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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. 2025 wheat harvest progress: Potential impacts of pre-harvest rainfall

The 2025 wheat harvest is off to a slow start in Kansas. According to the latest USDA report, as of June 23, about 20% of the Kansas wheat crop had been harvested, as compared to 49% in the previous year and to the 31% five-year average.

There are two main reasons for the slow progress of the Kansas wheat harvest this year. First, the wheat harvest started later than normal. It is not uncommon for parts of south central-southwest Kansas to start harvesting in the last few days of May or early June. Still, this year, harvest didn't start until the second week of June. The reason for a later start to the wheat harvest this year was the cool and moist weather conditions during the month of May and early June, which slowed down crop development and prolonged the grain-filling period and crop cycle. Also contributing to the slow progress, many rainfall events across the state have slowed down the crop harvest since its start. Depending on the region within Kansas, the total rainfall accumulated in the last 14 days ranged from nearly null in west-central Kansas to as much as 8 inches in McPherson and Rice counties (Figure 1).

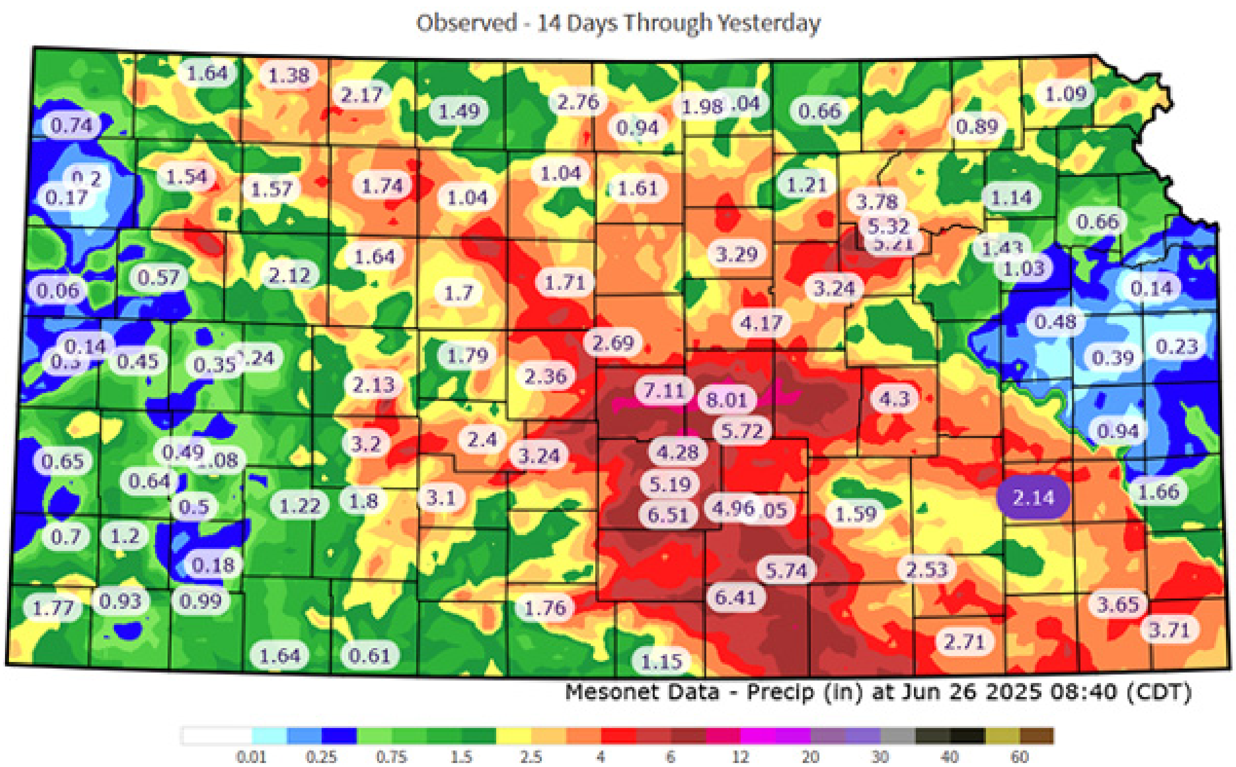

Figure 1. Cumulative rainfall during the 14-day period from June 12 to June 26, 2025, across Kansas. Source: mesonet.ksu.edu/precip/daily

These heavy rainfall conditions can have many consequences for the yield and quality of the wheat crop, especially since these storms were accompanied by very windy conditions. Some of these potential consequences include:

Yield reduction

- **Waterlogging:** Waterlogging has been a common theme in Kansas wheat in the last few days, in particular in parts of south-central Kansas that received large precipitation amounts **(** Figure 2**).** Waterlogged soils are depleted of oxygen in the root zone and can affect physiological processes in the crop, very detrimental to wheat that is still going through the grain filling period. While wheat can handle a couple of days of flooding, prolonged exposure to these anaerobic conditions can lead to crop damage. Some earlier waterlogging (during grain filling) occurred in parts of the state this year, in particular central Kansas (Salina region) and parts of western Kansas (Dighton region). Late-season waterlogging, such as the one caused by these recent storms during the last couple of weeks, has precluded growers from entering the field to progress on wheat harvest due to extremely wet soils and can lead to a greater incidence of saprophytic fungi.

Figure 2. Wheat field ready to harvest, however, with standing water due to recent rains near Hutchinson, Kansas. Photo by Luiz Pradella, K-State doctoral student, taken on June 24, 2025.

- **Lodging:** As we covered in detail in the last edition of the Agronomy eUpdate, these recent rainfall events resulted in lodged wheat across much of the state (https://bit.ly/45y0y8J). The earlier lodging occurs in the wheat cycle, the more likely it is to cause yield loss. This is because, among many reasons, it can disrupt the translocation of synthesized sugars to the developing grain and create a microclimate that can lead to greater severity of diseases. This is not the case for this year's crop, since lodging occurred later in the season when the grain was either already mature or very close to it. Still, late-season lodging can reduce grain yield by creating difficulties in harvesting the crop, as outlined in our previous article.

- **Grain shattering:** During the 2025 wheat season, the cool and moist grain fill conditions led to large and heavy kernels, and some varieties were showing opened glumes prior to harvest **(**Figure 3, left panel**)**, which makes the grain more prone to shattering. Wetting a mature wheat head leads to swollen grains (see Grain quality reduction section below), which may further open and weaken the glumes and make grain shattering more likely. Thus, these conditions were worsened by the heavy rains after the crop matured, and when combined with high winds, led to grain shattering across many wheat fields (Figure 3, right panel). How tightly the glume holds to the seed during grain dry down is referred to as glume tenacity, and varieties show different levels of tenacity. Once conditions for harvest resume, growers should prioritize harvesting of fields of varieties with known low glume tenacity (for example, varieties that are known to shatter more easily such as WB Grainfield and LCS Valiant) as compared to varieties of high glume tenacity (for example, SY Wolverine) since they will be more prone to grain shattering.

Figure 3. Open wheat glumes prior to maturity (left panel; photo by north-central Kansas farmer Neil Beckemeyer, on June 10, 2025), and shattered wheat grain as the mature crop endures windy storms (right panel; photo by master's student Jazmin Gastaldi on June 26, 2025, near Hays, Kansas).

- **Weed incidence:** Late-season moisture combined with high temperatures favors greater weed incidence, especially since at this time the wheat crop is not taking up more water and therefore the available water can be fully used by the developing weeds. While weeds at this time do not cause direct yield loss due to competition for resources, they can cause harvest problems (for example, higher grain moisture, machinery clogging, etc.) and lead to higher impurities and dockage at grain delivery. In dense wheat canopies, shading may be enough to delay weed emergence and development until harvest is completed. However, weeds can become really problematic in thinner wheat canopies, such as those of fields impacted by wheat streak mosaic virus this season (Figure 4).

Depending on weed incidence, a pre-harvest herbicide application may be warranted to reduce the chances of problems during wheat harvest. See the accompanying eUpdate article about pre-harvest herbicide options and intervals.

Figure 4. Developing weeds in a thin canopy of a mature wheat crop. The thin canopy was partially due to the high incidence and severity of wheat streak mosaic virus. Photo by Luiz Pradella, doctoral student, taken June 19, 2025, near Russell, Kansas.

Quality reduction

- **Decreased test weight:** Rewetting of a ripe wheat grain prior to harvesting reduces test weight due to two main reasons.
    - First, in a ripe wheat kernel, starch granules are densely packed together. Once these

grains receive moisture, the starch granules absorb water and thus they swell (increase in volume). Upon drying again, these molecules lose water and reduce in volume, but they never become as compact as they were initially. This means that the kernel, which originally had a given weight in a given volume, now has the same weight, but in a greater volume. In other words, grains now have a lower density. Since test weight, measured in pounds per bushel, is the grain volume weight, it is decreased with pre-harvest rainfall events.

  - Second, rewetting of the grain can reduce test weight through initiation of the germination process. This occurs when some of the starch starts to be digested, leaving small voids in the grain that reduce density. This year, some of the initial reports from growers and cooperatives were that the grain test weight was initially good (60-62 pounds per bushel); however, we started hearing reports of test weights as low as 57-58 pounds per bushel after some of these initial rains. Of course, different wheat varieties have different tendencies for test weight, some being above average and others naturally below average. But the message is that more pre-harvest rains could further reduce grain test weight.

- **Pre-harvest sprouting:** Pre-harvest sprouting is the germination of the grain while still within the head. For wheat seed to germinate, water must penetrate the seed coat and move into the seed, which is facilitated by multiple wetting and drying cycles. Recently mature wheat seeds are usually dormant, but the length of this dormancy period depends on the wheat variety, and the right conditions can initiate dormancy break. Periods such as the last two weeks, characterized by multiple rainfall events, high humidity, and high temperatures, increase the likelihood of dormancy break and consequent pre-harvest sprouting, especially when combined with the lack of genetic dormancy.

  In extreme cases, it is possible to see developing roots and shoots of wheat while still in the head. However, even without visible sprouting symptoms, pre-harvest sprouting can lead to problems due to reduced test weight, leading to potential discounts at the elevator. The activity level of the alpha-amylase enzyme, responsible for breaking down starch during grain germination, can be indicated by the falling number metric, with lower falling numbers indicating more enzyme activity / more pre-harvest sprouting.

  Wheat varieties with white seed-coat color tend to be more prone to pre-harvest sprouting than those with red seed-coat color, since the genes that control pre-harvest sprouting are associated with the genes for seed coat color. Thus, once conditions for harvesting are favorable again, growers should prioritize the harvest of white wheat fields since these would, in general, be more prone to pre-harvest sprouting than red wheat varieties.

- **Opportunistic fungi and mycotoxin accumulation:** Delays in harvest of a mature wheat crop can also lead to the growth of mold and other opportunistic fungi, leading to black point. Additionally, vomitoxin levels can increase in fields with high levels of Fusarium head blight. These issues were covered in detail in an article in the last edition of the Agronomy eUpdate (https://bit.ly/4na5rv2).

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2. Consider the value of soil residue before baling or burning wheat stubble

Following wheat harvest, some producers might think about baling or burning their wheat stubble. Producers may consider burning for several reasons: as a management practice to control plant diseases or weeds, to improve the seedbed for the subsequent crop, and possibly for other reasons. While burning is inexpensive and baling provides additional income, producers should understand the true value of leaving crop residue in the field. Some of the information below comes from K-State Extension publication MF-2604, *The Value of Crop Residue*.

There are four main factors to consider:

Loss of nutrients

The products of burned wheat stubble are gases and ash. Nutrients such as nitrogen (N) and sulfur (S) are largely combustion products, while phosphorus (P) and potassium (K) remain in the ash. When residue is burned, about one-third to one-half of the N and S will combust. The nutrients in the ash may remain for use by the plants if it doesn't blow or wash away first (more on that below). Therefore, instead of cycling these important plant nutrients back into the soil, they can essentially become air pollutants when the residue is burned. With the rise in price for nitrogen fertilizers, the amount of crop residue N that could be plant available in the future is worth more than in years past.

Table 1. Amounts of nutrients remaining in wheat stubble when assuming 50 bu/acre yield.

Nutrient	Pounds present in 5,000 lbs of wheat straw
N	27.0
P_2O_5	7.5
K_2O	37.5
S	5.0

Protection from soil erosion

Bare soil is subject to wind and water erosion. Without residue, the soil will receive the full impact of raindrops, thus increasing the amount of soil particles that may become detached during a rainfall event. Bare, tilled soils can lose up to 30 tons per acre of topsoil annually. In no-till or CRP systems where residue is left, annual soil losses are often less than 1 ton per acre. The detachment of soil particles can lead to crusting of the soil surface, contributing to greater amounts of sediment-laden runoff and, thus, reduced water infiltration and drier soils.

Leaving residue on the field also increases surface roughness, decreasing the risk of wind and water erosion. Most agricultural soils in Kansas have a "T" value, or tolerable amount of soil loss, of between 4 and 5 tons per acre per year, which is about equal to the thickness of a dime. To prevent water erosion, 30% ground cover or greater may be needed to reduce water erosion to "T" or less, especially in fields without erosion-control structures such as terraces.

Standing stubble is more effective at preventing wind erosion than flat stubble. Occasionally, accidental residue burns have resulted in devastating wind erosion events that happen repeatedly until a new ground cover is established (Figure 1). Once a field begins to erode from the wind, it is extremely difficult to stop. During extended drought, the soil profile gets dried out, and not even emergency tillage is effective at stopping wind erosion. Losing topsoil degrades soil productivity, and the long-term effect of this loss is not easy to quantify.

Figure 1. Sand-blasted soybean seedlings observed on 6-25-2025 in central Kansas. High wind speeds over the previous weekend on this extremely sandy and low-residue field led to extreme seedling damage. A similar thing could happen in double-cropped soybean fields after wheat.

Figure 2 shows research results from six locations in western Kansas. In this experiment, crop residue was removed at different levels by cutting it at different heights. For example, if the residue was 10″ after it was combined, it would be cut to 5″ and removed from the plot, which would equal 50% removal. The wind erodible fraction is the part of the soil less than 0.84 mm in size.

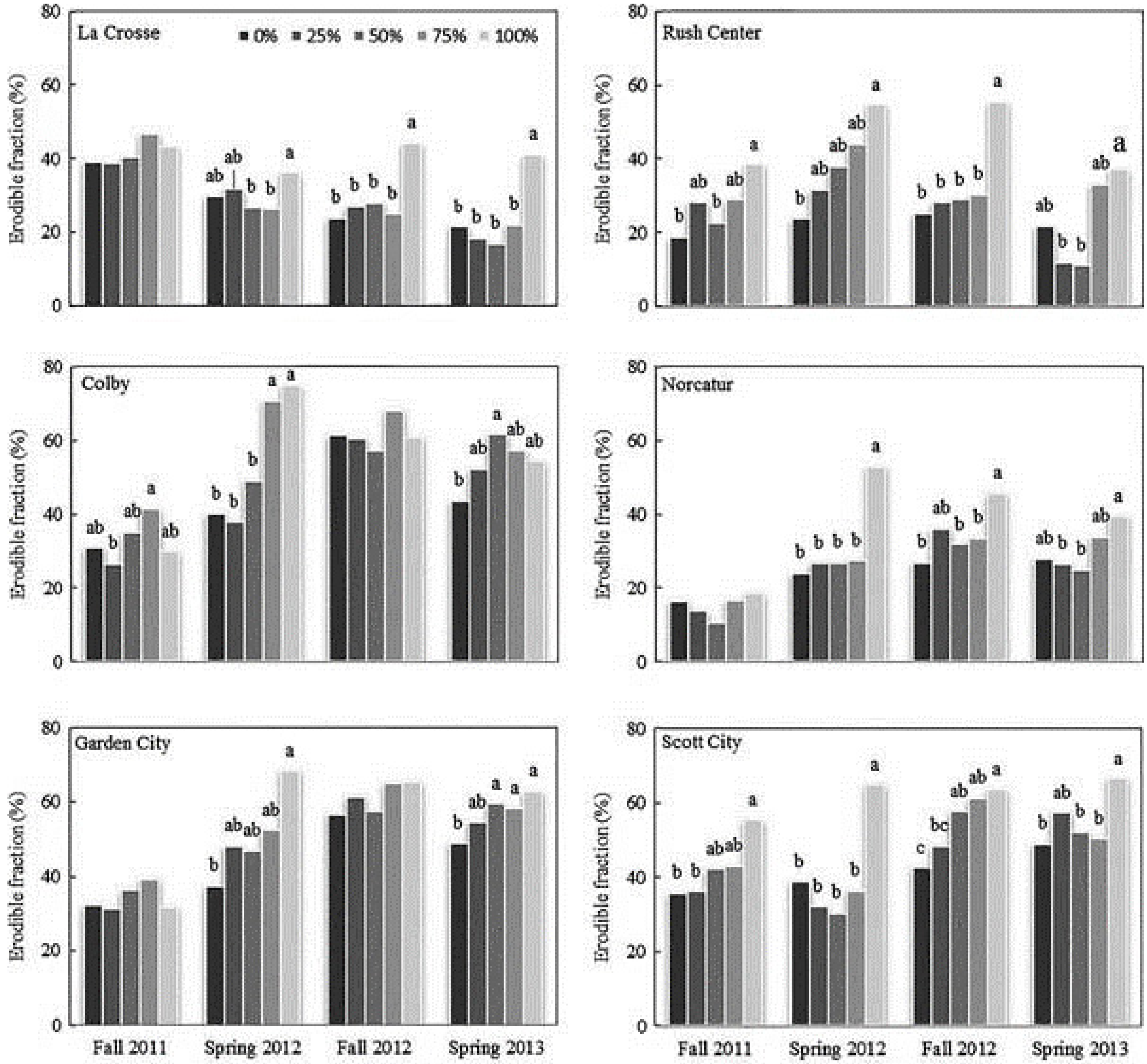

Figure 2. Effects of crop residue removal on the wind erodible fraction of soil, defined as <0.84 mm. Values on the x-axis (different shadings of the bars) refer to the percent residue removed. For example, 0% means no residue was removed, while 100% means all residue was removed. Lowercase letters indicate treatment differences at p<0.05. From: He et al., 2017, available at: https://doi.org/10.1111/gcbb.12483

Soil moisture, infiltration rates, and conservation

Wheat residue enhances soil moisture by increasing rainfall infiltration into the soil and by reducing evaporation. Residues physically protect the soil surface and keep it receptive to water movement into and through the soil surface. Without physical protection, water and soil will run off the surface more quickly.

Ponded infiltration rates were measured at Hesston in September 2007. Very low infiltration rates (1.9 mm/hour) were observed for continuous winter wheat in which the residue was burned each year before disking and planting the following crop. In contrast, high infiltration rates (13.3 mm/hour) were observed for a no-till wheat/grain sorghum rotation (Presley, unpublished data).

Another way residue increases soil moisture is by reducing evaporation rates. Residue blocks solar radiation from the sun and cools the soil surface by several degrees in the summer. Evaporation rates can decline dramatically when the soil is protected with residue. Research from dryland experiments has shown that crop residues are worth 2 to 4 inches of water annually in the central Great Plains states (*Efficient crop water use in Kansas*, MF3066).

Soil quality concerns

Over time, the continued burning of cropland could significantly degrade soil organic matter levels. By continually burning residue, soil organic matter is not allowed to rebuild. Soil organic matter is beneficial for plant growth as it contributes to water-holding capacity and cation exchange capacity. Soil organic matter binds soil particles into aggregates, which increases porosity and soil structure and thus, increases water infiltration and decreases the potential for soil erosion. One burn, however, will not significantly reduce the organic matter content of the soil (unless the field erodes, as discussed above).

If producers choose to burn or harvest their wheat stubble, timing is important, and should minimize the time the field will be without residue cover and vulnerable to erosion. Before choosing to burn residue, producers should check with the USDA Natural Resources Conservation Service and/or the Farm Service Agency to find out if this will affect their compliance with any conservation programs.

For more information, see:

- *Efficient crop water use in Kansas*, MF3066, available at: http://www.ksre.ksu.edu/bookstore/pubs/mf3066.pdf
- *Emergency wind erosion control*, MF2206, available at: http://www.ksre.ksu.edu/bookstore/pubs/MF2206.pdf
- *Crop residue harvest impacts wind erodibility and simulated soil loss in the Central Great Plains*. 2017. Global Change Biology Bioenergy, https://doi.org/10.1111/gcbb.12483

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3. Pre-harvest weed control in wheat

Making an herbicide application that will not directly influence crop yield is a difficult decision to make. However, pre-harvest applications may be beneficial, especially in wheat fields that were not treated earlier in the season. When broadleaf weeds grow rapidly in wheat fields at the end of the growing season, several potential concerns arise, such as harvest difficulties, dockage problems, weed seed production, and soil water depletion. A pre-harvest herbicide application can address these concerns. However, it is very difficult to estimate the value of pre-harvest weed treatments as it is influenced by the effects on harvest efficiency and dockage. It may not pay to treat wheat with lower weed densities unless harvest is delayed. If the weeds are about to set seed, a pre-harvest treatment can go a long way toward reducing weed problems in future years by preventing seed production.

Herbicides labeled for use as harvest aids in wheat are listed in Table 1. There are differences in how quickly they act to control the weeds, the interval requirement between application and grain harvest, and the efficacy on the weeds present in the field. All of them will require thorough spray coverage to be most effective.

Paraquat is sometimes mentioned as a possible herbicide for pre-harvest application, but it is **NOT** labeled for pre-harvest treatment in wheat**.** Application of paraquat to wheat is an illegal treatment and can result in a quarantine and destruction of the harvested grain, along with severe fines.

Figure 1. Weeds in wheat near harvest time. Photo by Dallas Peterson, K-State Research and Extension.

Table 1. Herbicides for use a pre-harvest weed control options in wheat.

Herbicide and rate	Weeds controlled	Application timing	PHI* (days)	Comments
Metsulfuron (Ally, others) 0.1 oz + 0.25 to 0.5 % v/v nonionic surfactant	Some broadleaf weeds	Hard dough stage	10	Apply in combination with glyphosate or 2,4-D Do not use on soils with a pH greater than 7.9 12- to 34-month rotation interval for soybeans Kochia, pigweeds, and marestail may be resistant
2,4-D LVE 1 pt of 4lb/gal	Broadleaf weeds.	Hard dough stage	14	Weak on kochia and wild buckwheat

product or 2/3 pt 6 lb/gal product				
Dicamba 0.5 pt	Broadleaf weeds	Hard dough stage and green color is gone from nodes	7	Do not use treated wheat for seed unless a germination test results in 95% or greater seed germination.
Glyphosate 1 qt of 3 lb ae/gal product, 22 fl oz of Roundup PowerMax, or 20 fl oz of Roundup PowerMax 3	Grasses and broadleaf weeds	Hard dough stage (30% or less grain moisture).	7	Consult label for recommended adjuvants Not recommended for wheat being harvested for use as seed Kochia, pigweeds, and marestail may be resistant.
Carfentrazone (Aim, others) 1 to 2 fl oz + 1% v/v crop oil concentrate	Pigweeds, kochia, lam bsquarters, Russian thistle, wild buckwheat, velvetleaf	Not specified, but hard dough (30% or less grain moisture) recommended	7	Acts quickly, usually within 3 days Regrowth of weeds may occur after 2-3 weeks or more, depending on the rate used.
Saflufenacil **(Sharpen)** 1 to 2 fl oz + 1% v/v methylated seed oil + 1 to 2% w/v AMS or 1.25-2.5% v/v UAN	Broadleaf weeds	Hard dough stage (30% or less grain moisture).	3	1-month rotation interval for soybean
Flumioxazin (Valor, others) 1.5 to 2 fl oz + Use 1 qt/A MSO	Broadleaf weeds	After wheat reaches the hard dough stage and 30% or less grain moisture	10	Acts quickly, usually within 3 days Regrowth of weeds may occur Some residual activity Rotation interval depends on the rate and the soil

*PHI = Pre-harvest interval, or days required between application and harvest.

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. For more information, see 2025 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland, K-State publication SRP-1190.

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4. Identifying nutrient deficiency symptoms in soybeans

As the growing season for soybeans progresses, the plants may begin showing signs of chlorosis or other leaf discoloration in all or parts of the field. There may be many causes of this discoloration. Nutrient deficiencies are one possibility. Compared to corn, wheat, and sorghum, soybeans remove relatively large amounts of nutrients per bushel harvested. High-yielding soybeans can remove substantial amounts of nutrients from the soil.

General considerations

The relative mobility of the nutrient within the plant will determine whether the deficiency symptom is first noticeable on the lower leaves or the upper leaves.

Mobile Nutrients: These nutrients can be transferred from older tissues to the youngest tissues within the plant. Deficiency symptoms are first noticeable on the lower, oldest leaves.

- Nitrogen (N)
- Phosphorus (P)
- Potassium (K)
- Magnesium (Mg)

Immobile Nutrients: These nutrients are not easily transferred within the plant. Therefore, symptoms occur first on the upper, youngest leaves.

- Boron (B)
- Calcium (Ca)
- Copper (Cu)
- Iron (Fe)
- Manganese (Mn)
- Molybdenum (Mo)
- Sulfur (S)
- Zinc (Zn)

Possible causes of nutrient deficiencies include:

1. Low soil levels of the nutrient
2. Poor inoculation (in the case of N deficiency)
3. Unusually low or high soil pH levels, depending on the nutrient in question
4. Roots are unable to access sufficient amounts of nutrients due to poor growing conditions, excessively wet or dry soils, cold weather, or soil compaction
5. Root injury due to mechanical, insect, disease, or herbicide injury
6. Genetics of the plant

The following briefly describes the symptoms of some of the most common nutrient deficiencies in soybeans.

Nutrient deficiency symptoms

Nitrogen. Chlorotic or pale green plants start with the lower leaf (Figure 1a). Within the plant, any available nitrogen (N) from the soil or nitrogen fixation within nodules on the roots first goes to the new growth. Soybeans prefer to take N from the soil solution as much as possible since this requires less energy than the nitrogen fixation process. However, both sources of N are important for soybeans since they are a big user of N. Nitrogen deficiency can be associated with poor nodulation (Figure 1b).

Figure 1a. Soybean field showing signs of chlorosis. Photo by Dorivar Ruiz Diaz, K-State Research and Extension.

Figure 1b. Lack of nodulation on far right soybean plants. Photo by Dorivar Ruiz Diaz, K-State Research and Extension.

Iron. Iron chlorosis occurs in calcareous soils (containing calcium carbonates) with high soil pH. The classic symptom is chlorosis (yellowing) between the veins of young leaves since iron is not mobile within the plant (Figures 2 and 3). A side effect of iron deficiency can be N deficiency since iron is necessary for nodule formation and function. If iron is deficient, N fixation rates may be reduced. Iron deficiency occurs on calcareous soils; in addition to high pH, plant stress can favor the development of iron chlorosis, and therefore, the severity can vary significantly from year to year in the same field. Iron chlorosis can be a big limitation in some regions of western Kansas.

Figure 2. Iron chlorosis in soybeans; the upper leaves become chlorotic. Photo by Dorivar Ruiz Diaz, K-State Research and Extension.

Figure 3. Close-up of iron chlorosis in soybeans. Photo by Dorivar Ruiz Diaz, K-State Research and Extension.

Magnesium. Lower leaves will be pale green, with yellow mottling between the veins. At later stages, leaves may appear to be speckled bronze. This deficiency may occur on very sandy soils.

Manganese. Stunted plants with interveinal chlorosis (Figure 4). It can be a problem in soils with high pH (>7.0) or on soils that are sandy or with a high organic matter content (>6.0% OM). Manganese activates enzymes that are important in photosynthesis, as well as nitrogen metabolism and synthesis. Symptoms are hard to distinguish from iron chlorosis.

Figure 4. Manganese deficiency symptoms are similar to symptoms of iron chlorosis in soybeans. Photo by Jim Camberato, Purdue University.

Phosphorus. Phosphorus deficiency may cause stunted growth, dark green coloration of the leaves, necrotic spots on the leaves, a purple color to the leaves, and leaf cupping. These symptoms occur first on older leaves. Phosphorus deficiency can also delay blooming and maturity. This deficiency may be noticeable when soils are cool and wet due to decreased phosphorus uptake.

Potassium. Soybean typically requires large amounts of potassium. Like phosphorus deficiency, potassium deficiency occurs first on older leaves. Symptoms are chlorosis at the leaf margins and between the veins (Figure 5). In severe cases, all but the very youngest leaves may show symptoms.

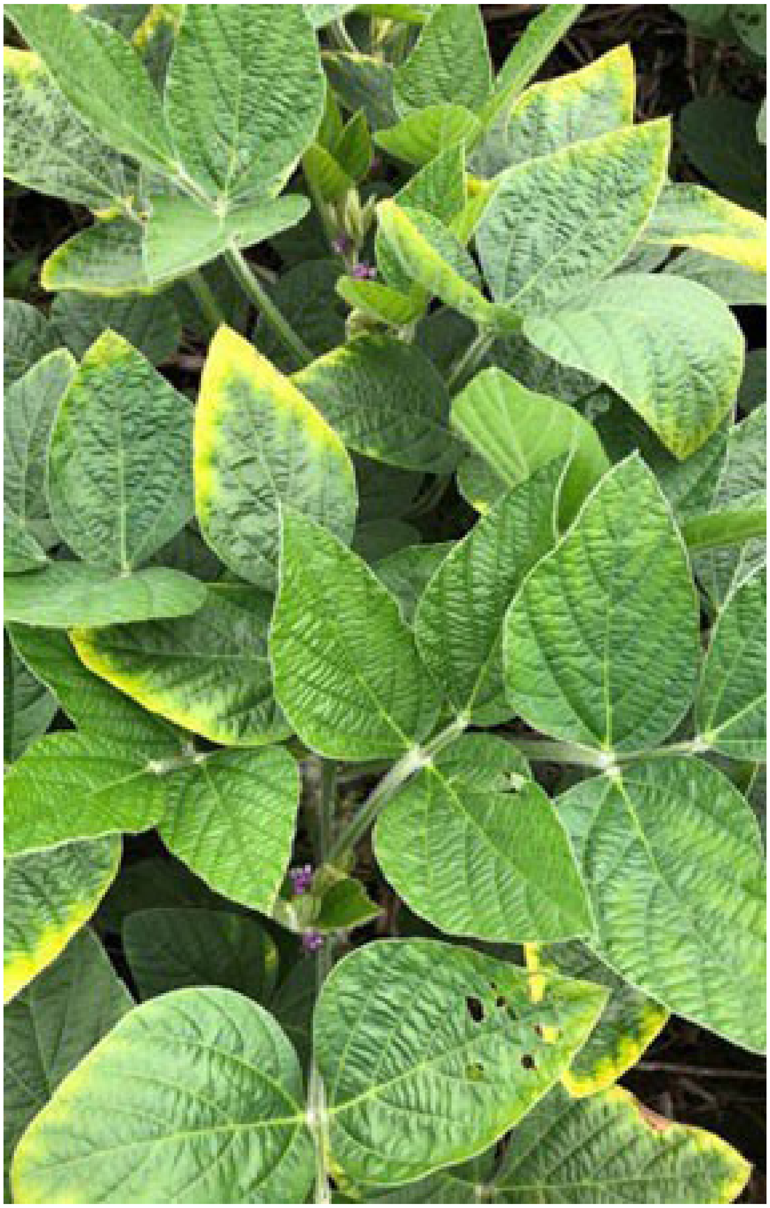

Figure 5. Potassium deficiency: chlorosis of the lower leaves. Photo by Dorivar Ruiz Diaz, K-State Research and Extension.

Sulfur. Stunted plants have a pale green color, similar to N deficiency except chlorosis may be more apparent on upper leaves. Sulfur deficiencies are becoming more common due to reduced atmospheric deposition (cleaner air) and more frequent use of high-yielding soybean varieties. Plant-available sulfur is released from organic matter. Deficiency is most likely during cool, wet conditions or on sandy soils with low organic matter content.

For more information, see K-State Research and Extension publication MF-3028, *Diagnosing Nutrient Deficiencies in the Field* at: http://www.ksre.ksu.edu/bookstore/pubs/MF3028.pdf

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5. Considerations for weather-damaged cotton stands

The 2025 growing season in Kansas has been challenging for many of our major crops, and cotton has been no exception. High winds and heavy rain have significantly damaged cotton stands in some parts of the state (Figure 1). While some stands of no-till cotton planted into heavier residue were protected and remain in good shape (Figure 2). Residue was key this year! For the damaged cotton stands, some producers may be considering terminating the cotton and switching crops. Several points must be considered before making this decision.

Figure 1. High winds and heavy rains resulted in reduced and non-uniform cotton stands. Photo courtesy of Rex Friesen, Southern Kansas Cotton Growers.

Figure 2. Crop residue protects sensitive cotton seedlings during high winds and heavy rain events. Photo courtesy of Rex Friesen, Southern Kansas Cotton Growers.

Should I keep my cotton?

Don't give up on your cotton crop too soon. Cotton is an indeterminate crop with a strong ability to recover and compensate for setbacks. Even in low populations—such as one plant per 30-inch row (about 17,500 plants per acre)—acceptable yields are still possible (see Table 1). However, non-uniform or sparse stands can lead to uneven and delayed maturity, which increases the risk of significant yield losses later in the season. Some fields in south central Kansas, for instance, have already been adjusted to yields as low as 10 pounds per acre.

Table 1. Plant populations at various row spacings.

Plants/foot	Row spacing (inches)				
	15	30	36	38	40
	Plants/acre				
1	34,848	17,424	14,520	13,756	13,068
2	69,696	34,848	29,040	27,512	26,136
3	104,544	52,272	43,560	41,268	39,204
4	139,392	69,696	58,080	55,024	52,272
5	174,240	87,120	72,600	68,780	65,340

Can I switch to soybeans or sorghum?

Soybean or sorghum could be options to follow failed cotton in Kansas. However, the most important consideration before switching crops is the potential rotation restrictions based on any residual herbicides that might have been applied. Where group 5 herbicides like fluometuron (Cotoran) or prometryn (Caparol) have been applied, DO NOT plant soybeans. However, soybeans can be planted following group 15 herbicides like acetochlor (Warrant, others), S-metalochlor (Dual, others), dimethenamid-P (Outlook), or pyroxasulfone (Zidua). Concep-treated sorghum can be planted where encapsulated acetochlor (Warrant or Enversa), S-metalochlor, or dimethenamid-P have been applied. DO NOT plant sorghum where fluometuron, prometryn, or pyroxafulfone have been applied.

Regardless of which crop is replanted, the current cotton stand should be removed. Herbicides that could be used to terminate the current stand would be saflufenacil (Sharpen), tiafenacil (Reviton), or paraquat (Gramoxone, others).

Managing soybeans or sorghum planted after failed cotton

For soybeans and sorghum following the failed cotton, it is important to consider soil fertility, variety selection, as well as seeding rate and row spacing. No additional fertility may be required if the full rate for cotton has already been applied and following with sorghum

In the case of soybean variety selection, a variety with the same or perhaps even slightly later maturity rating as a typical planting date for full-season soybeans will allow the plant to develop a large enough canopy before flowering. An earlier maturing variety will result in short plants with pods set close to the ground, while planting a much later variety increases the risk of immature pods at frost. Unlike soybeans, an earlier maturing sorghum hybrid should be selected to follow failed cotton. Sorghum development is primarily driven by the accumulation of heat units, and the remaining growing season is too short to allow medium-late or late hybrids to mature before the first frost in most of Kansas.

Both soybeans and sorghum can benefit from increasing seeding rates and narrowing row spacing (30” to 15”) when planting late. Increasing seed rate and narrowing row spacing can speed up canopy development, which helps with early-season light capture, suppressing weeds, and reducing erosion.

Crop insurance implications

Producers can claim no more than 135% on a given acre in a crop season. Two scenarios that could occur would be 1) a producer make a 100% claim on their cotton as the first and primary crop and 35% of their second crop (soybean or sorghum) or 2) a producer could make a claim of only 35% of their cotton as the first crop and retain the ability to claim 100% of the second crop (soybean or sorghum).

It is important to note that soybeans or sorghum planted after failed cotton will be insured as a full-season crop (not a double crop). The cutoff for full coverage of a full-season soybean or sorghum crop in Kansas was June 25. However, both crops can be insured as late-planted with 1% cover loss for every day following June 25 until July 20.

Other resources

- 2025 Chemical Weed Control Guide (KSU Extension)
- Failed Cotton Herbicide Rotation Restrictions to Soybean in Oklahoma (OSU Extension)
- Failed Cotton Herbicide Rotation Restrictions to Sorghum in Oklahoma (OSU Extension)

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6. Japanese beetles: Scouting and management tips

Japanese beetles have continued to be a persistent problem in recent years, and 2025 is no exception (Figure 1). The immature stage of this insect is a white grub that typically develops in areas other than the crop fields where adults feed. Like other white grubs, Japanese beetle larvae feed on plant roots and often develop in fields with perennial plant cover like turfgrass or vineyards. This development pattern is important because when the adult beetles emerge, they frequently fly in large numbers to the nearest available food source. Adult Japanese beetles feed on a wide variety of fruits and vegetables, but in row crops, they are most often seen feeding on young succulent soybean leaves or the silks and tassels of corn.

Figure 1. Japanese beetle adult. Photo by Cooper Wyckoff, K-State Research and Extension.

If you notice large numbers of beetles, be sure to scout the entire field. Infestations often appear concentrated on the side of the field closest to where the beetles emerged.

Treatment thresholds if large numbers of beetles are present

- **Corn**: Treatment may be justified if beetles are clipping silks to less than ½ inch and pollination is just beginning.
- **Soybeans:** Use thresholds similar to other defoliators. Treatment may be warranted if 50% of the plants are defoliated during vegetative stages or 20–25% during reproductive stages.

Remember, the beetles tend to congregate on the side of the field closest to where the larvae developed.

For more information relative to Japanese beetle management, please refer to K-State's Insect Management Guides for Corn and Soybeans:

Corn: https://bookstore.ksre.ksu.edu/item/corn-insect-pest-management-2025_MF810

Soybeans: https://bookstore.ksre.ksu.edu/item/soybean-insect-pest-management-2025_MF743

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7. Artificial Intelligence in Kansas Agriculture Conference on July 22

K-State Research and Extension and K-State's Institute for Digital Agriculture and Advanced Analytics (ID3A) are hosting the AI in Kansas Agriculture Conference, showcasing some of the newest agricultural technologies powered by artificial intelligence. The conference will feature panel discussions by K-State researchers, industry leaders, and producers on the latest AI and digital innovations in row crop and livestock production, along with live demonstrations of robotics and emerging technologies.

Date & Time: July 22, 2025 | 1:00 p.m. – 5:30 p.m.
Location: The Ranch House, 28784 US-75, Lyndon, KS 66451
Registration: Free, but limited to 200 attendees.
Registration link: https://kstate.qualtrics.com/jfe/form/SV_9H1PvyFaFrQFNZA

Agenda

12:30-1:15 p.m.	**Registration**
1:15-1:30 p.m.	**Opening Remarks**
1:30-2:15 p.m.	Historical Account of Ag Technology in the Last 10 Years to Modern Robotics
2:15-3:00 p.m.	AI and Its Trustability
3:00-3:45 p.m.	Cost-Benefit Analysis of Precision Ag Tools: Are They Worth the Investment?
3:45-4:00 p.m.	**Break**
4:00-4:45 p.m.	Revolutionizing Livestock Farming with Virtual Fencing Using Advanced Technology
4:45-5:30 p.m.	Spray Drone in Pasture Management - Outside Session Demonstration
5:30-7:30 p.m.	**Networking Dinner and Live Demonstrations**

For more detailed information, please visit our website: https://www.k-state.edu/next-gen/key-initiatives/interdisciplinary-institutes/digital-ag-advanced-analytics/about/AiInAg.html

For any questions or additional information, please contact:

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8. Save the Date for K-State Agronomy Fall Field Days

Join K-State agronomists and extension specialists at one or more of the Fall Field Days happening at various locations across the state. Before your calendars begin to fill up, we encourage you to save the dates for these events. As the time draws closer, more information about each event, including speakers and topics, will be shared in the eUpdate. Stay tuned!

Northeast/North Central Kansas

Rossville – August 12

Ottawa – August 20

Scandia – August 21

Western Kansas

Garden City – August 21

Hays – August 26

Tribune – August 28

9. Registration is open for the 2025 K-State/KARA Summer Field School

Kansas State University and the Kansas Agribusiness Retailers Association (KARA) are hosting two 2-day Summer Field School sessions on July 8–9 and July 10–11, 2025, at the K-State Agronomy Education Center (2213 Agronomy Farm Road), located just north of the K-State football stadium in Manhattan.

This year's program will spotlight soybean and cotton production, with comprehensive, hands-on sessions covering:

- Crop growth and soil fertility for soybeans and cotton production
- Herbicide symptomology and glufosinate optimization
- Weed identification
- Precision agriculture
- Soil health
- Crop diseases and insect management

Agendas for both sessions are included at the end of this article.

Registration Information

- **2-day program:** $220 (includes lunch both days)
- **1-day option:** $135 (includes lunch for that day)
- Earn multiple CCA and 1A credits (exact credit total forthcoming)

The complete program overview and registration link are available at the K?State Agribusiness Retailers site: https://www.ksagretailers.org/events-training/ksu-field-days/

Lodging & Details

Lodging options and additional information are listed on the registration page.

Note for KSRE agents: A special registration link will be shared via the Ag Agent email listserv shortly - please wait for that link before registering.

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Kansas State University/KARA Summer Field School (Session 1)

North Agronomy Farm, Manhattan, July 8-9, 2025

K·STATE Research and Extension

Tuesday 7/8/2023

Time	Group A	Group B	Group C
7:45 AM	Registration – **North Agronomy Farm**		
8:20 AM	Welcome, Instructions		
8:45 AM	**Crop Insect Pests** (Whitworth)	**Weed ID** (Dille & Cott)	**Cotton/Soybean Growth & Development** (Simon & Sullivan)
9:35 AM	**Crop Diseases** (Onofre)		
10:25 AM	**Break**		
10:40 AM	**Weed ID** (Dille & Cott)	**Cotton/Soybean Growth & Development** (Simon & Sullivan)	**Crop Insect Pests** (Whitworth)
11:30 AM			**Crop Diseases** (Onofre)
12:20 PM	**Lunch – North Agronomy Farm**		
1:10 PM	**Cotton/Soybean Growth & Development** (Simon & Sullivan)	**Crop Insect Pests** (Whitworth)	**Weed ID** (Dille & Cott)
2:00 PM		**Crop Diseases** (Onofre)	
2:50 PM	**Adjourn**		

Wednesday 7/9/2023

Time	Group A	Group B	Group C
7:00 AM	Registration – **North Agronomy Farm**		
7:30 AM	**Cotton/Soybean Fertility and Production** (Ruiz Diaz, Simon & Sullivan)	**Herbicide Symptomology** (Lancaster)	**Precision Ag** (Joshi)
8:20 AM		**Optimizing Glufosinate** (Lancaster)	**Soil Health** (Obour)
9:10 AM	**Break**		
9:25 AM	**Precision Ag** (Joshi)	**Cotton/Soybean Fertility and Production** (Ruiz Diaz, Simon & Sullivan)	**Herbicide Symptomology** (Lancaster)
10:15 AM	**Soil Health** (Obour)		**Optimizing Glufosinate** (Lancaster)
11:05 AM	**Lunch – North Agronomy Farm**		
11:55 AM	**Herbicide Symptomology** (Lancaster)	**Soil Health** (Obour)	**Cotton/Soybean Fertility and Production** (Ruiz Diaz, Simon & Sullivan)
12:45 PM	**Optimizing Glufosinate** (Lancaster)	**Precision Ag** (Joshi)	
1:35 PM	**Break**		
1:50 PM	**Core Hour**		
2:40 PM	**Adjourn**		

Kansas State University/KARA Summer Field School (Session 2)

North Agronomy Farm, Manhattan, July 10-11, 2025

K·STATE Research and Extension

		Thursday 7/10/2023	
7:45 AM	Registration – **North Agronomy Farm**		
8:20 AM	Welcome, Instructions		
	Group A	**Group B**	**Group C**
8:45 AM	**Cotton/Soybean Fertility and Production** (Ruiz Diaz, Simon & Sullivan)	**Herbicide Symptomology** (Lancaster)	**Precision Ag** (Joshi)
9:35 AM		**Optimizing Glufosinate** (Lancaster)	**Soil Health (Obour)**
10:25 AM		**Break**	
10:40 AM	**Precision Ag** (Joshi)	**Cotton/Soybean Fertility and Production** (Ruiz Diaz, Simon & Sullivan)	**Herbicide Symptomology** (Lancaster)
11:30 AM	**Soil Health** (Obour)		**Optimizing Glufosinate** (Lancaster)
12:20 PM		**Lunch – North Agronomy Farm**	
1:10 PM	**Herbicide Symptomology** (Lancaster)	**Precision Ag** (Joshi)	**Cotton/Soybean Fertility and Production** (Ruiz Diaz, Simon & Sullivan)
2:00 PM	**Optimizing Glufosinate** (Lancaster)	**Soil Health** (Obour)	
2:50 PM		**Adjourn**	
		Friday 7/11/2023	
7:00 AM	Registration – **North Agronomy Farm**		
	Group A	**Group B**	**Group C**
7:30 AM	**Crop Insect Pests** (Whitworth)	**Weed ID** (Dille & Cott)	**Cotton/Soybean Growth & Development** (Simon & Sullivan)
8:20 AM	**Crop Diseases** (Onofre)		
9:10 AM		**Break**	
9:25 AM	**Weed ID** (Dille & Cott)	**Cotton/Soybean Growth & Development** (Simon & Sullivan)	**Crop Insect Pests** (Whitworth)
10:15 AM			**Crop Diseases** (Onofre)
11:05 AM		**Lunch – North Agronomy Farm**	
11:55 AM	**Cotton/Soybean Growth & Development** (Simon & Sullivan)	**Crop Insect Pests** (Whitworth)	**Weed ID** (Dille & Cott)
12:45 PM		**Crop Diseases** (Onofre)	
1:35 PM		**Break**	
1:50 PM		**Core Hour**	
2:40 PM		**Adjourn**	

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