing, Inc. evaluates to determine its value. Monetary awards are also given to the three highest-value entries.

Farmers may enter both the yield and value contests and must do so to be eligible to win a trip to Commodity Classic in Denver. The top yield entry, top value entry, and one randomly drawn entry earn a trip to the 2025 Classic March 2-4. All participants receive a T-shirt.?

A full guide of contest rules and regulations and the digital entry form are available at kansassoybeans.org/contests. Questions may be directed to the Kansas Soybean office by phone at 877-KS-SOYBEAN (877-577-6923) or local KSRE offices.

7. Western Kansas Fall Field Days: August 27-29

Join K-State agronomists and extension specialists at one or more of the Western Kansas Fall Field Days. A series of three programs will take place in late August in Hays (Aug. 27), Tribune (Aug. 28), and Garden City (Aug. 29). These events are open to the public and free to attend, and a meal will be provided at each location.

Registration is requested to have an accurate meal count. You can register for one or more locations at this link: https://wkrec.org/events/field_days/ or by scanning the QR code on the flyer below.

Hays – August 27, 10:00 AM - 3:15 PM (CT)

Lunch will be provided

- Integrated crop-livestock systems
- Occasional tillage in wheat-fallow rotations
- Weed management

Location: 1232 240th Ave, Hays

Tribune – August 28, 8:30 AM – 1:00 PM (MT)

Lunch will be provided

- Nitrogen management for dryland sorghum
- Long-term dryland rotation studies
- Effects of no-till, reduced-till, and occasional dryland tillage

Location: Southwest Research Center Headquarters, 1 mile west of Tribune on Hwy 96

Garden City – August 29, 8:30 AM – 2:00 PM (CT)

Lunch will be provided

- Corn and sorghum insect control update
- Weed control in irrigated corn and dryland sorghum
- Integrating cover crops and annual forages into wheat-sorghum-fallow cropping systems

For questions, contact:

Tribune: Lucas Haag – lhaag@ksu.edu

Hays: Augustine Obour – aobour@ksu.edu

Garden City: Jonathan Aguilar - jaguilar@ksu.edu

WKREC FALL FIELD DAYS

August 27-29

AUGUST 27
10:00 AM - 3:15 PM CT

1232 240TH Ave.,
Hays, KS 67601

Agricultural Research Center-Hays Field Day

Lunch will be provided.

- Integrated Crop-Livestock Systems
- Occasional Tillage in Wheat-Sorghum-Fallow Rotations
- Weed Management

AUGUST 28
8:30 AM - 1:00 PM MT

SWRC headquarters, 1 mile west of Tribune on Highway 96

Southwest Research Center-Tribune Field Day

Lunch will be provided.

- Nitrogen Management in Dryland Sorghum
- Long-Term Dryland Rotation Studies
- Effects of No-Till, Reduced Till, and Occasional Dryland Tillage

AUGUST 29
8:30 AM - 2:00 PM CT

4500 E Mary St, Garden City, KS 67846

Southwest Research-Extension Center Field Day Plus+

Lunch will be provided.

- Corn and Sorghum Insect Control Update
- Weed Control in Irrigated Corn and Dryland Sorghum
- Integrating Cover Crops and Annual Forages into Wheat-Sorghum-Fallow Cropping Systems

Scan for more and to RSVP

For Any Questions Contact:
Tribune: Lucas Haag – lhaag@ksu.edu
Hays: Augustine Obour – aobour@ksu.edu
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