Issue 1071

K-STATE Research and Extension

Extension Agronomy

eUpdate

09/11/2025

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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eUpdate Table of Contents | 09/11/2025 | Issue 1071

1. Grain sorghum yield components and estimating yield potential

The time when farmers can start estimating sorghum yields is upon us. In the most recent USDA-NASS Kansas Crop Progress and Condition report (Sept. 8), sorghum in Kansas was 96% headed, 63% coloring, and 23% mature, which were all near or ahead of average. Even though estimating crop yields before harvest can be difficult, having these estimates is valuable information for producers, as it helps them to make relevant decisions on inputs.

When can I start making sorghum yield estimates?

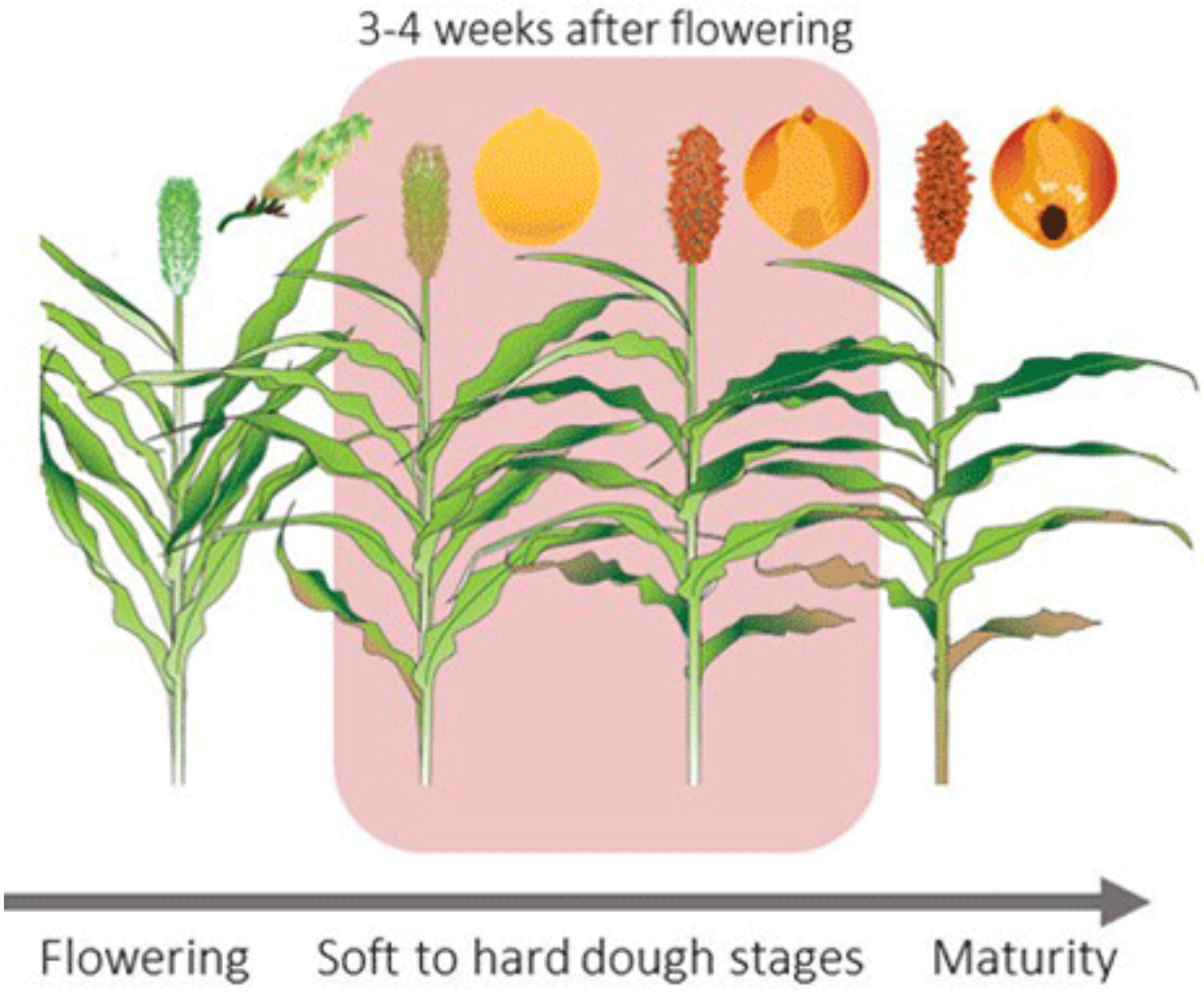


Figure 1. Sorghum flowering stages. Image credit: K-State Research and Extension.

As the sorghum crop gets closer to maturity, yield estimates will be more accurate. Nonetheless, we can start taking yield estimations three to four weeks after flowering (from soft to hard dough stages), though final seed number can change. In addition to the seed number, the seed weight will be only partially determined – approximately 50 to 75% of dry mass accumulation as compared to the final weight attained at maturity.

Understanding sorghum yield components and management/environmental impacts

- **Plants per acre, planting date**: These affect the plant's ability to tiller. The more plants per acre, the less tillering. Earlier (mid-to-late May) planted sorghum tends to tiller more compared to later (mid-to-late June).
- **Environment, final head number, and size**: Heat and drought stress will reduce the plant's ability to tiller more and could severely reduce the tiller survival rate. The total number of seeds per head will be determined within a 1 to 2-week period before flowering until the milk to soft dough stages (approximately two to three weeks after flowering).
- **End-of-season seed size**: Sorghum grains have already accumulated about 50% of the final dry mass during the soft dough stage (15-25 days post-flower). Thus, the period around flowering is critical for defining the final number of grains per head and the potential maximum kernel size. The final seed weight will be determined when the grains reach physiological maturity (visualized as a "black layer" near the seed base). From this time until harvest, the grains will dry down from approximately 35% to 20% moisture content.

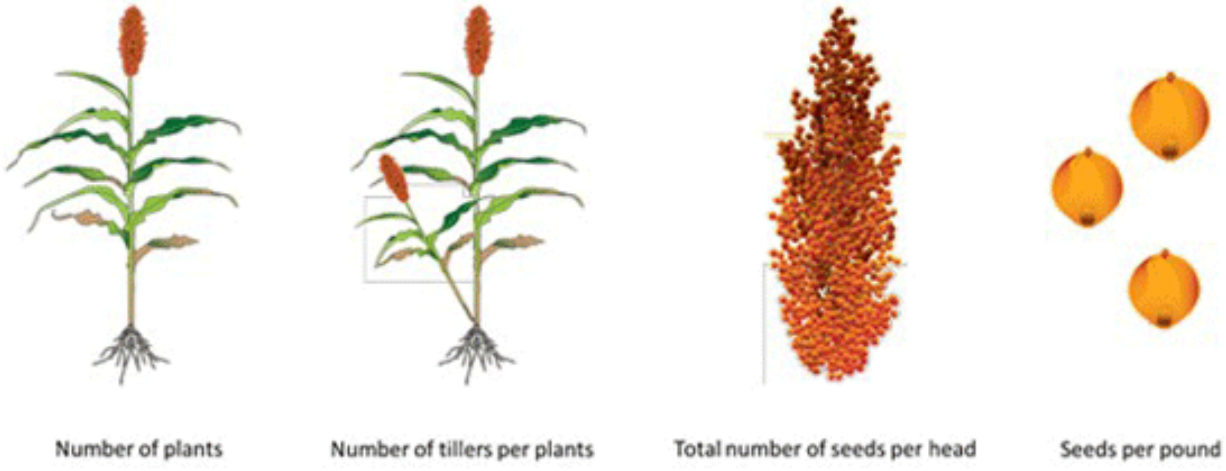


Figure 2. The four main components of sorghum yield are the number of plants, tillers, seeds per head, and seed size. Graphic by Ana P. Carcedo, K-State Research and Extension.

Variability within the field

The interaction among all four components will determine the final yield, but a wide range of variation can be expected in all these main yield-driving forces. When estimating sorghum yields using the "on-farm approach", the variability between plants needs to be properly accounted for. Another important factor is the variation between different areas in the field, with yield estimations being conducted in at least 5 to 10 sections of the field.

On-farm approach for estimating sorghum yields

The sorghum yield estimates should consider these main driving forces:

1. **Total number of heads per unit area** [number of plants per acre x heads per plant]
2. **Total number of seeds per head**
3. **Number of seeds per pound**
4. **Pounds per bushel**, or test weight, which for sorghum is **56 lbs/bushel**

Step 1. Number of heads per unit area

For this on-farm approach, start by counting the number of heads from a 17.4-foot length of row when the sorghum is in 30-inch row spacing (this represents 1/1000th the area of an acre). If the sorghum is in 15-inch row spacing, then count the number of heads in two rows. For a 7.5-inch spacing, take into account four rows.

Take head counts in several different field areas to properly account for the potential yield variability. If the proportion of smaller heads (less than 3 inches in height) is very low (< 5%), those heads could be avoided due to the smaller proportion for determining the final yield estimation.

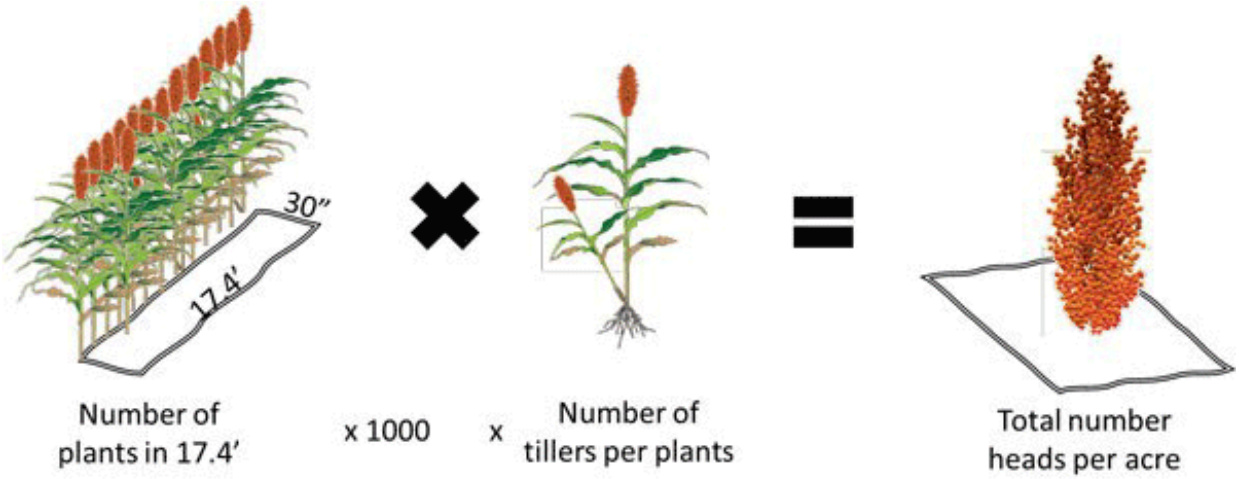


Figure 3. Calculating the total number of heads per acre.

Step 2. Estimating the number of seeds per head

The seed number is, by far, one of the most complicated yield components to estimate. The total number of seeds per head can vary from 100 to 5,000 seeds per head, but most of the time the number is around 1,500 to 2,500 seeds per head.

The method of estimating seed counts is summarized in Table 1.

- If conditions were very poor during pollination and grain set, and the general yield environment is low, the total number of seeds per head will average around 900 seeds per head.
- If conditions around flowering were very favorable and the general yield environment was very high, then the number of seeds per head could be around 2,500.
- Intermediate yield environment scenarios can occur if a portion of the 3 to 4-week period around flowering was favorable and part of it was unfavorable. In that case, the number of seeds per head could average around 1,745.

This information is provided only for general guidance on estimating sorghum yield potential using the on-farm approach.

Table 1. Total number of seeds per head and seed weight components.

Yield range (bu/acre)	Average see weight (g/10
<50	24.5
50-100	25.5
100-150	26.2
150-200	25.6
>200	25.5

Step 3. Estimating seed weight

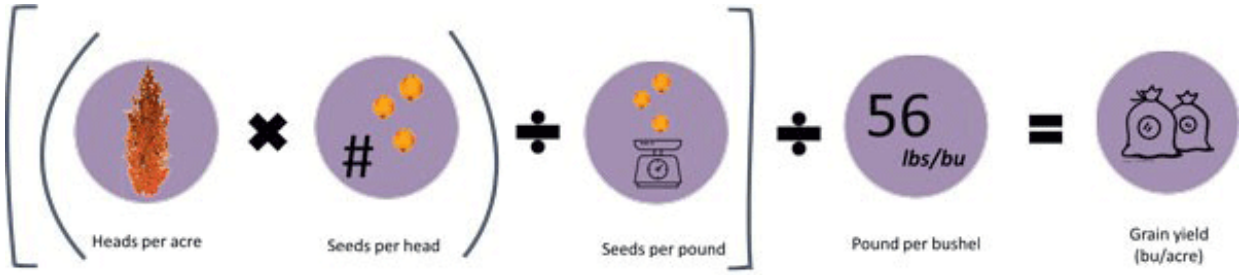
A similar procedure can be followed to estimate the seed weight (Table 1). For the seed weight component, there is a very narrow variation compared to the variability in the seed number. Generally, lower seed weight is expected with low yield, but the difference among yield levels is negligible. Table 2 shows the conversion from average seed weight to seeds per pound.

Table 2. Seed weight, seeds per pound.

Yield range (bu/acre)	Average Seed v (g/1000)
<50	24.5

50-100	25.5
100-150	26.2
150-200	25.6
>200	25.5

Step 4. Final calculation using the "On-Farm" Yield Estimation Approach:



Example calculation for dryland sorghum in Kansas

Dryland sorghum with 72,000 heads/acre), fair flowering (2000 seeds/head), and good grain filling (17,723 seeds/pound):

Yield Estimation = [(72,000 x 2,000) ÷ 17,723] ÷ 56 = **145 bu/acre**

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2. In-furrow fertilizers for wheat

Wheat is considered a highly responsive crop to band-applied fertilizers, particularly phosphorus (P). Phosphorus applied as a starter fertilizer can be an effective method for part or all of the P needs. Wheat plants typically show a significant increase in fall tillers (Figure 1) and better root development with the use of starter fertilizer (P and N). Winterkill can also be reduced with the use of starter fertilizers, particularly in low P testing soils.

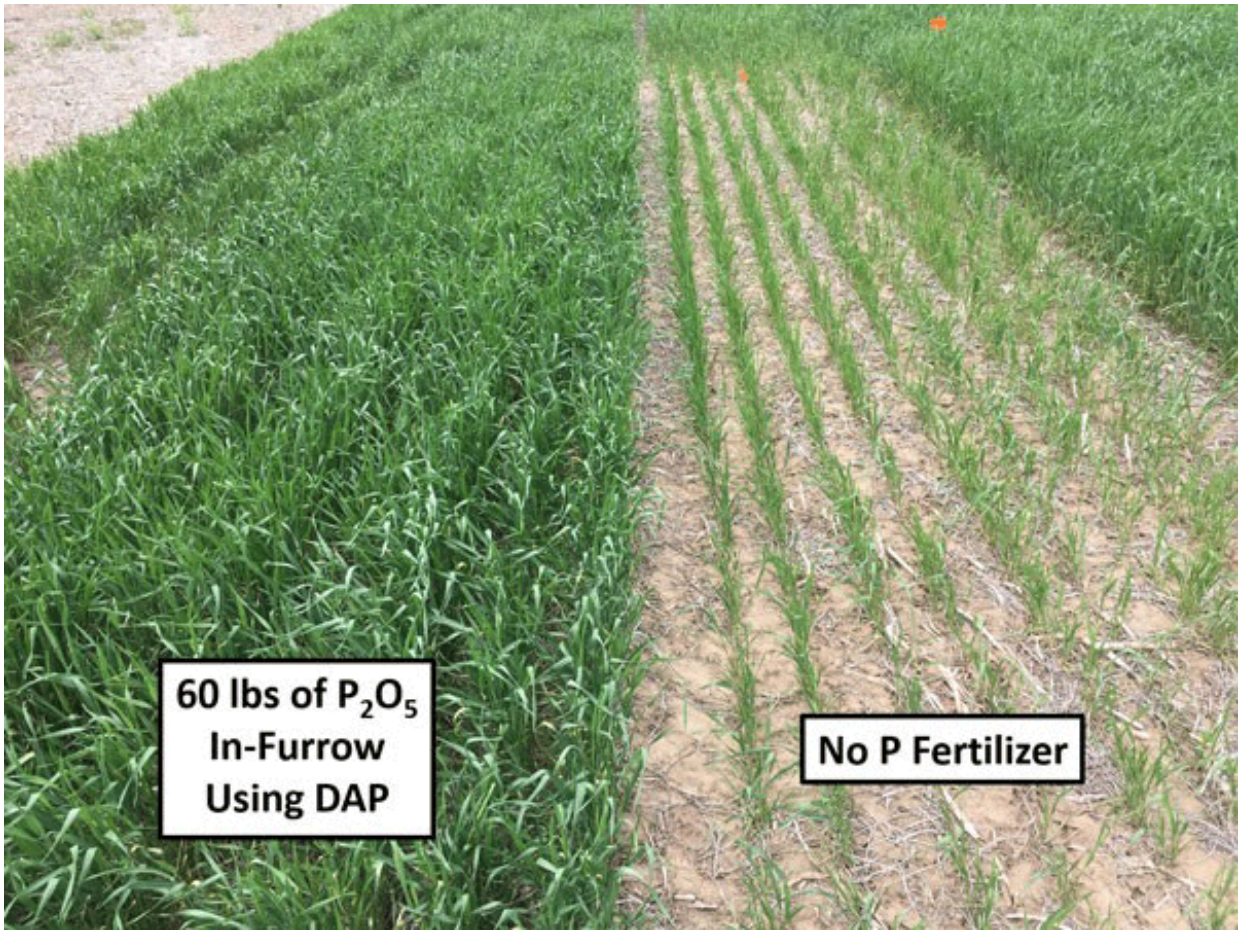

Figure 1. Effects on wheat tillering and early growth with in-furrow P fertilizer on soil testing low in P. Photo taken in 2020 in Manhattan, KS. Photo by Chris Weber, K-State Research and Extension.

In-furrow fertilizer application

Phosphorus fertilizer application can be done through the drill with the seed. In-furrow fertilizer can be applied, depending on the soil test and recommended application rate, either in addition to or instead of any pre-plant P applications. The use of dry fertilizer sources with air seeders is a very popular and practical option. However, other P sources (including liquid) are agronomically equivalent, and decisions should be based on cost and adaptability for each operation.

When applying fertilizer with the seed, rates should be limited to avoid potential toxicity to the seedling. When placing fertilizer in direct contact with wheat seed, producers should use the

guidelines in Table 1.

Research conducted at K-State has shown that in-furrow applications of phosphorus fertilizer consistently improved wheat yields compared to no starter, particularly in soils with low soil test phosphorus. Yield responses were similar across P sources (DAP vs. MESZ), but increased as the fertilizer rate increased, with the highest yields observed at 120 lbs/acre (Figure 2). These results highlight that wheat can safely tolerate higher in-furrow P rates, provided application guidelines are followed.

Table 1. Suggested maximum rates of fertilizer to apply directly with the wheat seed

	Pounds N + K_2O (No urea-containing fertilizers)	
Row spacing (inches)	Medium-to-fine soil textures	Course textures or dry soils
15	16	11
10	24	17
6-8	30	21

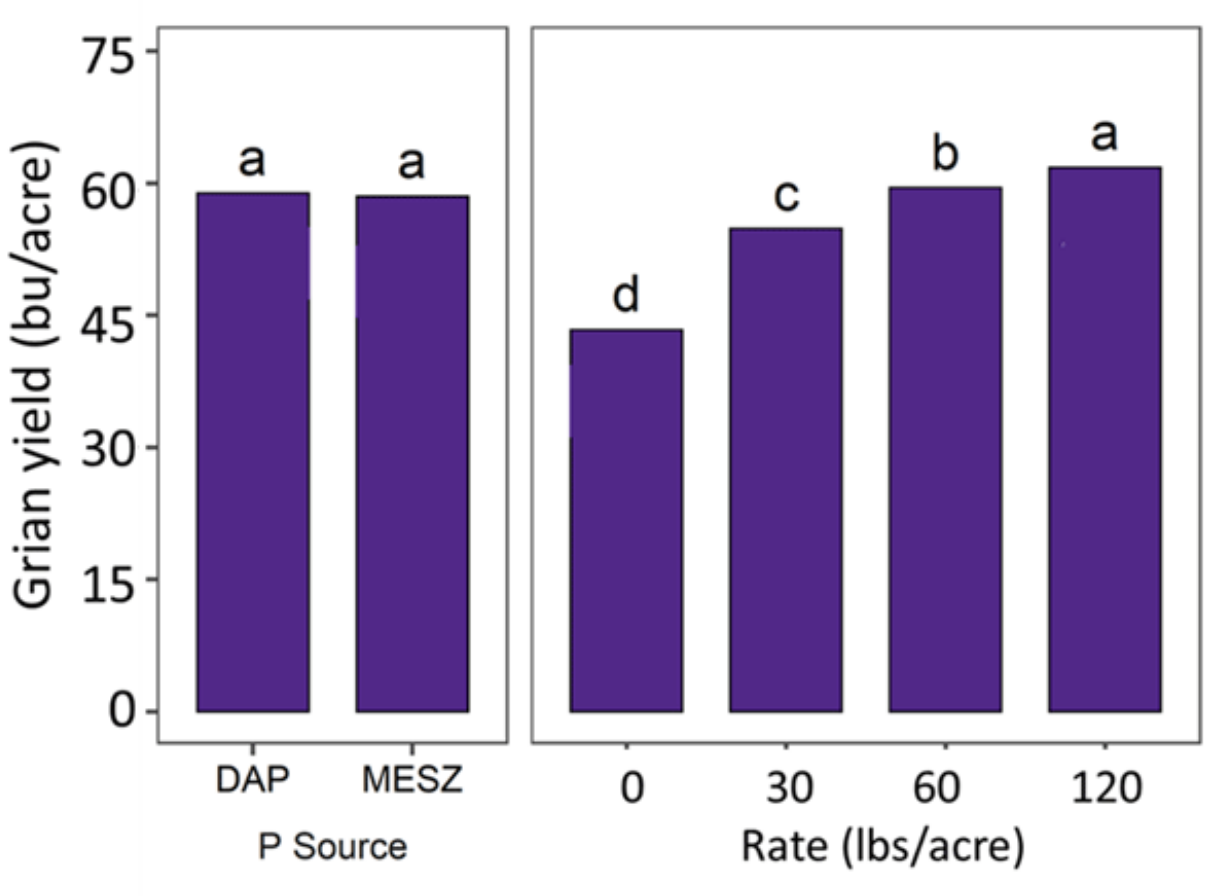

Figure 2. Wheat grain yield response as affected by phosphorus fertilizer source and application rate. Graph by Dorivar Ruiz Diaz, K-State Research and Extension.

Air seeders that place the starter fertilizer and seed in a 1- to 2-inch band, rather than a narrow seed slot, provide some margin of safety because the concentration of the fertilizer and seed is lower in these diffuse bands. In this scenario, adding a little extra N fertilizer to the starter is less likely to injure the seed - but it is still a risk.

What about blending dry 18-46-0 (DAP) or 11-52-0 (MAP) directly with the seed in the hopper? Will the N in these products hurt the seed?

The N in these fertilizer products is in the ammonium-N form (NH_4^+), not the urea-N form, and is much less likely to injure the wheat seed, even though it is in direct seed contact. As for rates, the guidelines provided in the table above should be used. If DAP or MAP is mixed with the seed, the mixture can safely be left in the seed hopper overnight without injuring the seed or gumming up the works. However, it is important to keep the wheat mixed with MAP or DAP at a lower relative humidity. Humidity greater than 70% will result in the fertilizer taking up moisture and will cause gumming or caking within the mixture.

Although the wheat response to these in-furrow fertilizer products is primarily from the P, the small amount of N that is present in DAP, MAP, or 10-34-0 may also be important in some cases. If no pre-plant N was applied, and the soil has little or no carryover N from the previous crop, the N from these fertilizer products could benefit the wheat.

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3. Seed treatment fungicides for wheat disease management

Seed treatments are an important part of wheat production in Kansas. The updated K-State publication MF2955, *Fungicide Seed Treatments for Wheat Disease Management,* is available at http://www.ksre.ksu.edu/bookstore/pubs/MF2955.pdf

This publication provides information about setting seed treatment priorities, considerations for seed treatment success, a key to common seed treatment active ingredients, and a list of some of the more common seed treatments labeled for use in Kansas.

Most fungicide seed treatments provide protection against several seed-borne diseases (common bunt, loose smut, flag smut) and seedling diseases that may result in poor emergence or damping off. Additionally, fungicide seed treatments should be a priority if seed is saved from fields with Fusarium head blight.

Additional benefits of seed treatments:

Fungicide seed treatments help keep seed-borne diseases such as smuts and bunts in check. Loose smut (Figure 1) and common bunt, sometimes called "stinking smut" (Figure 2), can be controlled very effectively with most commercial treatments that contain fungicides. Some regions of the state have struggled with these diseases in recent years. In 2025, loose smut was particularly prevalent. If you are planning to keep any seed with known exposure to common bunt or loose smut, it is critical to use a fungicide seed treatment to avoid problems in the future.

Figure 1. At heading, heads infected with loose smut will emerge as a black mass of spores and will not produce grain. Spore will infect neighboring plants at flowering, which can lead to a higher incidence in subsequent seasons if seed is saved from infected fields. Fungicide seed treatments should provide complete control of this disease. Photo by Kelsey Andersen Onofre, K-State Research and Extension.

Figure 2. Seed with common bunt (aka stinking smut). Kernels are dark and typically smaller than healthy kernels and can be easily broken open to reveal black spores. These black spores contaminate healthy seed during harvest and can cause increased common bunt in the following season. Fungicide seed treatments should provide complete control of this disease. Photo by Kelsey Andersen Onofre, K-State Research and Extension.

Fusarium head blight (scab) not only causes discoloration of heads, but it can also cause grain to have a lightweight, chalky (sometimes pink) appearance (Figure 3). Seed lots that come from fields that had Fusarium head blight in 2025 may have reduced stand and germination because the fungus that causes this disease can survive in seed and infect seedlings as they emerge. Seed cleaning to remove lightweight kernels and seed treatments with a fungicide can eliminate this issue.

Figure 3. Seed from a field with Fusarium head blight (head scab). Kernels often appear white and occasionally with pink discoloration. Fungicide seed treatments reduced the risk of seedling diseases due to Fusarium. Photo by Kelsey Andersen Onofre, K-State Research and Extension.

Seed production fields are a top priority for fungicide seed treatments. These fields have a high value, and investments in seed treatments here help prevent the introduction and development of seed-borne diseases on your farm. Due to the high value of the seed produced, even small yield increases can justify the use of seed treatments.

Seed treatments can aid stand establishment when planting wheat after soybean harvest, even on seed that has high test weight and good germination. Planting wheat late into cool, wet soils often delays emergence and reduces the tillering capacity of wheat seedlings. This reduced tillering capacity diminishes the plant's ability to compensate for stand loss and maintain yield potential.

Some fungicide seed treatments also suppress the fall development of foliar diseases. For example, treatments containing tebuconazole and difenoconazole provide some protection against fall infections of powdery mildew, leaf rust, and Stagonospora nodorum leaf blotch. It is important to note that most seed treatment fungicides will provide a maximum of 30 days of control. A seed treatment will not prevent the disease from becoming reestablished in the spring, and foliar fungicide applications may still be required to protect the yield potential of the crop.

Things to remember

As with most things in agriculture, producers must balance the possible benefits against the cost. Some growers also prefer not to risk having leftover treated seed to deal with at the end of planting. If the seed is treated on-farm, pay close attention to ensure thorough coverage of the seed.

Incomplete coverage can reduce the efficacy of the seed treatment.

There are many different seed treatments available for wheat. Although most seed treatment ingredients are fungicides, some will also contain insecticides. Each ingredient targets a slightly different spectrum of disease-causing fungi or insect pests. Therefore, many commercial formulations include combinations of ingredients that provide a broader spectrum of protection.

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4. Arctic cotton: Will there be enough heat units to finish the Kansas cotton crop?

A generally cool start and end to the cotton growing season in Kansas this year has many wondering, "Will we have enough heat units to finish the crop?" Similar to corn and sorghum, cotton requires the accumulation of heat units to reach its key growth stages and mature bolls (seeds and fiber). The base temperature for calculating growing degree days for cotton is 60°F. However, unlike corn (86°F) or sorghum (100°F), the research does not recognize cotton as having a maximum temperature. The cotton crop accumulates generally 2200 to 2600 GDUs to go from planting to harvest-ready (Table 1), though research in the Oklahoma Panhandle suggests that cotton in the region may be harvest-ready in as few as 1800 GDUs on the High Plains, potentially because of higher solar radiation compared to most of the U.S. Cotton Belt [Cannon et al. (Unpublished)].

Table 1. Average range of days and heat units required to reach key cotton growth stages.

Growth Stage	Days	Heat Units
Planting to Emergence	4-9	50-60
Planting to 1st Flower	60-70	775-850
Planting to 1st Open Boll	102-127	1575-1925
Planting to Boll Opener/Defoliation	120-140	2150-2300
Planting to Harvest - Ready	130-160	2200-2600

Source: Oosterhuis et al. (1990).

Cumulative cotton GDUs are generally greatest in south central Kansas and less in central and southwest Kansas due to the combination of latitude and altitude differences (Figure 1).

Figure 1. Average number of cotton GDDs between May 1st and the average first freeze date in Kansas.

As of September 8, in the cotton-producing counties of Kansas:

- For cotton planted on **May 1** (Figure 2a), GDU accumulation ranged from 1700 to 2100.
- For cotton planted on **May 15** (Figure 2b), GDU accumulation ranged from 1600 to 2000.
- For cotton planted on **May 31** (Figure 2c), GDU accumulation ranged from 1500 to 1900.

Figure 2. Contour maps of accumulated growing degree days for cotton (GDD) across Kansas during three different planting dates (May 1, May 15, and May 31).

The 2025 season resulted in few cotton growers planting in early May and the majority planted between May 15 and May 31. For the May 15 planting date, we see that the south central counties have accumulated 1800 to 2000 GDUs, indicating the crop may already be opening bolls in some places along the Oklahoma border. In comparison, the southwest Kansas counties' cotton planted on May 15 would have accumulated 1600 to 1800 GDUs. For the May 31 planting date in both these areas, the crop is approximately 100 to 150 GDUs behind the May 15 planting. It is important to keep in mind that only 222 to 264 GDUs were accumulated in south central and southwest Kansas from May 1 to May 31 this year, which was up to 52 GDUs below normal and 88 GDUs less than in 2024, specifically in southwest Kansas.

Last effective bloom date

Generally speaking, the last effective bloom date in Kansas is between August 20 and August 25 (Figure 3), considering it takes about 45 days for a flower to mature into an open boll.

Figure 3. Cotton at Garden City, KS, on August 27. Significant boll load developed in the canopy. Recent blooms are likely too late to mature by the first frost.

How much heat could remain?

The average first fall freeze date in Kansas ranges from October 14 to October 21 in southwest Kansas and from October 21 to October 28 in south central Kansas. The expected number of GDDs for cotton from September 9 through the average date of first freeze is shown in Figure 4.

Figure 4. Expected average of accumulated GDUs for cotton from Sept. 8 until the average date of first freeze for Kansas.

Will we have enough heat units to finish the crop?

The answer is, "it depends." We will continue to monitor cotton growth and development throughout the remainder of the growing season. As we approach the end of the season, cotton growers should be mindful of harvest aid application timing relative to crop maturity as well as the first frost. A follow-up article that will come out next week will discuss harvest aid applications in cotton in greater detail.

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5. Don't wait until summer: Manage musk thistle now

Musk thistle (*Carduus nutans*) is one of 12 noxious weeds in Kansas, infesting over 400,000 acres. It has been reported in nearly every county in Kansas (Figure 1) and is found primarily in pastures, rangeland, hay meadows, alfalfa, fallow, roadsides, and waste areas. Under the Noxious Weed Law, introduced in March 2021, musk thistle is considered a Category C weed. That means it is well established within the state and has an extensive population.

Control efforts should be aimed at reducing or eliminating new populations, and established stands should be managed with any accepted control method. Accepted control methods include mechanical, chemical, and biological approaches.

Mechanical control involves removing the entire plant or just the reproductive parts to prevent the plants from producing flowers/seeds. Mowing, digging, and hoeing are common mechanical methods of controlling musk thistle.

Several herbicides are labeled for musk thistle control and are discussed further below.

Biological control requires a permit and needs to be integrated with other methods. Head and rosette weevils are found in the state but cannot be transported across state lines. These biological controls tend to be slow-acting due to population establishment and may only favor areas with high moisture and high thistle density. A flower fly (*Cheilosia corydon*) is available as a biological control of musk thistle, though it has had limited movement in many musk thistle areas due to being a non-native species.

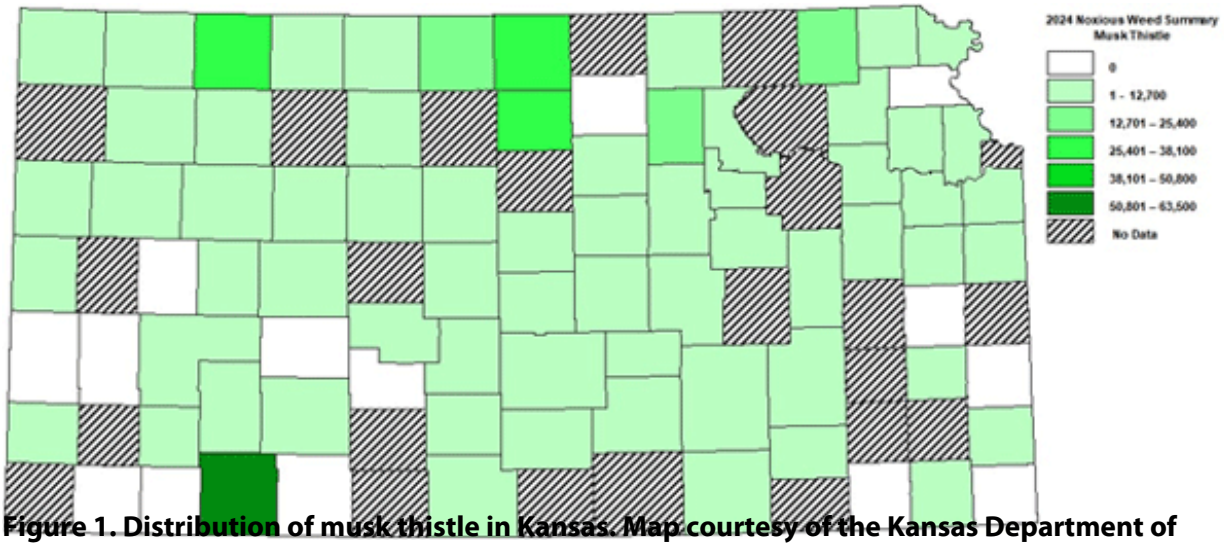

Figure 1. Distribution of musk thistle in Kansas. Map courtesy of the Kansas Department of Agriculture.

Musk thistle is primarily a biennial or winter annual species. Biennials take two growing seasons to complete their life cycle. Thistles germinating in the spring will spend the entire summer as a rosette, live through the winter, and bolt the next year in May and June. Winter annual plants will germinate with moisture and warm temperatures in the fall, live through the winter, and bolt the following year. This weed can act as a biennial, winter annual, and occasionally a summer annual, making control complex but manageable when multiple modes of action are implemented. Most people recognize musk thistle during the early summer when the plants are actively blooming (Figure 2, top photo).

However, musk thistle control is easiest as a rosette (Figure 2, bottom photo).

Figure 2. Musk thistle in flowering stage (top photos with inset) and rosette stage after emerging in the fall and overwintering (bottom photo). Photos courtesy of Mike Haddock (top photos with inset) and Sarah Lancaster, K-State Research and Extension.

Chemical control. Fall is an excellent time to spray musk thistle as all are in the rosette growth stage. Another advantage of fall treatment is reduced risk of off-target drift. Waiting until most deciduous trees have lost their leaves and most crops are harvested will greatly reduce the likelihood of damage from herbicide drift. A wider window of opportunity for treating musk thistle also exists in the fall. The spraying window in the fall probably extends until the ground is frozen, and the musk thistle plants have shut down activity until warmer temperatures in the spring. Freezing temperatures will start to damage musk thistle plants, with some yellowing and curling of leaves. However, the plants are susceptible to herbicides as long as green tissue exists.

Dry conditions in the fall can reduce the control of musk thistle with certain herbicides. Still, studies in Kansas indicated that a fall application of 2,4-D LVE at 2 lbs per acre was more effective (80% control) than a similar rate of 2,4-D amine (49% control). Dicamba + 2,4-D amine at 0.25 + 0.75 lbs per acre and picloram at 0.125 lbs per acre were also effective (>90% control) on musk thistle treated in the fall. Other herbicides that have proven effective include 3-5 fl oz/acre aminopyralid (Milestone) and aminopyralid + metsulfuron (Chaparral at 1.5 oz/acre). Products containing picloram and aminopyralid will not only control rosettes treated in the fall but will have enough carryover to control emerging seedlings the following spring.

If you need to treat musk thistle this fall, select the proper herbicide for the job. If possible, select a warm, sunny day to spray. Scattered rosettes can also be mechanically removed by digging two inches below the crown.

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6. Fall planting of tall fescue pastures

Tall fescue is best seeded in the fall in Kansas pastures and hay meadows, especially when rainfall has been abundant. By starting now with soil tests, variety selection, and seedbed preparation, tall fescue can be a productive pasture for many years to come.

Both tall fescue and smooth bromegrass make good cool-season permanent pasture in eastern Kansas (Figure 1). Tall fescue is hardier, more grazing-tolerant than smooth bromegrass, and more tolerant of wet conditions. Tall fescue can be utilized for fall and winter grazing much better than smooth bromegrass.

Be sure to use either endophyte-free or nontoxic (sometimes called novel or "friendly" endophyte-infected) varieties of tall fescue when establishing a new pasture, or renovating an old pasture if improved animal performance is the main objective. Endophyte-free fescue often lacks its competitive nature in droughty and overgrazing situations, as the endophyte fungus is fully gone. This can also lead to endophyte-free varieties becoming infected if Old KY-31 or similar endophyte varieties still exist in a stand, as the pathway can be filled in. Think of it as a puzzle missing a piece. Novel or "friendly" endophyte fescues have more vigor and drought tolerance, limited livestock toxicity, and have a puzzle piece in that gap to mitigate infection. Old KY-31 endophyte-infected fescue would be acceptable to plant where you know excessive grazing will occur, for example, in grass traps or pens for animal receiving facilities. In these examples, the main goals are ground cover and animal comfort.

Figure 1. Tall fescue pasture near Parsons. Photo by Doohong Min, K-State Research and Extension.

Site selection

Tall fescue will grow on almost any soil but produces best on fertile, moist soils. The ability of tall fescue to withstand low fertility and wet soil is excellent. Tall fescue can also withstand submersion for a few days. It will produce on soils with a pH of 5.2 to 8.0, but optimum growth occurs in the 5.8 to 7.0 pH range.

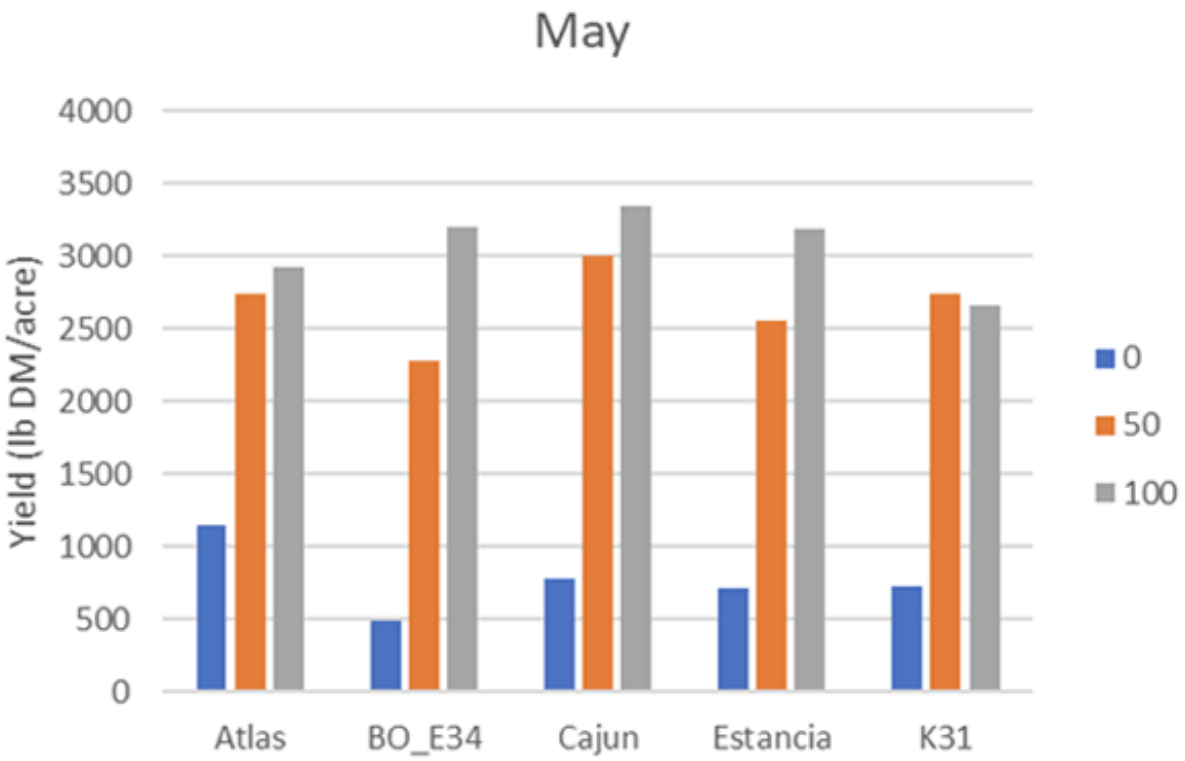
Varieties

Several new varieties are suitable for Kansas. New, certified varieties are either free of the endophyte fungus or contain the "friendly" nontoxic endophyte that does not produce the ergovaline toxin detrimental to livestock. Endophyte-free seed of older varieties like Kentucky-31 is also available. Check the seed tag to be sure of the endophyte level and type. To avoid reduced animal performance resulting from toxic endophyte-infected grass that is fed or grazed, livestock producers should plant the seed free of live toxic endophyte. Plants produced from fungus-free seed remain free of the endophyte. But as previously stated, productivity can be lower in varieties without the endophyte.

The Southeast Agricultural Research Center has tested tall fescue varieties. The table below is from "Evaluation of Tall Fescue Cultivars," in the SEARC's 2017 Agricultural Research report: http://newprairiepress.org/cgi/viewcontent.cgi?article=1376&context=kaesrr

More recently, in 2021, five fescue varieties were established in a comparison trial at the Southeast Research and Extension Center, Columbus location. Data from the 2023 season show the performance of the three types of fescues and the importance of proper N fertility programs (Figures 2a &2b). The yield drag of endophyte-free, novel, and traditional showed up more in the second cutting compared to the first. This can be year-dependent, especially when drought conditions occur. To read more about this trial, please go to https://newprairiepress.org/kaesrr/vol10/iss2/10/.

Overall, the addition of nitrogen increased biomass production in all varieties evaluated. Bar Optima had the greatest response to the additional nitrogen in regard to biomass production, though 50 units of N produced the lowest total yield. When biomass was measured in May, Cajun at both 50 and 100 units of nitrogen had the greatest yield, followed closely by yields with 100 units of nitrogen on Bar Optima and Estancia. Atlas and K-31 fescue varieties at both 50 and 100 units of nitrogen had similar biomass and had the lowest yields of the fertilized treatments.



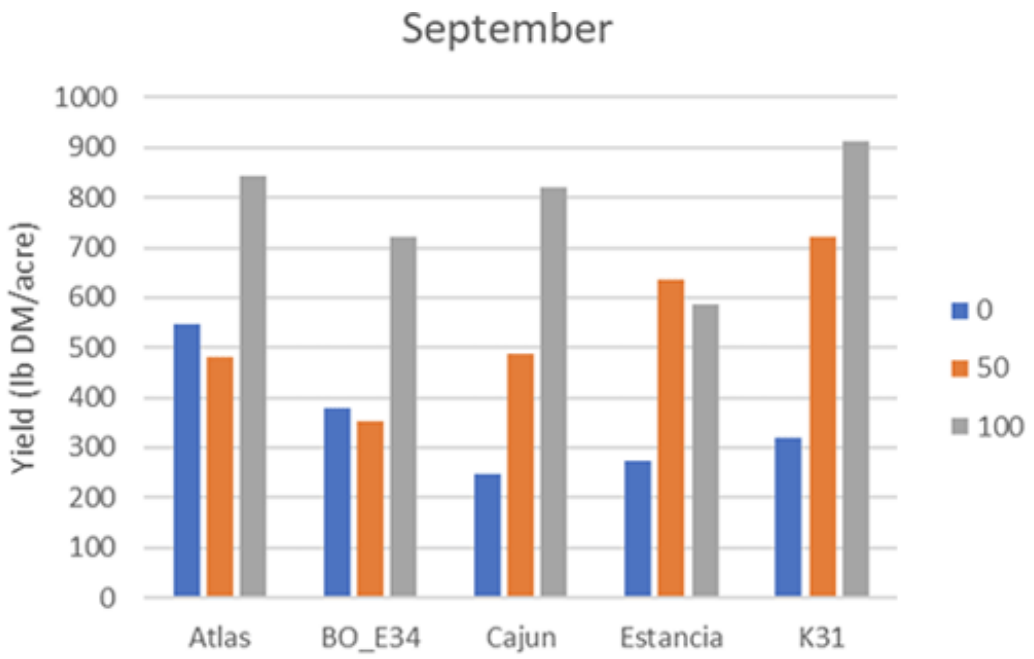


Figure 2a-b. Forage accumulation of five fescue varieties with two cutting dates: a) May and b) September in 2023 at three nitrogen rates (0, 50, and 100 lbs N/ac). Atlas is endophyte-free, BO_E34 (Bar Optima) is novel endophyte, Cajun is endophyte-free, Estancia is novel endophyte, and K31 is the old standard carrying endophyte and often produces ergot alkaloids.

Seedbed preparation

Tall fescue establishes best in a well-limed and fertilized seedbed that has been tilled 4 to 6 inches deep, leveled, and firmed before seeding. Several producers report successful stands by simply broadcasting or no-tilling the seed into existing overgrazed grass pastures in the fall. Even though the practice works on occasion, it is not recommended. A well-prepared seedbed improves chances of rapid stand establishment.

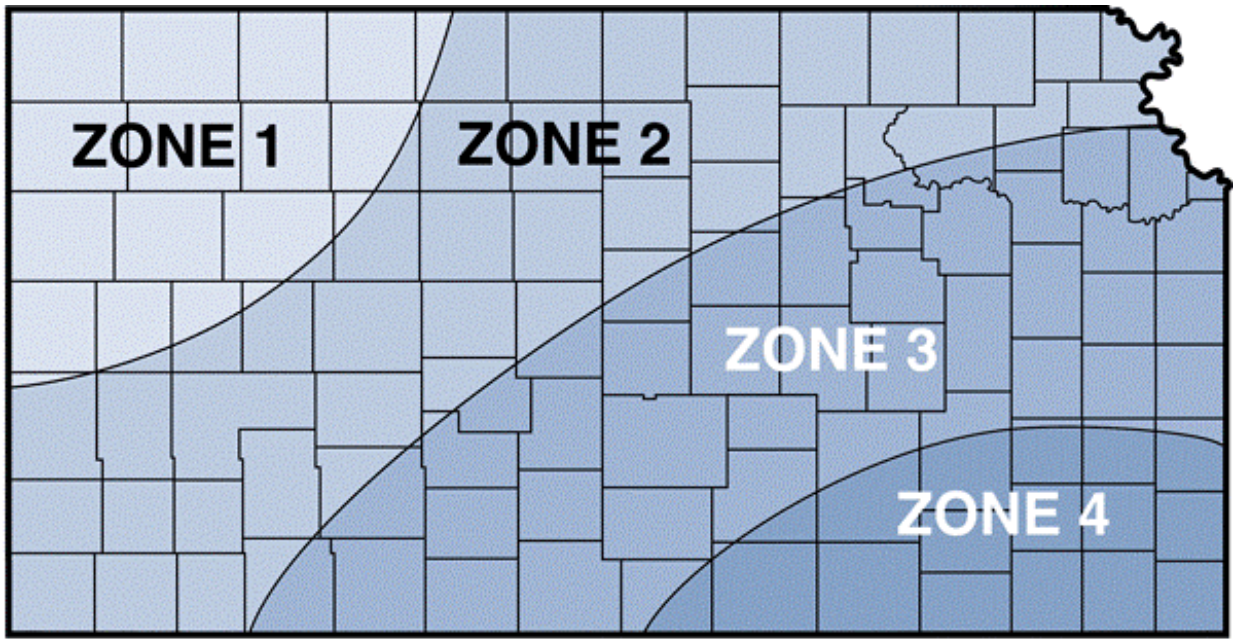
A soil test should be taken well ahead of planting to determine lime and fertilizer needs, and needed lime and phosphate should be incorporated into the seedbed before planting. About 30 - 40 pounds of N per acre should be applied at or before planting.

An existing tall fescue stand will tolerate pH as low as 5.0. On existing pastures with a pH less than 6.0, 2 tons of agricultural lime per acre, topdressed, will increase the life of the stand and the growth of legumes if present.

Stand establishment

The proper planting dates for each area in Kansas are shown in Figure 3. On droughty, claypan soils, only fall plantings are recommended because winter and spring plantings may not survive if summers become hot and dry. However, if a moist summer persists, seedlings may establish well. Deeper soils and/or good moisture supplies will result in successful winter or spring seedings. When planting in a well-prepared seedbed, 12 - 20 pounds per acre of pure live, high-germinating seed is

adequate. When seed germination is not known or the seedbed is less than desirable, a rate of 20 to 25 pounds per acre may be required for a satisfactory stand. For drilled seedings, use the lower end of that seeding rate range. For broadcast incorporation, use the higher end of the range. On average, tall fescue germinates in temperatures as low as 40°F.



Optimum Planting Dates for Cool-season Grasses

	Zone 1	Zone 2	Zone 3	Zone 4
Fall	Aug 10–Sept 10	Aug 15–Sept 15	Aug 20–Sept 20	Aug 15–Oct 1
Winter	Not recommended	Not recommended	Not recommended	Not recommended
Spring	Mar 1–Apr 1	Feb 15–Mar 15	Feb 15–Mar 15	Not recommended

Figure 3. Recommended planting dates for tall fescue for each area in Kansas. Map from K-State Research and Extension.

For best results, seed should be covered with 1⁄4 to 3⁄8 inch of soil. Seeding tall fescue with winter wheat or an annual ryegrass assists with soil cover and weed suppression.. The wheat seeding rate should not be much higher than 60 lb/acre. Planting a cover crop like wheat can protect the soil from erosion and furnish additional grazing or grain production income in the seeding year. If wheat is grazed, avoid grazing in fall or spring when new grass seedlings could be injured by trampling during wet weather.

Converting endophyte-infected pastures

Establishing a new tall fescue pasture on ground with an existing endophyte-infected pasture requires some special care. The endophyte fungus that infects many tall fescue pastures in Kansas will survive in the seed up to 14 months. For that reason, you should prevent seed production on established endophyte pasture for 14 months before renovating with fresh seed. Otherwise, infected seed from the previous tall fescue may emerge along with the newly planted seed.

You can kill existing endophyte-infected tall fescue by applying glyphosate at the rate of 0.75 to 1.5 lb ae/acre when new growth is about 4 inches tall. It is easier to control fescue in the fall than in the spring; however, excellent spring control can be achieved. After tall fescue has been killed, producers could grow an alternative crop for one year that will allow the use of herbicides to control any volunteer tall fescue that emerges.

After 14 months without seed production from the old tall fescue, replant the field with an endophyte-free variety or a nontoxic endophyte variety. There are several nontoxic endophyte varieties on the market, including MaxQ, DuraMax Gold, and BarOptima Plus E34, but new nontoxic endophytes are continually being developed, so be watchful for their release.

More information

For more information, see Tall Fescue Production and Utilization, K-State Research and Extension publication C729, at: http://www.ksre.ksu.edu/bookstore/pubs/c729.pdf.

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7. Spurge identification and control in forage systems

In the past few weeks, questions have come in about managing spurge species in pastures and hayfields, especially where stands were thinned by fall armyworm damage. Spurges don't compete well with healthy forage, so they usually aren't a problem, and chemical control isn't often needed. However, the sap is an irritant and can be toxic if ingested by animals. Thus, dense and/or large areas of infestation should be controlled. In Kansas, the three species most commonly seen are spotted spurge, prostrate spurge, and nodding spurge, with nodding spurge being the one most likely to show up in pastures and hayfields (Figures 1 and 2). The other two are more often found in lawns, gardens, or along sidewalks. This article will supplement information shared last week about general weed control and annual brome control in damaged cool-season grass pastures and hayfields.

Figure 1. Nodding spurge growing in a cool-season forage stand damaged by fall armyworms. Photo credit to Rod Schaub of Frontier District.

Figure 2. Close-up of nodding spurge growing in thinning, cool-season grass. Notice the more upright growth pattern. Photo credit to Rod Schaub of Frontier District.

Identification

All three plants are summer annuals that can germinate and emerge in a wide range of environments. Table 1 lists identifying characteristics of the three plants. Like others in the spurge family, such as toothed spurge and snow on the mountain, all three species exude milky sap when the stems are broken. Spotted and prostrate spurge are very similar and even considered to be one species by some scientists. Inconspicuous flowers are found at the base of leaves throughout the summer, and all three species are prolific seed producers. In suitable conditions (warm and wet), seeds that fall from the plant will germinate; in unsuitable conditions, seeds will remain dormant until next spring. Much like other weeds, it is important to control the seed bank and promote forage production with a good fertility program.

Table 1. Characteristics of spotted, prostrate, and nodding spurge.

	Spotted spurge	Prostrate spurge	Nodding spurge

Distribution	Throughout Kansas	Eastern Kansas	Throughout Kansas
Stems	Prostrate, pink, hairy, up to 20 inches long, does not root at nodes	Prostrate, pink, hairy, up to 20 inches long, roots at nodes	Green and red, up to 30 inches tall, hairs on upper nodes
Leaves	Opposite, egg-shaped to elliptic, with a red spot at the base, hairy, serrated margins, 1/8 to 2/3 in long	Opposite, egg-shaped, red spot at the base, hairy, margins may be serrated, 1/8 to 2/3 in long	Opposite, oblong, few hairs, margins irregularly toothed, 1 to 12/3 inches long
Flowers	Inconspicuous, at base of leaves in the upper stem, appear clustered	Inconspicuous, at base of leaves in the upper stem, single or in pairs	Inconspicuous, at base of leaves in the upper stem
Fruit/seeds	3 seeds contained in a three-lobed capsule	3 seeds contained in a three-lobed capsule	3 seeds contained in a three-lobed capsule

Management

During establishment, infestations can be reduced in fall seedings compared to spring, due to an environment that is not conducive to germination of the weed seeds. Mowing will not be effective, as these plants are adapted to low-growing environments.

Products that contain pendimethalin (Prowl H2O, others) can suppress the emergence of spurge species when applied before germination. Postemergence options include herbicide triclopyr (Remedy Ultra, others) and fluroxypyr (Vista, others), and imazapic (Plateau, others).

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8. Managing Phragmites in waterways, wetlands, and roadsides

Late summer is an excellent time for herbicide applications to control Phragmites, or common reed, which is a perennial plant that is increasing in Kansas waterways, wetlands, and roadsides.

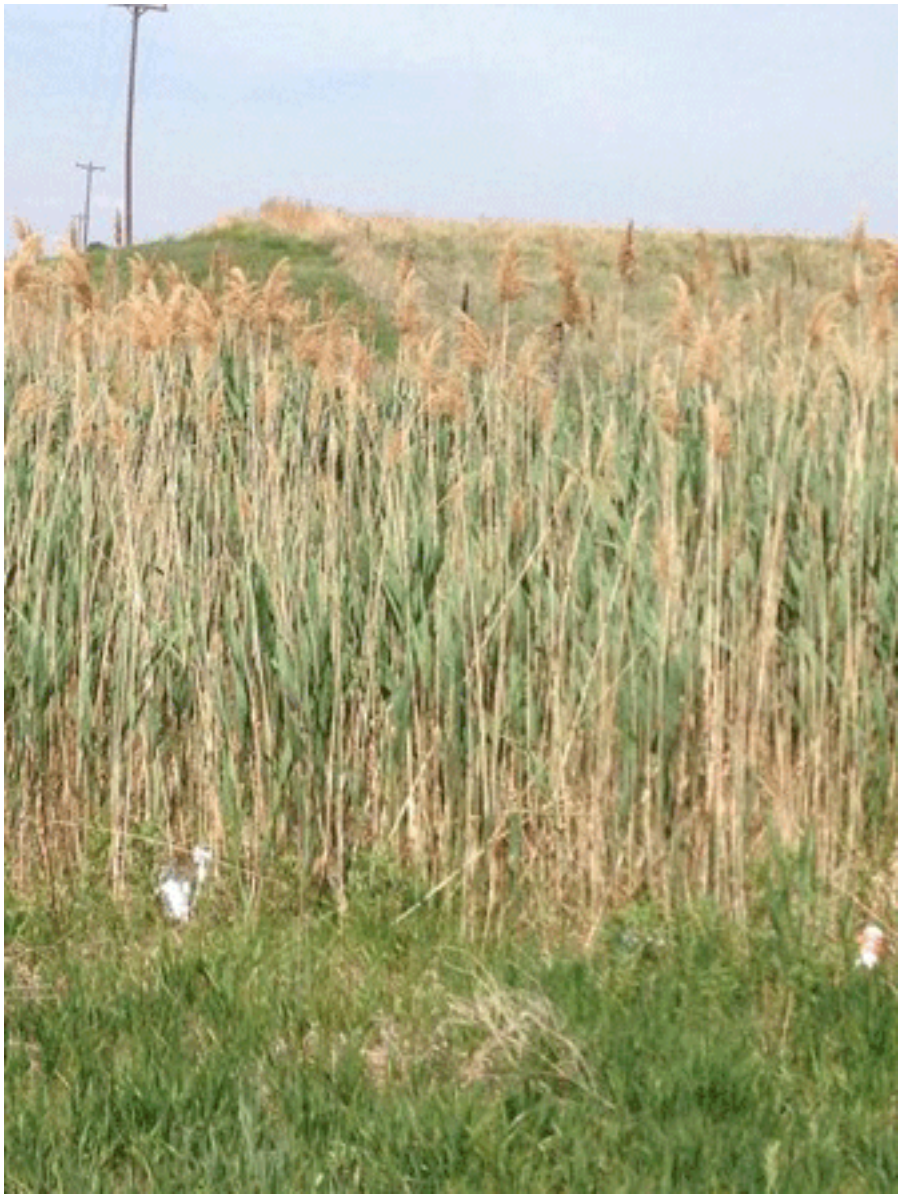

Figure 1. Dense stand of non-native Phragmites at the Kanopolis Recreation Area. Photo by Robert Buhler, Kansas Department of Agriculture.

There are actually two subspecies of Phragmites in Kansas: a non-invasive native species and an introduced species that is considered a noxious weed in Nebraska and Colorado, but not in Kansas. Some key characteristics that distinguish the non-native species are:

- Dense, monoculture stands with many standing dead stems. (Native stands have more plant

diversity and fewer dead stems.)
- Rough, green stems. (Native stems are smooth, glossy, and rose/red in the lower part of the plant.)
- Leaf retention after senescence. (Native leaves are easily removed and often dropped from stems.)

Figure 2. Phragmites seed heads: native (left) and non-native (right). Photo from Great Lakes Phragmites Collaborative.

If you have identified non-native Phragmites in your area, you can report the location to EDD MapS (Early Detection and Distribution Mapping System).

Management options

We currently lack data from Kansas regarding Phragmites control, but recommendations from the Great Lakes Phragmites Collaborative include nonchemical options such as:

- **Mechanical removal** to allow better site access for herbicide applications. This can be done with large or small equipment, depending on the size of the stand. Removal is most beneficial before seed heads are produced and is often done before plants break dormancy in the spring.
- **Prescribed fire** to increase the effectiveness of future herbicide treatments. This is most effective during the winter when the plants are dormant.
- **Cutting stems** so the entire plant is below the waterline to 'drown' the plants. This can be effective when done during phases of active growth in spring/early summer, or once the

plant begins to translocate carbohydrates to the rhizomes in late summer/fall. Cut plants should be removed from the site.
- **Manual removal** below the soil surface. This requires the removal of the shoots below ground. Cutting the stems above the soil surface may stimulate growth.

Herbicides are generally the most effective means of controlling Phragmites. The best time for application is after the plant stops using energy to produce seeds and begins to prepare to overwinter by translocating carbohydrates to the rhizomes (summer/fall).

Because Phragmites is a perennial plant, multiple applications will likely be needed to completely kill the rhizomes, especially in large, well-established stands. Herbicide and surfactant options are often limited due to the need for an aquatic application label. The two products most commonly used are glyphosate (Rodeo, others) and imazapyr (Arsenal, others). Suggested rates and other information are provided in Table 1.

Table 1. Suggested rates and timing for commonly used herbicides to control Phragmites.

Chemical name	Trade name	Best timing	Rate (aerial application)	Rate (low-volume backpack application)
Glyphosate	Rodeo	After full bloom and before first killing frost	4 to 6 pints per acre + NIS	0.75 to 2% solution + NIS
Imazapyr	Arsenal	After full leaf elongation and before first killing frost	4 to 6 pints per acre + NIS	1 to 1.5% solution + NIS
Glyphosate + Imazapyr	--	After full bloom and before first killing frost	3 pints + 3 pints + NIS	0.75% + 0.75% solution + NIS
Imazamox	Clearcast	After full leaf elongation and before first killing frost	4 pints per acre + NIS	1 to 2% solution + NIS

Aquatic applications often lend themselves to aerial applications, typically by helicopter or drone, provided the herbicide label allows for aerial application. When applying glyphosate or imazapyr for control of Phragmites, care should be taken to avoid off-target movement and injury to desired species and follow the setback distance to water intakes.

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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9. Updates and considerations for crop insurance decisions due September 30

Several changes to the federal crop insurance program in the One Big Beautiful Bill Act (OBBBA) affect decisions due by September 30. For wheat and other fall-planted small grains, September 30 is the sales-closing date. The new Margin Coverage Option (MCO) is also available to Kansas corn and soybean producers for the 2026 crop year, with the same September 30 sales-closing date. Below are key considerations for 2026.

Wheat prices. The 2025 projected price was **$5.90/bu**. If the 2026 price-discovery period ended today (September 9), the projected price would be about **$5.62/bu**. With fertilizer costs still rising and many 2025 crop budgets showing tight or negative margins, profit margins are likely to remain tight in 2026.

Premium changes for individual policies. Premium subsidies for Revenue Protection (RP), Yield Protection (YP), and related plans increased under OBBBA. For many coverage levels under all three unit structures choices (basic, optional, enterprise), producer-paid premiums decline by about **$1 per acre**, though actual changes will vary by county, practice, yield levels, and coverage selection.

Changes to the Supplemental Coverage Option (SCO). The SCO premium subsidy rate increases from **65% to 80%**, lowering producer costs. For 2026, SCO remains available at the **86%** coverage level; in subsequent years, it moves to **90%**. Taken together, these changes are expected to substantially increase expected net indemnities (SCO payments minus the producer-paid premium).

Changes to other high-coverage policies. The Enhanced Coverage Option (ECO), Margin Coverage Option (MCO), and other area-based policies now carry an **80% premium subsidy**. Producer costs fall, and similar to SCO, expected net indemnities likely rise; impacts will vary by crop, county, and coverage choices.

Increased benefits for beginning farmers. Eligibility now extends to producers with fewer than **10 crop years**, and benefits last up to **10 years**. In addition to the existing **+10 percentage points** premium subsidy, BFRs get **+5 points in years 1–2, +3 in year 3, and +1 in year 4**.

Introduction of MCO (corn and soybeans). MCO uses the Margin Protection framework but is structured to operate like ECO and SCO. It triggers on a county-level gross margin—revenue (futures price × county yield) minus selected input-cost indexes—yet, in practice, payouts will likely most often driven by price and/or yield declines. A key feature is earlier price discovery (mid-August to mid-September instead of February), which may appeal to producers who (1) expect lower February prices, (2) want to diversify the timing of price-risk management, and (3) prefer to lock in coverage before fall marketing, input purchases, and operating-loan decisions. MCO is not a hedge: it has a deductible, and falling input costs or stronger-than-expected yields can reduce or eliminate payments even when prices fall.

Tradeoffs for SCO and other high-coverage policies. Producers may opt for SCO/ECO/MCO because they offer (1) greater risk protection, (2) high premium subsidies, and (3) better cost-effectiveness than 80–85% RP. Despite the improved value, the usual tradeoffs remain:

1. **County trigger:** payouts may not match farm-level losses.
2. **Total cost:** premiums still increase versus buying only 70–75% RP, even with subsidies.

3. **Timing:** indemnities are typically paid around June following the crop year (e.g., June 2026 for 2025).
4. **Frequency:** even with high coverage, several years can pass with no payout.

Unit structure. Optional units (OU) cost more but can pay on losses for individual fields. Enterprise units (EU) cost less but trigger on whole-farm losses. Producers use OU because (1) they want field-level protection, (2) the added cost still pencils out versus EU, or (3) tradition. With higher subsidies and tight margins, it's worth confirming that your unit choice matches your risk goals. In some cases, a higher coverage level with EU (e.g., 80%) can provide protection comparable to, or better than, lower-coverage OU (e.g., 70%) at a lower total premium.

References and Resources

- RMA Summary of OBBBA changes: https://www.rma.usda.gov/policy-procedure/bulletins-memos/managers-bulletin/mgr-25-006-one-big-beautiful-bill-act-amendment
- MCO Fact Sheet: https://www.rma.usda.gov/sites/default/files/2025-05/Margin-Coverage-Option-Fact-Sheet_0.pdf
- SCO Expected Net Indemnity Maps: https://agmanager.info/crop-insurance/crop-insurance-papers-and-information/sco-expected-net-indemnity-payments-map
- Kansas Yield Correlation (compares operation yields to county yields): https://agmanager.info/crop-insurance/crop-insurance-papers-and-information/kansas-yield-correlation-tool
- Risk and Profit Conference 2025 Agricultural Policy Update: https://agmanager.info/events/risk-and-profit-conference/previous-conference-proceedings/2025-risk-and-profit-conference/1

This article is also available on AgManager at https://www.agmanager.info/crop-insurance/crop-insurance-papers-and-information/updates-and-considerations-crop-insurance

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10. Seasonal decline in Kansas temperatures: Transitioning into Fall 2025

Meteorological summer came to an end on August 31. We are now entering the second week of meteorological fall, and so far, temperatures have been reminiscent of autumn. Below normal temperatures have been the rule as of late. September 8 was the 17th consecutive day of below-normal temperatures, based on the average daily temperature across the Kansas Mesonet. You may be surprised to learn that this is the longest such run since a 25-day run in February and March of 2019, about six and a half years ago! This string is partly responsible for pulling August's average temperature down, which in turn pulled summer's average temperature down as well. The official monthly average temperature for August was released by the National Centers for Environmental Information on September 9. The average of 75.9°F was 1.2° below normal and ranked as the 40th coldest August in 131 years of record keeping. Combined with June and July's average temperatures, meteorological summer finished 0.1° below normal. The summer of 2024, by comparison, finished 0.9° above normal.

Are we completely done with the heat? We may not be quite through with 90-degree temperatures (more on that later), but the likelihood of temperatures that warm is decreasing daily. Average daily highs and lows have already begun their annual retreat from their summertime peaks. For example, Goodland's hottest average daily high is 91°, which is the average high from July 9 through 25. As of today, September 11, the average high is down to 82° and, in less than three weeks, the average high on the last day of September will be just 74°. The descent into cooler readings is slow at first but increases more rapidly in autumn. Let's take a closer look at the timeline for the annual arrival of cooler days and nights, and when during fall that average highs and lows reach various thresholds.

We are in the opening act of Mother Nature's magic show, where summertime warmth vanishes into thin air. On September 1 (the first day of meteorological fall), average high temperatures across the state ranged from 84° in the northeast to 88° in the southwest and south central Kansas. Highs in the 90s are common in early September. By the end of September, average highs are in the mid and upper 70s statewide. During October, daily averages fall more rapidly; the rate of decrease is nearly half a degree per day. By Halloween, highs are normally in the low to mid 60s. By Thanksgiving, daytime highs average only in the low 50s. Table 1 lists the average dates each of Kansas' nine climate divisions reaches thresholds starting at 85° and decreasing by five degrees down to 50°.

Table 1. Dates when divisional average daily high temperatures fall to the thresholds listed at the top and bottom of each column.

Division	85 °F	80 °F	75 °F	70 °F	65 °F	60 °F	55 °F	50 °F
Northwest	Sep 5	Sep 19	Sep 30	Oct 11	Oct 22	Nov 2	Nov 13	Nov 24
North Central	Sep 4	Sep 19	Oct 1	Oct 12	Oct 23	Nov 2	Nov 13	Nov 23
Northeast	Aug 29	Sep 15	Sep 29	Oct 11	Oct 22	Nov 2	Nov 12	Nov 23
West Central	Sep 6	Sep 21	Oct 2	Oct 13	Oct 24	Nov 4	Nov 15	Nov 27
Central	Sep 8	Sep 22	Oct 4	Oct 15	Oct 26	Nov 6	Nov 17	Nov 27
East Central	Sep 1	Sep 16	Sep 30	Oct 12	Oct 24	Nov 4	Nov 15	Nov 26
Southwest	Sep 13	Sep 26	Oct 8	Oct 19	Oct 30	Nov 10	Nov 21	Dec 3
South Central	Sep 11	Sep 24	Oct 6	Oct 18	Oct 29	Nov 9	Nov 20	Dec 1
Southeast	Sep 6	Sep 21	Oct 4	Oct 17	Oct 29	Nov 9	Nov 20	Dec 2

Table 2 lists average dates for low temperatures at thresholds ranging from 65° down to 30°. On September 1, averages range from 57° in northwest to 64° in southeast Kansas. These lows are 5 to 7 degrees lower than their mid-summer peak values. Cooler nights are the rule by month's end, as average lows on September 30 range from the mid-40s to the low-50s across the state. Like high temperatures, low temperatures during October drop nearly half a degree each day. Concerns over a killing freeze are on the minds of everyone with agricultural interests by mid-month. By Halloween, the poetic sight of "frost on the pumpkin" has often become reality, as lows on October 31 average near freezing in northwest and west central Kansas and are in the 30s everywhere but southeast Kansas, where the average low is still 40°. Nights grow ever longer in November, and low temperatures continue to cool. By November 22, average lows are at or below freezing in every division in the state, and normal lows range from 21 to 29 degrees by month's end.

Table 2. Dates when divisional average daily low temperatures fall to the thresholds listed at the top and bottom of each column. * indicates a division where the low temperature never averages above the threshold value during the year.

Division	65 °F	60 °F	55 °F	50 °F	45 °F	40 °F	35 °F	30 °F
Northwest	*	Aug 22	Sep 7	Sep 19	Sep 30	Oct 10	Oct 22	Nov 3
North Central	Aug 12	Sep 1	Sep 15	Sep 27	Oct 8	Oct 19	Oct 30	Nov 11
Northeast	Aug 18	Sep 5	Sep 18	Sep 30	Oct 12	Oct 24	Nov 5	Nov 19
West Central	*	Aug 24	Sep 9	Sep 21	Oct 2	Oct 12	Oct 23	Nov 5
Central	Aug 18	Sep 6	Sep 19	Sep 30	Oct 11	Oct 22	Nov 3	Nov 16
East Central	Aug 23	Sep 8	Sep 21	Oct 3	Oct 15	Oct 28	Nov 10	Nov 23
Southwest	Aug 6	Aug 31	Sep 15	Sep 26	Oct 7	Oct 17	Oct 29	Nov 11
South Central	Aug 24	Sep 10	Sep 22	Oct 4	Oct 15	Oct 26	Nov 8	Nov 21
Southeast	Aug 27	Sep 12	Sep 24	Oct 6	Oct 18	Oct 31	Nov 13	Nov 28

What will fall 2025 hold for Kansas?

In the short term, the 8 to 14-day outlook from the Climate Prediction Center (Figure 1) favors above-normal temperatures. Since average highs are dropping, above normal may mean more 80s than 90s, but 90-degree readings are not unusual this time of year. For Manhattan, the average date of the last 90-degree day is September 28. Highs over 100 degrees have happened on occasion as late as October. It hit 101° in Dodge City on October 17, 2016, and Wallace topped out at 102° last October 5th.

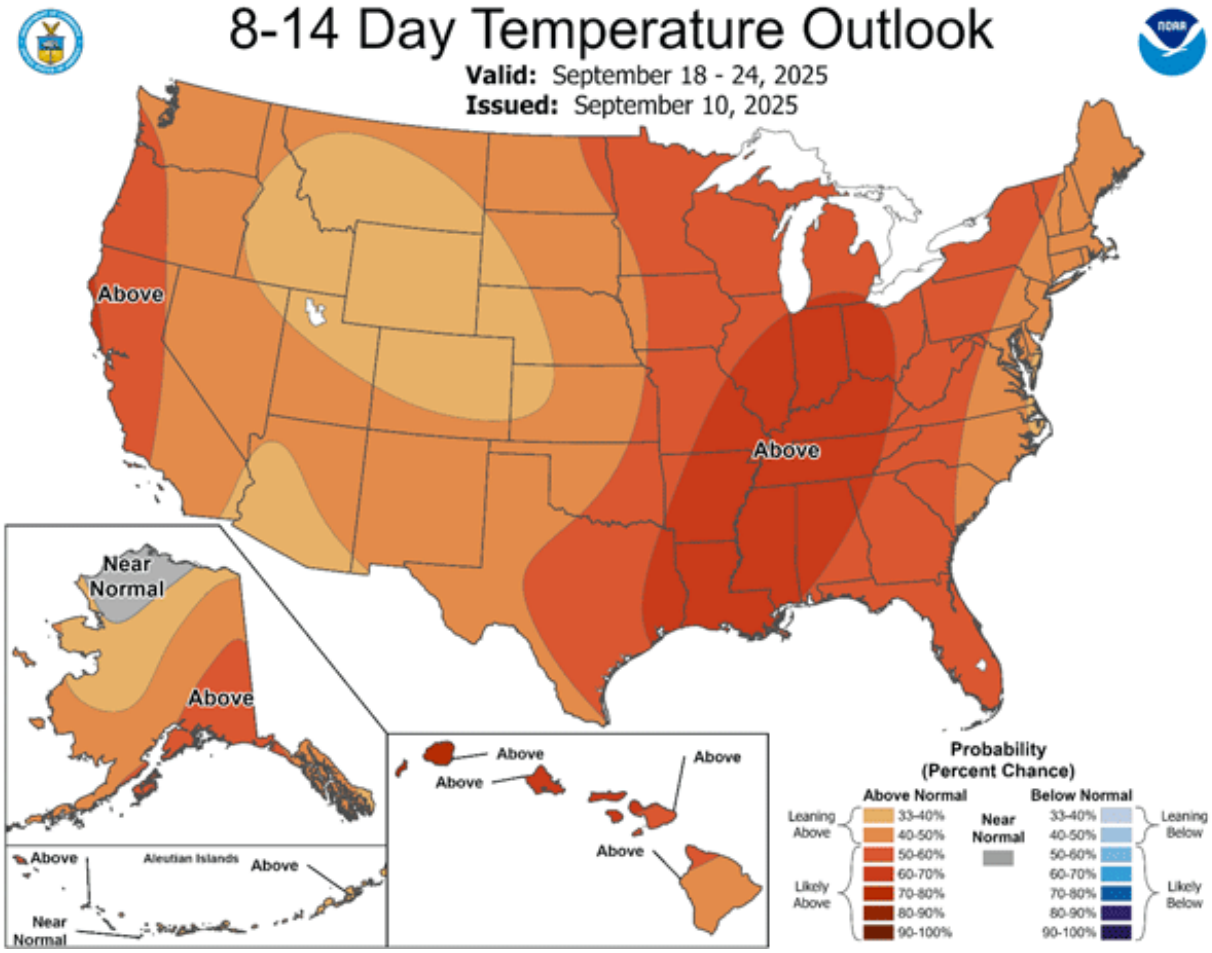

Figure 1. The Climate Prediction Center's 8 to 14-day temperature forecast, valid for the period September 18-24, 2025.

Does an above-normal forecast like this suggest Kansas' first frost and freeze will be delayed? Not necessarily. It only takes one chilly airmass to bring a killing freeze. Medium-range forecasts don't contain any information regarding the probability of an early-season, singular, short-lived cold-air outbreak; these are impossible to accurately predict well in advance. In October, keep an eye on the 6-to-10 and 8-to-14-day outlooks. Watch for higher probabilities of cooler-than-normal temperatures, as these can suggest a threat for frost and freezing conditions.

The Kansas Mesonet (https://mesonet.k-state.edu) is a great resource to track temperature data. When you visit, you'll find a Freeze Monitor page with information regarding the number of hours each Mesonet site has spent below freezing and sub-freezing thresholds. Fortunately, we have a few more weeks to prepare for the arrival of freezing conditions, but the journey towards frosty mornings has begun; we're already headed for colder temperatures as the normal highs and lows drop a little bit each day.

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11. Join us for the 2025 Cotton Field Day - September 30

Producers are invited to attend the 2025 Cotton Field Day on **Tuesday, September 30, from 5:00 to 7:30 p.m.** This evening event will begin at the field location (see flyer QR code and map below) and then move to the farm location.

The program will feature local data, demonstrations, and expert discussions on timely cotton production topics, including:

- Precision fertilizer placement with ExactShot
- Targeted weed control and crop response with See & Spray technology
- Southern Kansas gin report
- Preparing your cotton stripper for harvest

This field day is brought to you by PrairieLand Partners, K-State Department of Agronomy, and supporting partners. Dinner will be provided, and an RSVP is requested.

RSVP online at: PrairieLandPartners.com/RSVP

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PRAIRIELAND PARTNERS

JOIN US FOR OUR 2025 COTTON FIELD DAY

AGRONOMY
Kansas State University

Starting at the Field location below and moving to the Farm location afterwards. We'll dive into key topics and you'll see real, local data firsthand. Don't miss this chance to gain valuable insights, network with fellow growers, and get your questions answered!

SEPTEMBER 30TH
5:00 PM - 7:30 PM

Please RSVP as Dinner will be provided
PrairieLandPartners.com/RSVP

SCAN FOR COTTON FIELD LOCATION
WE WILL START IN THE FIELD AT 5:00PM

SCAN FOR FARM LOCATION

Topics that will be covered during the field day include:

- Precision Fertilizer placement / ExactShot
- Putting Weeds in the Crosshairs / Weed control & Crop response with See & Spray
- Southern Kansas Gin Report
- Is your Cotton Stripper ready for harvest

RSVP SAVE YOUR SEAT - RSVP ONLINE AT *PrairieLandPartners.com/RSVP*

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SCAN FOR COTTON FIELD LOCATION

WE WILL START IN THE FIELD AT 5:00PM

SCAN FOR FARM LOCATION

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