Issue 1074

K-STATE
Research and Extension

Extension Agronomy

eUpdate

10/02/2025

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. Sorghum ergot has been detected in Kansas

In the past week, sorghum ergot has been detected in several locations in Kansas, primarily in forage sorghum fields, but also in grain sorghum. This is a relatively rare event, with notable prior occurrences in 1997 and 2017. Sorghum ergot in the U.S. is caused by the fungus *Claviceps africana. Claviceps africana* has been reported in Australia, Central America, North America, South America, and South Africa. **Sorghum ergot is not the same pathogen that causes ergot in wheat** (Claviceps purpurea).

Sorghum ergot development

This fungus, *Claviceps africana,* infects unfertilized sorghum ovaries, resulting in no development of grain. Pollen present at the same time as ergot inoculum usually prevents ergot infection because pollination occurs much more quickly. The absence of pollen in male-sterile sorghum forage fields makes them extremely susceptible to infection by C. africana when both the pathogen and a favorable environment are present. Sorghum ergot can also be a problem if pollen is somehow absent or ineffective at the flowering stage. This can occur if the plants were subjected to cool, moist conditions prior to or during the flowering period. Anything that reduces pollination increases the potential for ergot infection.

Studies have shown a higher risk of sorghum ergot infection when minimum temperatures are ~53°F. Additionally, the chance of infection decreases when temperatures are above 75°F prior to flowering. However, cycling of the pathogen in variously-aged male-sterile forage sorghum fields under extended wet periods can occur at temperatures well above 75°F. Lack of pollen in these fields can be associated with rapid disease development and increased conidial (spore) spread across multiple fields. That may be a major factor in 2025 compared to previous years, as might be the large increase in acres planted to male-sterile sorghums.

Symptoms and Dispersal

Sorghum ergot is a grain replacement disease that creates two major problems.

- First, infection of non-pollinated ovaries precludes normal seed-set or development. Thus, infections are directly responsible for grain yield losses.
- Secondly, seed developing adjacent to infected florets often become contaminated with sugary, sphacelia honeydew, which is a sweet, sticky, amber-colored fluid (Figure 1).

The honeydew can also spread into other plant structures and leaves below the developing head. Honeydew is typically observed 7 to 10 days after initial infection. The honeydew consists of liquid and conidia (spores) that exude from diseased florets and are most visible during cool, damp weather. Honeydew production might affect grain and forage sorghum quality, but it is not associated with alkaloid toxin production, which occurs only in sclerotia. Once sphacelia production is complete, and especially when honeydew production has ceased, there is no risk of sclerotia production. Later-blooming male-sterile forage sorghums or late tillers may have a slightly increased risk of sclerotia production due to increasingly lower temperatures, but we have not observed any production in current fields.

Figure 1. Forage sorghum head infected with Sorghum Ergot in Ness County, Kansas.

Figure 2. Honeydew has dripped from the plant onto the soil surface. Photo taken in Ness County, Kansas.

Honeydew contains three types of conidia: macroconidia, secondary conidia, and microconidia. This honeydew also supports the growth of saprophytic fungi/molds, which can affect forage and grain quality. These seeds are of poor and downgraded quality and, because of their stickiness, may be difficult to remove during harvest. Honeydew may be disseminated from flower to flower by insects, rain, and wind. Aerial dispersal of conidia over long distances is believed to be the primary source of inoculum.

The formation of sclerotia by *Claviceps africana* has rarely been observed under field conditions in the United States. Sclerotia production requires low temperature conditions and is associated with the production of ergot alkaloid dihydroergosine. Johnsongrass, volunteer sorghum, and likely feral sorghums, such as shattercane, are also important for maintaining viable inoculum in the fields.

Management considerations

- Fungicide applications at this point in time will not be effective.
- Harvesting of sorghum, for grain or silage, may prove difficult due to the sticky nature of the honeydew.
- If portions of the field are more severely affected than others, producers may consider not harvesting that portion of the field or keeping the resulting hay lots separate for future testing.
- Delaying harvest until after a rain or freeze can help reduce the amount of honeydew on the plant.
- Honeydew can cause mold formation in baled hay or silage. Mold formation will reduce feed quality and can form mycotoxins.
- The presence of alkaloids, which are a toxic concern for livestock feeding, is reliant on the production of sclerotia. At this time, sclerotia production has not been verified in Kansas fields.

We are continuing to monitor this situation and evaluate the infections present in Kansas. Additional information on sclerotia and alkaloid production, as well as their potential effects on feeding and appropriate forage sampling procedures, will be included in a future eUpdate article.

Please help us track sorghum ergot!

You can contact Rodrigo Onofre directly at 785-477-0171 if you suspect a field has sorghum ergot and/or submit a sample to the K-State Plant Disease Diagnostic Lab at https://www.plantpath.k-state.edu/extension/diagnostic-lab/documents/2021_PP_DiseaseLabChecksheet.pdf.pdf. This will help us monitor the situation in the state.

Additional resources

Texas A&M Sorghum Ergot Factsheet: https://southtexas.tamu.edu/files/2023/05/sorghum-ergot-new-disease-threat-to-the-sorghum-industry.pdf

UNL Sorghum Ergot Factsheet: https://cropwatch.unl.edu/plant-disease/sorghum/ergot/

SORGHUM ERGOT: Distinguishing Sphacelia and Sclerotia of Claviceps africana in Seed: https://cdn-de.agrilife.org/extension/departments/plpm/plpm-pu-021/publications/files/sorghum-ergot-distinguishing-sphacelia-and-sclerotia-of-claviceps-africana-in-seed-.pdf

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2. Fall soil testing of hayfields and pastures

Soil testing is the foundation of a sound fertility program for pastures and hayfields. Soil testing can be done in either spring or fall on hayfields and pastures. Tests can be taken in either spring or fall, but fall is generally preferred. Sampling in the fall allows time for lime applications to react before the next growing season and gives producers more flexibility in planning fertilizer applications.

Figure 1. Fertility management effect in bermudagrass pastures. The left side of the pasture received an application of nitrogen fertilizer, while the right side did not. Photo credit: K-State Research and Extension.

Soil sampling is typically recommended at least every 3-4 years. However, more frequent sampling (every two years) can prevent over-application of fertilizer or manure and increase yields by revealing exactly which soil nutrients are too low for optimum productivity. This is especially valuable when fertilizer prices are high.

Collecting a representative soil sample

- Use a soil probe if possible (many county Extension or NRCS offices have probes available). A shovel or spade may also be used, but avoid "pointed" samples that over-represent the surface layer.
- Combine 15–20 cores into one composite sample for each uniform area (≤40 acres, or ≤10 acres in variable fields). Keep separate samples for areas with different crops, forages, or soil types.
- Avoid contamination by using clean equipment and containers.

Sampling depths

- **pH evaluation**: 3-4 inches
- **mobile nutrients (nitrogen and sulfur)**: 24 inches
- **Immobile nutrients (phosphorus and potassium)**: 6 inches

Why soil pH matters

Soil pH is one key soil property for forage production, especially with legumes. The optimal pH level is 6 to 7, depending on the forage species.

- Nutrient uptake can be reduced if the soil pH is too low or too high.
- Smooth brome grass and tall fescue performe best in the pH range of 6.0 – 7.5, but can handle pH down to 5..
- Legumes, especially alfalfa, require a near-neutral pH (~pH 7). A low soil pH reduces nodulation and nitrogen fixation in legumes, such as alfalfa and clover.
- Aluminum toxicity can occur at low soil pH.

If liming a new pasture, it is important to apply the lime 6 to 12 months before planting. Finer lime materials with a high effective calcium carbonate (ECC) value will react more quickly. Fields being prepared for alfalfa should also be evaluated for phosphorus and potassium, with any corrections made before planting. Sulfur and boron can also limit legume production, particularly in eastern Kansas.

Additional resources

For more information on soil sampling and submitting samples to the K-State Soil Testing Laboratory, visit the K-State Soil Testing Laboratory at https://www.agronomy.k-state.edu/outreach-and-services/soil-testing-lab/.

You can also find practical soil sampling tips in these two recently updated eUpdate articles:

"Fall soil sampling: Sample collection and submission to the K-State Soil Testing Lab"
https://eupdate.agronomy.ksu.edu/article/fall-soil-sampling-sample-collection-and-submission-to-k-

state-soil-testing-lab-665-6

"The challenge of collecting a representative soil sample"
https://eupdate.agronomy.ksu.edu/eu_article_prep.php?article_id=4218

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3. Rate of dry down in grain sorghum before harvest

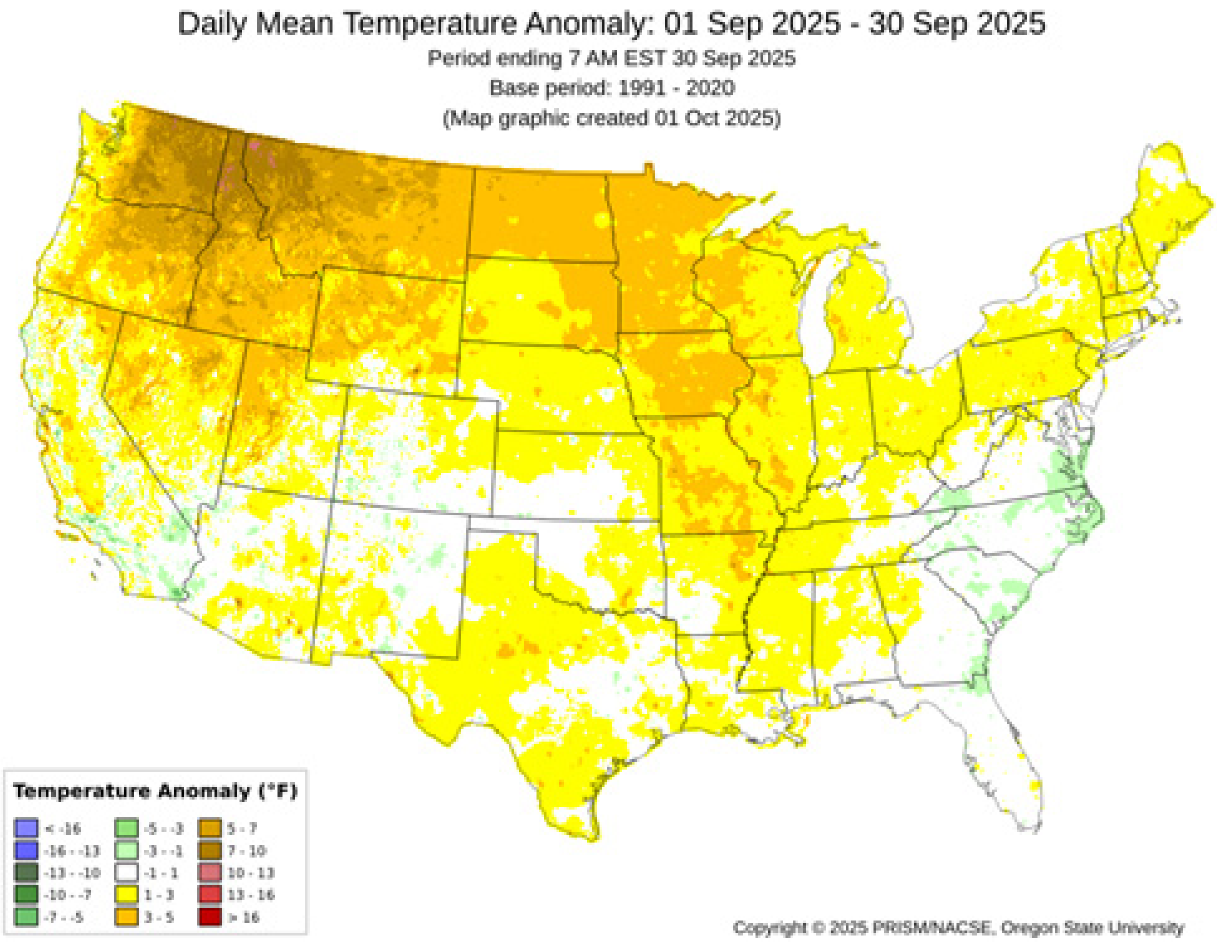
In recent years, a common question from farmers has been related to the dry down rate for sorghum as the season approaches its end. Based on previous information, the average dry down rate depends on weather, primarily temperature and moisture conditions; however, modern hybrid data are limited.

The latest Crop Progress and Condition report from Kansas Agricultural Statistics, on September 28, stated that grain sorghum maturity was 48%, behind the 58% last year, but near the average (52%). Harvest is at 7% this year, behind last year (16%) and the 5-year average (12%).

Recent Temperature and Precipitation Patterns

The weather conditions experienced from early September to early October are critical for sorghum as they are related to the grain-filling rate and the determination of final grain weight. While the month of September began with very unseasonably cool conditions, warmer temperatures towards the end of the month resulted in average to slightly above-average temperatures (Figure 1, top map). Temperatures ranged as high as 97° to as low as 42°F during the period.

Localized, very heavy precipitation in some areas, primarily central and southwest Kansas, resulted in these locations observing 200-400% of normal rainfall (Figure 1, bottom map). A significant amount of this rain ran off, resulting in isolated flooding. However, many wet areas have observed recurring timely moisture that has yielded good soil moisture profiles in these locations. Other areas, such as far eastern Kansas, were much drier than normal and observed some drought expansion. Despite the overall wetter-than-normal conditions for September on average, a much warmer/drier end to the month occurred than what the final monthly average statistics would support. This has been particularly timely for regions of the state that have been experiencing wet conditions (central/west), but it has compounded the dryness along the Missouri border. Still, wet areas continue to experience increased dew, humidity, and periods of fog due to the moist soils resulting from previous precipitation events.


Daily Mean Temperature Anomaly: 01 Sep 2025 - 30 Sep 2025
Period ending 7 AM EST 30 Sep 2025
Base period: 1991 - 2020
(Map graphic created 01 Oct 2025)
Temperature Anomaly (°F)
< -16
-16 - -13
-13 - -10
-10 - -7
-7 - -5
-5 - -3
-3 - -1
-1 - 1
1 - 3
3 - 5
5 - 7
7 - 10
10 - 13
13 - 16
> 16
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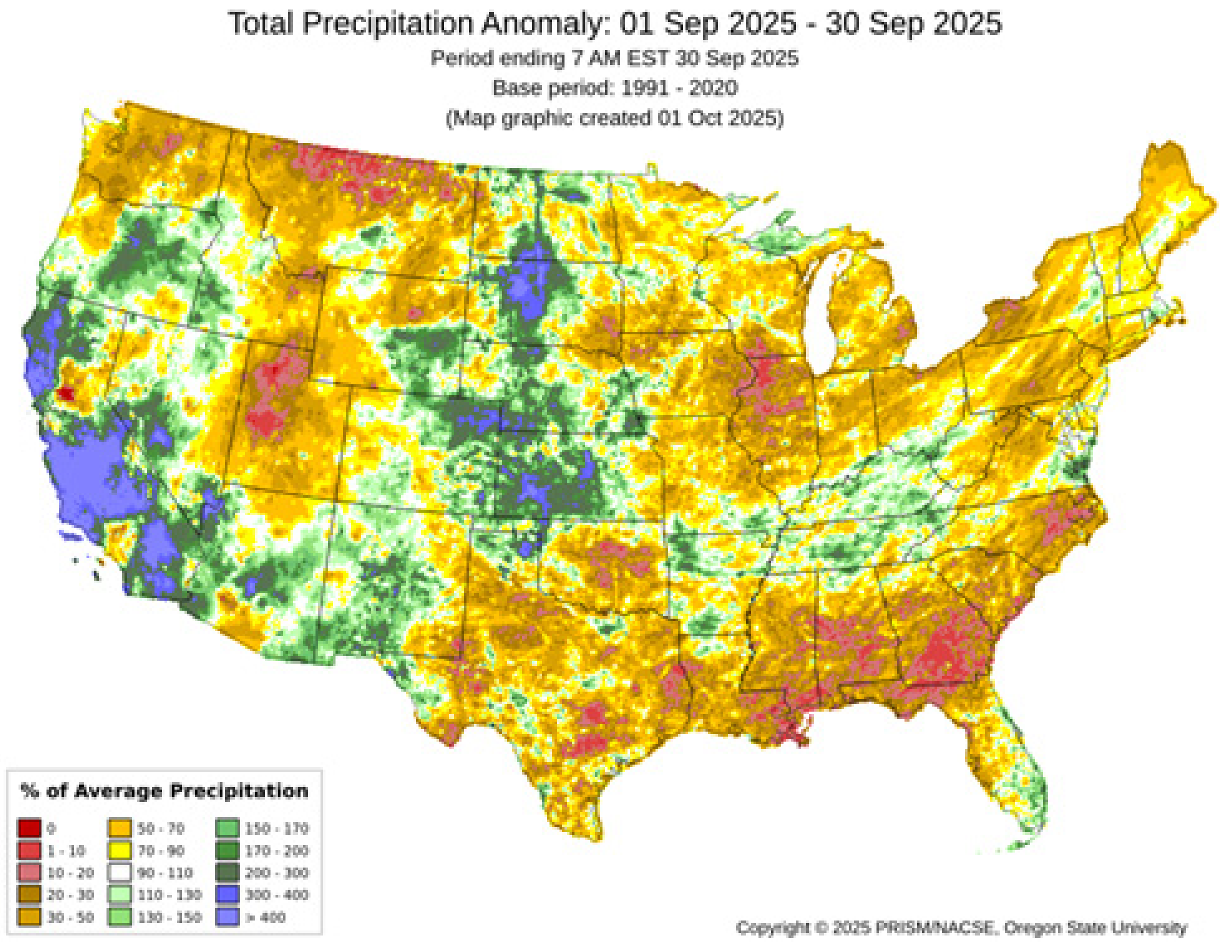

Figure 1. Departure from normal temperatures (top map) and percent of normal precipitation (bottom map) from September 1 – 30, 2025. Maps by PRISM.

In recent years, a common question from farmers has been related to the dry down rate for sorghum as the season approaches its end. Based on previous information, the average dry down rate depends on weather, primarily temperature and moisture conditions; however, modern hybrid data is limited.

Weather Outlook for October and November

The weather outlook for the remainder of October favors continued (but moderated) above-normal temperatures and above-normal moisture. As the calendar turns to November, drier-than-normal conditions are expected to materialize. Average precipitation is decreasing each month. Drier-than-normal conditions in November could potentially yield much more limited rainfall, favoring a faster dry down rate. Additionally, warmer-than-normal temperatures favor a later-than-normal freeze, which may be more effective at drying down, especially when combined with drier conditions in November.

Growing Degree Days and Crop Maturity

From a crop perspective, the overall cumulative GDD from flowering to maturity is about 800-1200 (based on 50°F as the base temperature), with the shortest requirement in GDD for short-season hybrids. Before maturity, from the beginning of grain filling (soft dough until maturity), grain moisture content within a grain will go from 80-90% to 25-35%, where black-layer is usually formed (Figure 2). From maturity (seen as a "black-layer" near the seed base; Figure 2) to harvest time, sorghum grain will dry down from about 35 to 20% moisture, but the final maximum dry mass accumulation and final nutrient content will have already been attained at maturity.

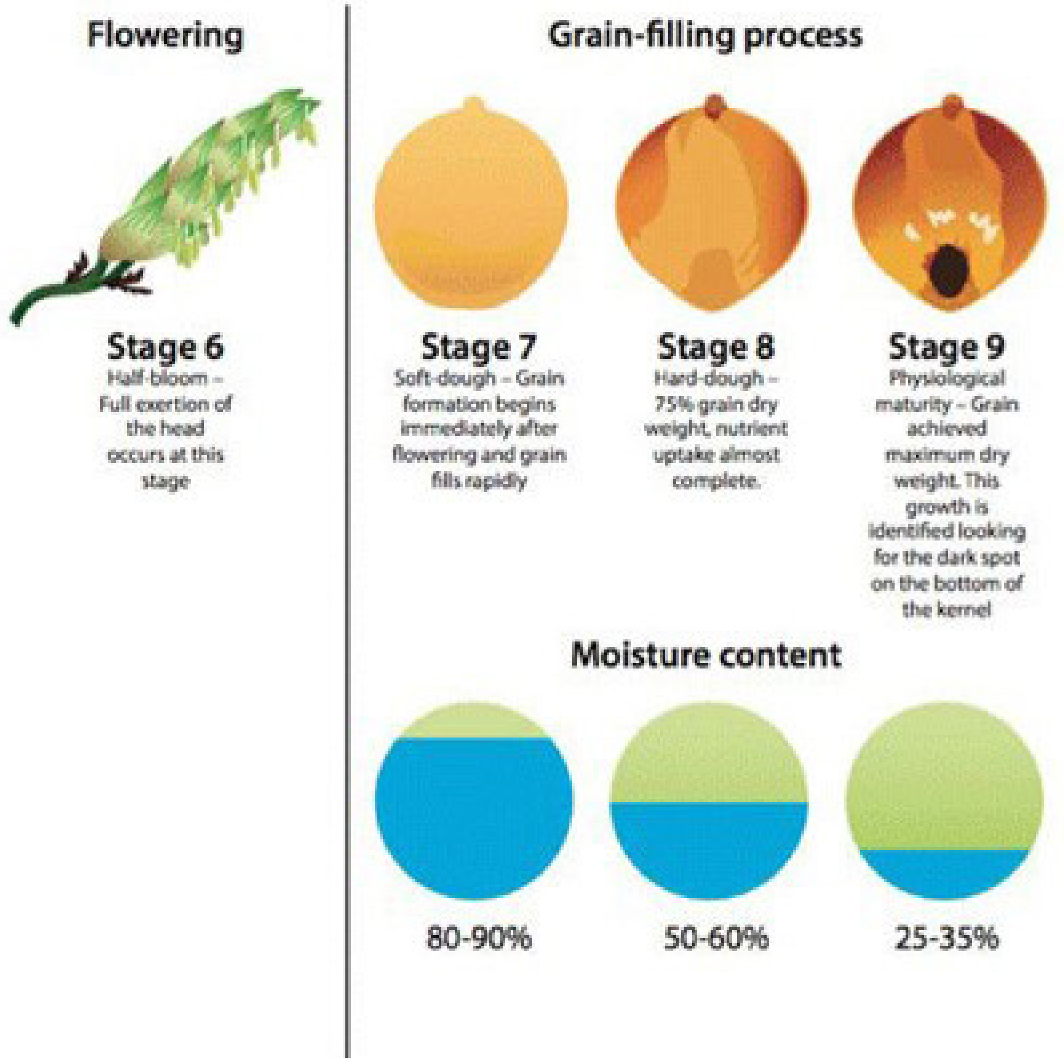

Figure 2. Sorghum growth stages from half-bloom and grain filling (including soft dough, hard dough, and physiological maturity). Infographic representing changes in grain coloration and moisture content during the grain filling period until black layer formation (maturity). For further reference on sorghum growth and development please check: https://bookstore.ksre.ksu.edu/pubs/MF3234.pdf. Graphic by K-State Research and Extension.

Dry down process for grain sorghum

Grain water loss occurs at different rates but with two distinct phases: 1) before "black-layer" or maturity (Figure 2), and 2) after black-layer. For the first phase, Figure 2 illustrates the changes in grain moisture from soft dough to physiological maturity in sorghum.

To answer the rate of dry down question, a study was conducted to investigate the effect of the grain dry down rate from the moment of "black-layer" until commercial harvest grain moisture is reached. For the conditions experienced in 2019, 2021, and 2022 (from early September until mid-October), the overall dry-down rate was around 0.7% per day (from 31-34% to 16-17% grain moisture), taking an overall of 30 days. This is slower than the average dry rate for corn (1%) and for soybeans (3%).

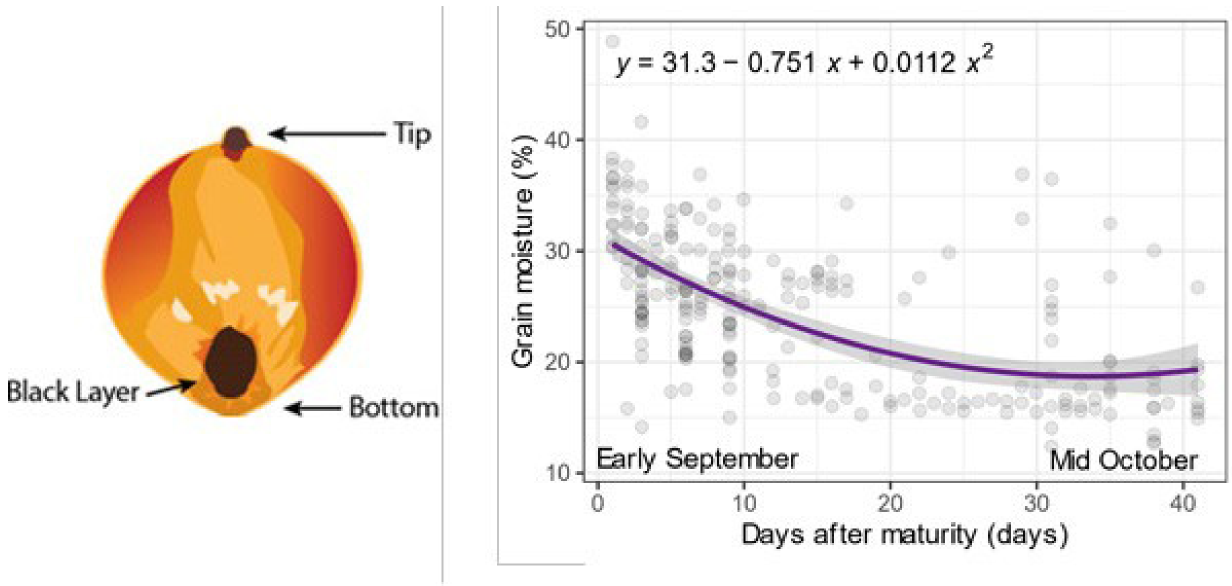

Figure 3. Grain moisture dry down across different sorghum hybrids for a study near Manhattan, KS (2019, 2021, and 2022 growing seasons). The graphic in the left panel illustrates the black layer stage of grain for sorghum. Graphics from K-State Research and Extension.

This dry down process can be delayed by:

- Low temperatures
- High humidity
- High grain moisture content at black layer (38-40%)

It is expected that the dry down rate will decrease to around<0.5% per day for late-planted sorghum entering reproductive stages later in the growing season. A similar decrease is also expected for sorghum that was exposed to late-season stress conditions (e.g., drought, heat, and freeze). Under these conditions, maturity may be reached with high grain water content, and the last stages after black layer formation could face lower temperatures and higher humidity. These main factors should be considered when it is time to harvest.

You can track temperature and humidity levels on the Kansas Mesonet website at http://mesonet.k-state.edu/weather/historical/ by selecting the station and time period of interest.

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4. 2025 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.

Entries must be postmarked or submitted electronically by November 15, 2025. Yield contest districts are determined by region, tillage method, and irrigation status, with a total of 18 districts under consideration. Only one entry per field will be accepted. An individual may enter multiple categories within the yield contest (conventional, no-till, dryland, or irrigated), but only one entry may be accepted per district. Individuals may submit one entry into the value contest.

Results are expected to be released in mid-December, followed by official recognition of the winners at the Kansas Soybean Celebration on January 30 in Salina.

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 awards are as follows:

- In each category:
    - 1st Place - $300 and a farm sign
    - 2nd Place - $200 and a certificate
    - 3rd Place - $100 and a certificate
- The overall highest yields in the dryland and irrigated categories will each receive an additional $1,000. The producer with the highest yield that exceeds the record high yield (126.6) will receive an additional $1,000.

No-Till on the Plains may have additional awards for the no-till categories.

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.

The top yield contest winner for the state, the top value contest winner for the state, and one randomly drawn individual who entered both contests will win a sponsored trip for two to the Commodity Classic in San Antonio, TX, February 25-27, 2026. Airfare, accommodations, and registration will be covered.

A full guide to contest rules and regulations, along with the digital entry form, is 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.

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5. Kansas cool-season forage performance tests

The results of the 2025 Kansas Performance Tests for cool-season annual forage varieties are available online at https://www.agronomy.k-state.edu/outreach-and-services/crop-performance-tests/forages/hay-and-silage/. The results are summarized by location (Garden City, Hays, and Belleville). At this time, only yield results are available for the cool-season forages. Quality results for the forages will be released in the near future.

Annual forage performance tests are conducted each year by the Kansas Agricultural Experiment Station (Figure 1). The objectives of these variety trials are to evaluate the performance of released and experimental varieties, determine where these varieties are best adapted, and increase the visibility of summer annual forages in Kansas. Breeders, marketers, and producers use data collected from the trials to make informed variety selections.

This work was funded in part by the Kansas Agricultural Experiment Station and seed suppliers. Sincere appreciation is expressed to all participating researchers and seed suppliers who have a vested interest in expanding and promoting annual forage production in the U.S.

Figure 1. Harvesting a cool-season forage variety trial at the Southwest Research and Extension Center in Garden City, KS. Photo from John Holman, K-State Research and Extension.

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