



K-STATE
Research and Extension

Extension Agronomy

eUpdate

02/26/2026

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. Topdressing Wheat with Nitrogen Fertilizer

Wheat crop status and N considerations

The wheat crop across the state best be described as variable, with tall wheat with thick stands in some areas and thinner, smaller wheat in other areas. As discussed in last week's [K-State Agronomy eUpdate article](https://bit.ly/4cEi2nn) (<https://bit.ly/4cEi2nn>), warmer temperatures and longer days will cause wheat to gradually lose its winter hardiness and progress out of dormancy. In parts of the state, our wheat is moving along and appears to be a bit ahead of what would typically be expected at the end of February.

At this time, it is important to think ahead to the next growth stages of the wheat. That includes the head development and setting the potential number of spikelets per head. Some may know the term spikelet as a 'mesh' or the structure where kernels are formed and attached to the rachis (wheat stem). The potential number of spikelets is determined at Feekes 5, when the leaf sheaths are strongly erect. This is before jointing (Feekes 6, when the first node of the stem is visible).

Because of the early green-up in parts of Kansas, now is the time to prepare for topdressing nitrogen. Some key elements to consider when deciding on the program you plan to use include **timing, N source, application method, and N rate**. Ideally, the N in topdress applications will be moved into the root zone with precipitation well before jointing begins in order to be most efficiently utilized by wheat. With some small wheat with limited tillers, having adequate N available to support spring tillering when it breaks dormancy will be important. Also, the potential number of kernels per head is determined right after spring green-up and prior to jointing; thus, having available N in the root zone can help ensure a good yield potential. Some combination of fall pre-plant, at-seeding N, and/or early topdressed N is also normally needed to supply adequate N to support head differentiation. This article will discuss some issues to consider when making topdressing decisions.

Application Timing

Timing is usually the most important factor in getting a good return on topdress N. Getting the N on early enough is critical to have the maximum potential impact on yield, especially in a year with limited fall tillering. While waiting until spring just prior to jointing can be done successfully, this can be too late in some years, especially when little or no N was applied in the fall. For the well-drained, medium- to fine-textured soils that dominate our wheat acres, the odds of losing much of the N that is topdress-applied in the winter is low. For these soils, topdressing can begin anytime now, and usually, the earlier, the better. For wheat grown on sandier soils, earlier is not necessarily better for N applications. On these soils, there is a greater chance that N applied in the fall or early winter could leach completely out of the root zone if precipitation is unusually heavy. Waiting until closer to spring green-up to make topdress N applications on sandier soils will help manage this risk.

On poorly drained and/or shallow claypan soils, especially in south central or southeast Kansas, N applied in the fall or early winter would have a significant risk of denitrification N loss. Waiting until closer to spring green-up to make topdress N applications on these soils will help minimize the potential for this N loss.

Remember that N should not be applied to the soil surface when the ground is deeply frozen, especially snow-covered. This will help prevent runoff losses with snow melt or heavy precipitation.

Additionally, once the soils start to melt, they will likely be too wet for any field work. Therefore, every field should be considered for characteristics such as slope, N source, tillage system, and the short-term forecast for temperature and precipitation.

Split applications may be a strategy to consider on sandy soils subject to leaching and poorly drained soils prone to denitrification. This would involve applying enough N in the fall at or before planting to support fall growth and tillering -- generally 20-30 pounds of N. Then, follow up with an additional application of about 20-30 pounds of N in late winter or early spring to support spring tillering, possibly applied with herbicides. This late-winter/early-spring application becomes especially important when stands are thin due to poor emergence, as many fields are this year. Finally, return around jointing or a few days later with a final application to support heading and grain fill. This strategy can also provide flexibility in a year like this with poor fall growth, allowing us to hold back part of the N for later in the spring as we have a better idea of soil moisture and weather conditions for the season.

Application Method

Most topdressing is broadcast applied. In high-residue situations, this can result in some immobilization of N, especially where liquid UAN is used. If no herbicides are applied with the N, producers can benefit from applying the N in a dribble band on 15 to 18-inch centers. This can minimize immobilization and may provide for a more consistent crop response.

Nitrogen Source

The typical sources of N used for topdressing wheat are UAN solution and dry urea. Numerous trials by K-State over the years have shown that both are equally effective. In no-till situations, there may be some slight advantage to applying dry urea since some of it will fall to the soil surface (Figure 1) and be less affected by immobilization than broadcast liquid UAN, which tends to get hung up on surface residues.



Figure 1. Urea broadcast to tillering wheat in a topdress application. Photo by Romulo Lollato, K-State Extension.

Dribble (surface band) UAN applications would also avoid some of this tie-up on surface crop residues. However, if producers plan to tank-mix with an herbicide, they must use liquid UAN and broadcast it.

Broadcast applications of UAN solution greater than 10 gallons per acre can cause leaf burn on young wheat plants, which may be especially visible in tall, thick stands this year. Risk of leaf burn is especially true if applications are made to actively growing wheat when ambient air temperatures are greater than 60°F. However, this type of injury is almost always cosmetic and rarely reduces yield when applied at optimal growth stages (Feekes 4).

Controlled-release products such as polyurethane-coated urea (ESN) might be considered on sandy soils prone to leaching or poorly drained soils prone to denitrification. Generally, a 50:50 blend of standard urea and coated urea will immediately provide some N to support tillering and head development and continue to release some N in later stages of development. This would work best in settings with high loss potential.

Nitrogen Rate

Producers should have started the season with a certain N recommendation, ideally based on a profile N soil test done before the crop is planted and before any N has been applied. If a soil sample

was taken at sowing, profile nitrate-N can help determine the rate to be applied based on the yield goal. However, it is not too late to use the profile N soil test if taken in late winter/very early spring before green-up. While it will not be as accurate as when sampled in the fall, it can still identify fields or areas in fields with high levels of available nitrate N. Unfortunately, it is not reliable in measuring recently applied N. So, if a high rate of N has already been applied, a late winter profile sample probably shouldn't be taken. Remember that topdressing should complement or supplement the N applied in the fall and the residual soil N present in the soil. The total N application, planting and topdressing, should equal the target recommended rate.

If the wheat was grazed this fall and winter, producers should add an additional 30-40 lbs N/acre for every 100 lbs of beef weight gain removed from the field. If conditions are favorable for heavy fall and/or spring grazing, additional N may be necessary, especially for a grain crop.

Some fields may also benefit from the application of sulfur and chloride. Like N, these nutrients are mobile in the soil, and a topdress application before jointing is considered an effective application time. Sulfur and chloride topdress applications should be made based on soil tests and the history of response.

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2. Optimal Time to Remove Cattle from Wheat Pastures: First Hollow Stem

The unique climate characteristics of the US southern Great Plains allow producers to use wheat as a forage and grain crop (dual-purpose), potentially increasing overall profitability compared to grain-only or forage-only systems depending on partial budgets for wheat and cattle enterprises. The date of grazing termination is an important factor in determining wheat's recovery potential and ability to produce grain in dual-purpose systems. First hollow stem (FHS) is the optimal time to remove cattle from wheat pastures to protect grain yield potential.

What is the first hollow stem (FHS) stage of wheat development?

Before the wheat leaf sheaths become erect after spring green-up, the developing growing point, which is below the soil surface, will soon begin to form a tiny head. Although the head is quite small at this point, some important yield components have already been established. At this stage, the maximum potential number of spikelets per head is determined. Sufficient nitrogen (N) should already be available in the root zone at this growth stage to maximize the potential number of seeds per head.

Once the embryo head has developed, the first internode will begin to elongate, pushing the head up through the leaf sheaths. This first internode will be hollow. This will be visible before you can actually feel the first node (joint, located just above the first internode).

FHS is the point at which a 1.5 cm (about half-inch) length of hollow stem can first be identified below the developing head (Figure 1). This length is roughly equivalent to the diameter of a dime, which makes its identification in the field easier. FHS occurs when the developing head is still below the soil surface. This means that producers have to pull the entire plant out of the ground to measure it.

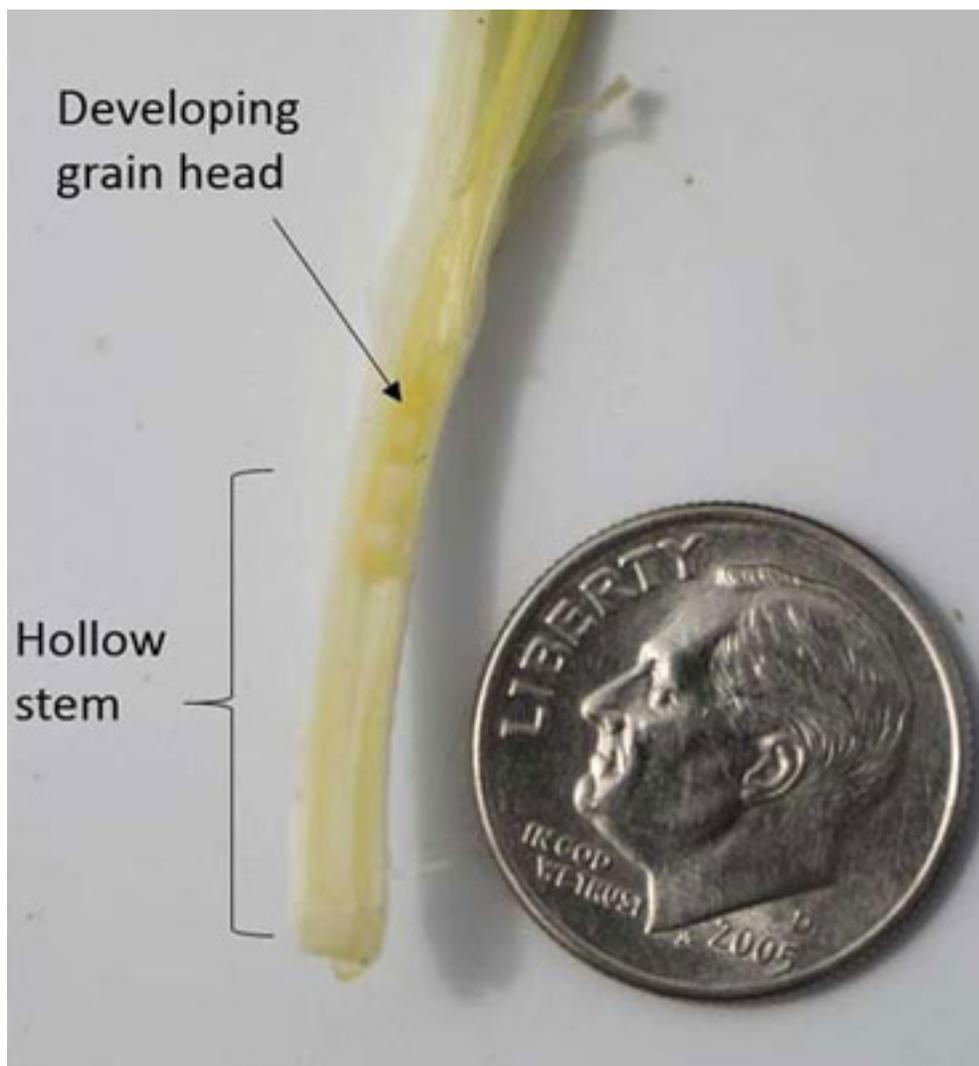


Figure 1. Wheat plant reaching the first hollow stem stage of growth, characterized by approximately 1.5 cm (or roughly the diameter of a dime) of hollow stem underneath the developing grain head. Photo by Romulo Lollato, K-State Extension.

Assessing for first hollow stem

To look for FHS, start by pulling up some plants from fields or areas that have not been grazed, such as field corners or just outside the fence. The date of FHS is variety- and field-specific, so it is important to sample each individual field. Select the largest tillers to examine, and slice the stem open from the crown area up. Look for the developing head, which will be very small. Next, see if you can find any hollow stem between the developing head and the crown area. If there is any separation between the growing point and crown, the hollow stem is elongating. If that separation is 1.5 cm, the wheat plant is at FHS. FHS occurs about a week or so prior to jointing, depending on temperatures.

Kansas Mesonet offers tool for estimating first hollow stem

Winter wheat is beginning to break dormancy, and the Kansas Mesonet has a tool to help track the crop development: [Wheat First Hollow Stem](#) page. This page tracks soil temperature to calculate wheat growing degree days (GDD) associated with first hollow stem occurrence. This tool employs a

wheat growth model developed by Oklahoma State University and the Oklahoma Mesonet, which was validated for wheat growing conditions experienced in south central Kansas during the 2016-2021 growing seasons. The output of the model provides the probability of first hollow stem occurrence (current and historical) both for early and late-maturing wheat varieties. More details for the tool are found [here](#).

Yield losses from grazing past first hollow stem

If the wheat has reached FHS, cattle should be removed to prevent grain yield loss. Yield losses from grazing after FHS can range from 1 to 5% per day, depending on grazing intensity and the weather following cattle removal (Figure 2). If cattle removal is followed by cool, moist weather, yield losses will often average about 1% per day grazed after FHS; if weather is hot, dry, and harsh, yield losses of 5% per day or more can be expected. It is easy for producers to be late by a few days in removing livestock as they wait for obvious nodes and hollow stems to appear, and even the first few days can be significant.

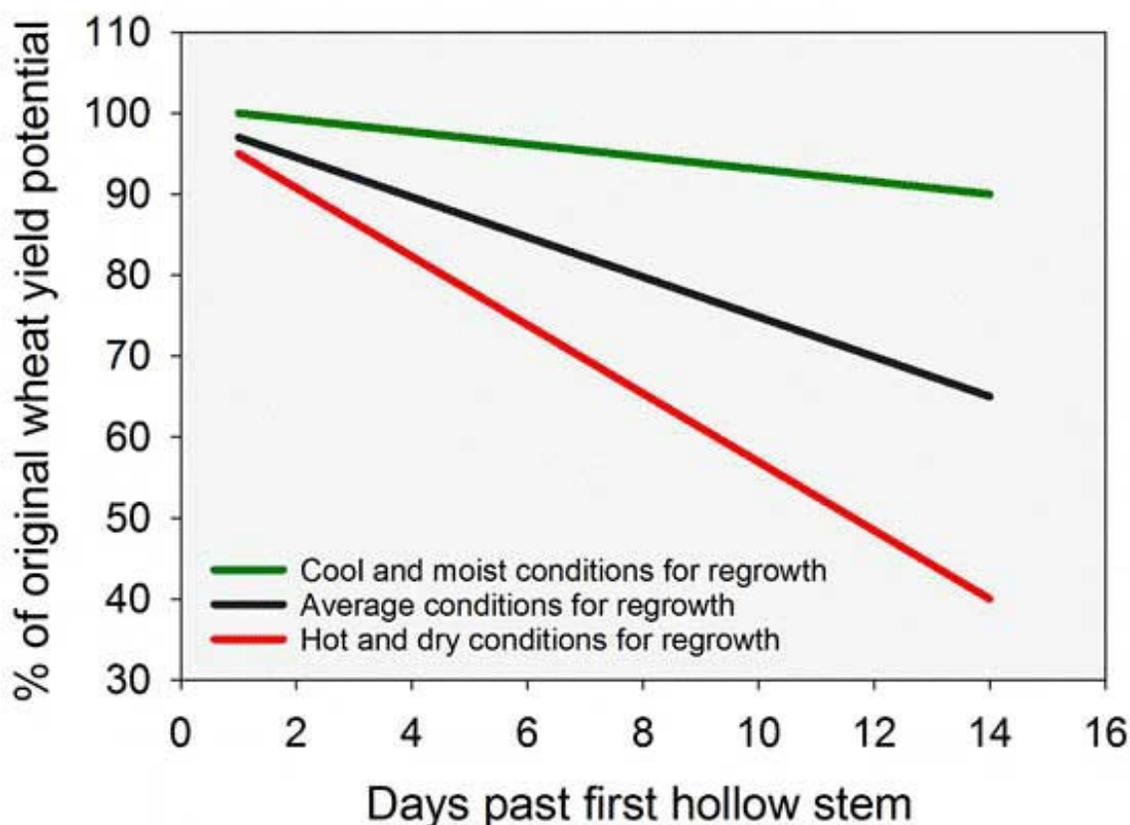


Figure 2. Percent of original wheat yield potential as affected by days of grazing past first hollow stem and weather conditions following grazing termination. Average yield losses by grazing for 14 days past first hollow stem ranged from 10% under favorable conditions to 60% under non-favorable conditions. Research conducted by Oklahoma State University (OSU) and published as K-State publication MF3375 and OSU publication PSS-2178.

Two things can happen when wheat is grazed too long: 1) fewer heads per acre because the primary tiller has been removed, and 2) smaller and lighter heads than expected because leaf area has been

removed. As cattle continue grazing, the wheat plant is stressed and begins to lose some of the tillers that would otherwise produce grain. A little later, if there are not enough photosynthates, the plant begins aborting the lower spikelets in the head or some of the florets on each head. Finally, if there is not enough photosynthate during grain filling, the seed size will be reduced and if the stress is severe enough, some seed will abort.

Air and soil temperatures in 2026

Crop development is mostly a function of available water, nutrients, and temperature. Nutrient availability is field specific and thus we will not discuss it here.

Despite periods of dryness, most of the state observed above-normal moisture for the September through November period. As a result, moisture was available for crop establishment once planted. Temperatures through this period were also warmer than normal, leading to increased growth with a generally later than normal first freeze

(<https://eupdate.agronomy.ksu.edu/article/kansas-fall-weather-2025-the-season-in-review-674-3>).

[Warmer-than-normal temperatures persisted in December through February, with only two periods of colder-than-normal temperatures \(early December and late January\)](#). Recent warmth following the very cold end of January is likely signaling to the crop that it is time to resume spring growth and development (and thus, the crop might start progressing toward first hollow stem). As temperatures continue to increase and wheat begins growing more rapidly in the spring, producers should start thinking about when to pull cattle off pasture to protect grain yields in dual-purpose crops.

For more information on managing wheat in dual-purpose systems, check the K-State Research and Extension publication MF3375 [PSS-2178 from Oklahoma State Extension], "Dual-purpose wheat: Management for forage and grain production" at <https://www.bookstore.ksre.k-state.edu/pubs/MF3375.pdf>.

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3. First Hollow Stem Update - 2/23/2026

Cattle should be removed from wheat pastures when the crop reaches first hollow stem (FHS). Grazing past this stage can severely affect wheat yields. For a full explanation, please refer to the companion article in this eUpdate, "Optimal time to remove cattle from wheat pastures: First hollow stem."

First hollow stem update

To screen for FHS during this important time in the growing season, the K-State Extension Wheat and Forage crew measures FHS on a weekly basis in 12 different commonly grown wheat varieties in Kansas. The varieties are in a September-sown replicated trial at the South Central Experiment Field near Hutchinson.

Ten main stems are split open per variety per replication (Figure 1), for a total of 40 stems monitored per variety. The average length of the hollow stem is reported for each variety in Table 1. As of February 23, no variety had reached first hollow stem; however, a few varieties had begun stem elongation (Figure 2).



Figure 1. Ten main wheat stems were split open per replication per variety to estimate first hollow stem for this report, for a total of 40 stems (10 per repetition) split per variety. Photo by

Luiz Pradella, K-State PhD student.



Figure 2. First hollow stem (initial stem elongation) observed at 10x magnification. Photo by Luiz Pradella, K-State PhD student.

Table 1. Length of hollow stem measured on February 17 and 23, 2026, of 12 wheat varieties sown in late September 2025 at the South Central Experiment Field near Hutchinson. The critical FHS length is 1.5 cm (about a half-inch or the diameter of a dime).

Variety	First Hollow Stem (cm)	
	02/17/2026	2/23/2026
AP CP17CU3493#009	0	0.01
AP Sunbird	0	0.02
AP24 AX	0	0.01

CP7017AX	0	0.03
CP7599CLP	0	0.00
Gallagher	0	0.03
KS Bill Snyder	0	0.00
KS Providence	0	0.00
KS20HD134	0	0.00
KS211130	0	0.00
PlainsGold Sheridan	0	0.00
Zenda	0	0.17
Mean	0	0.02

* For reference: 1 inch = 2.54 cm, or 1 cm \approx 0.3937 inches

We will report the progress of first hollow stem during the next few weeks until all varieties are past this stage. Additionally, first hollow stem is generally achieved within a few days from when the stem starts to elongate, depending on temperature and moisture conditions. Therefore, we advise producers to closely monitor their wheat pastures. Since each farm/crop reality is unique at the field level.

The intention of this report is to provide producers with an update on the progress of first hollow stem development in different wheat varieties. Producers should use this information as a guide, but it is extremely important to monitor FHS from an ungrazed portion of each wheat pasture to make the decision to remove cattle from wheat pastures.

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4. Spring herbicide decisions on wheat - Pay attention to the growth stage

Producers should pay close attention to the growth stage of their wheat before making spring herbicide applications. Some herbicides must be applied after tillering, several must be applied before jointing, and others can be applied through the boot stage. Remember that weeds are most susceptible at early growth stages. Coverage becomes difficult as the wheat canopy develops, so the earliest practical and labeled applications generally result in the best weed control.

Applications permitted prior to jointing

Dicamba can be applied to wheat between the 2-leaf and jointing stages. Application of dicamba after wheat reaches the jointing stage of growth causes severe prostrate growth of wheat and a significant risk of yield loss. Dicamba is effective for controlling Russian thistle, wild buckwheat, and susceptible populations of kochia, but it is ineffective against mustard species. Kochia, Russian thistle, and wild buckwheat are summer annual weeds that may emerge before or after wheat starts to joint, so timing dicamba applications for control of these weeds can sometimes be difficult. Fortunately, dicamba provides some residual control of these weeds following application.

Products labeled only for use on herbicide-resistant wheat must also be applied prior to jointing. Beyond should be applied to 1 gene ClearField wheat after tiller initiation and prior to jointing, but can be applied to 2-gene ClearField wheat until the second node is detected at the soil surface. Aggressor should be applied to CoAXium wheat varieties after the 4-leaf growth stage but before jointing. Beyond should only be applied to ClearField wheat varieties, and Aggressor should only be applied to CoAXium wheat varieties.

Other herbicides that must be applied prior to jointing include Agility SG, Everest, Olympus, Outrider, Pulsar, Rave, PowerFlex HL, or GR1. Two relatively new products that can be applied after three-leaf are Tarzec, which is a combination of PowerFlex and Elevore (described below), and Irongate, a combination of PowerFlex and Everest.

Applications permitted through boot

Herbicides that can be applied later in the spring – prior to boot stage – include Ally + 2,4-D, Amber, Finesse, Glean, Starane Flex, and Starane NXT. Fluroxypyr products (Starane, others) are a better choice than dicamba products for control of kochia after wheat begins jointing.

2,4-D is labeled for application to wheat from the full-tiller stage until prior to the boot stage of growth. Application of 2,4-D prior to full-tiller hinders the tillering process and can result in significant yield loss. Wheat sometimes exhibits prostrate growth when 2,4-D is applied at the jointing stage, but yields are generally not significantly reduced when applied before the boot stage.

In general, MCPA is safer for wheat than 2,4-D, especially when applied before tillering. MCPA can be applied after the wheat is in the three-leaf stage (may vary by product label) until it reaches the boot stage of growth. Neither herbicide should be applied once the wheat is near or reaches the boot stage of growth, as an application at that time can result in malformed heads, sterility, and significant yield loss (Figure 2).

Both 2,4-D and MCPA are available in ester or amine formulations. Ester formulations generally

provide slightly better weed control than amine formulations at the same application rates, but are also more susceptible to vapor drift. However, the potential for vapor drift damage in early spring is minimal. Ester formulations are generally compatible for use with fertilizer carriers, while amine formulations often have physical compatibility problems when mixed with liquid fertilizer. To minimize crop injury, it is recommended that nitrogen make up no more than 50% of the carrier solution when spraying an herbicide, especially if a surfactant or crop oil is included in the mixture.

Applications permitted through flag leaf

Many herbicides used in the spring on wheat can be applied up to the time the flag leaf is visible, or later. Some newer premix products based on the herbicide halauxifen methyl (Elevore) that can be applied through flag leaf are Pixxaro (with Starane), Quelex (with florasulam), Rezuvant (with Starane and Axial XL), and WideARMatch (with Starane and Stinger). Halauxifen methyl is a Group 4 herbicide that controls emerged broadleaf weeds, including marestail, flixweed, and henbit. Elevore is not labeled for application to wheat.

Other herbicides that can be applied through flag leaf include Affinity BroadSpec, Affinity TankMix, Ally Extra SG, Express, Harmony, Harmony Extra, Huskie, Sentrallas, Supremacy, Talinor, Weld, and WideMatch.



Figure 1. Stunting from an application of 2,4-D to wheat prior to tillering. Photo by D. Peterson, K-State Extension.



Figure 2. Malformed heads from an application of 2,4-D at boot stage. Photo by D. Peterson, K-State Extension.

For more detailed information, see the “2026 Chemical Weed Control for Field Crops, Pastures, and Noncropland” guide available online at <https://bookstore.ksre.ksu.edu/pubs/SRP1194.pdf> or check with your local K-State Research and Extension office for a paper copy.

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

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5. Rangeland and Pasture Management After Wildfire

Days with low humidities and exceedingly high winds have combined with abundant dry fuels from last year's good grass production to once again result in wildfires throughout Kansas (Figure 1).

Several fires occurred last week in southwestern Kansas, including the Ranger Road Fire, which overlapped areas burned in the 2017 Starbuck Fire, which affected approximately 660,000 acres in Kansas (Figure 2).

Grassland vegetation is highly adapted to fire, and fire should not permanently harm the quality of vegetation on native rangelands. However, a wildfire may act differently from a carefully planned prescribed burn. If the fire produces enough heat, it could cause some damage, especially to bunch grasses, potentially resulting in a decline in productivity for a year or two. The best general advice for now on burned rangeland is to just wait and see how well it recovers.

A companion article in this eUpdate discusses management on cropland, soil quality, and soil erodibility.



Figure 1. Photo of a 4,000-acre fire that burned in Chautauqua and Elk counties in early February. Courtesy of the Elk County Rural Fire Department.

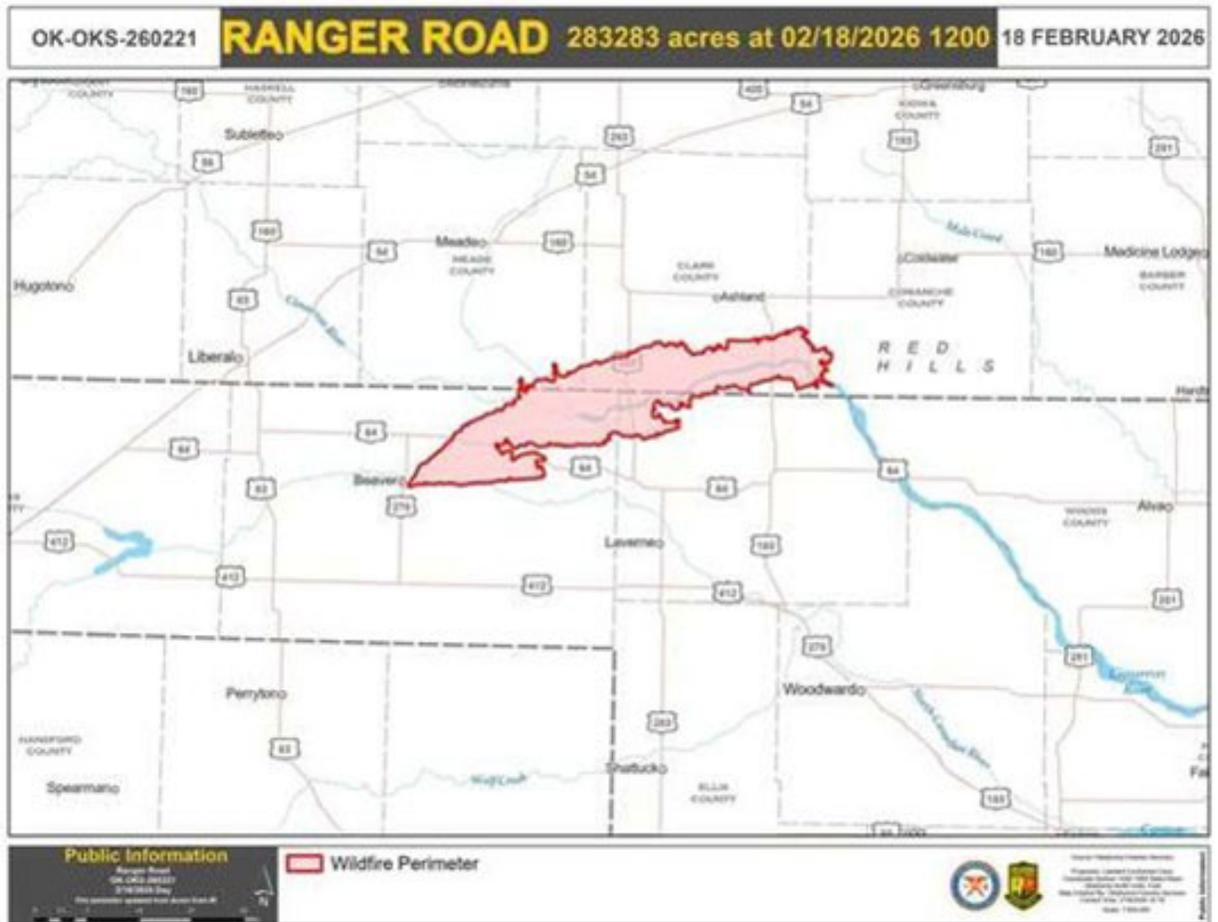


Figure 2. Aftermath of the Ranger Road Fire in Clark County (top) and the fire perimeter extending from Oklahoma into Kansas (bottom). The fire is contained as of this publication

and burned approximately 280,000 acres. Images courtesy of Dr. Randall Spare (top) and the Oklahoma Forest Service (bottom).

Effects on Rangeland and Management Strategies

Where a wildfire occurs, the ability of rangeland or tamegrass pastures to regenerate forage depends on precipitation amounts, the time of year the fire occurs, the water infiltration ability of the soil, and management factors following the fire. Most of the soils in western Kansas were in a drying phase at this point in the winter. The topsoil was generally quite dry at the time of the fire, and while the subsoil was moist early in the winter, subsoil was also drying at this point. Dry soil will slow grass recovery and may take up to a few years to fully recover, depending on moisture during the growing season.

Research Summary: Post-fire Forage Response

- Shortgrass rangeland (blue grama, buffalograss, western wheatgrass) burned mid-March in a dry year: 65% production reduction year 1, 39% reduction year 2.
- December wildfire in shortgrass: ~25% reduction year 1; ~10% lower production sustained after 3 years.
- Mixed prairie (post-Four County Fire, Dec 2021): little bluestem cover declined and 25% first-year forage reduction. Recovery occurred as big bluestem and sideoats grama (both rhizomatous) increased. No reductions in years 2–3.

Expect first-year reductions that vary by vegetation type and moisture, with typical recovery by year 2–3 when precipitation is adequate.

Fire Behavior and Plant/Soil Impacts

Wildfires tend to move rapidly, typically driven by high winds, low relative humidity, and warm air temperatures. Movement through rangeland grasses, especially those with rhizomes, is normally quick with reduced residence time. Therefore, it is expected that grasses will recover in time. Wildfires can also reduce stored carbohydrate reserves for grass plants, reduce moisture infiltration, increase evaporation and runoff, lead to erosion, create grazing distribution problems, and possibly lead to an increase in weedy species.

The crowns of grass plants often survive a wildfire and will regrow, but some can be damaged if the fire occurs when soil and air conditions are extremely dry. Bunchgrasses, such as little bluestem, are the grasses most likely to experience any injury because of litter and old vegetation buildup at the base of the plant as fuel. If plant litter remains after the fire, less damage will have occurred to the plant crowns, and soil conditions will be better. Evaporation and runoff are likely to increase, especially if the fire occurs early in the dormant season. Bare soil may lose at least one-half inch of moisture per week through evaporation. The higher the clay content of the soil, the greater the potential for puddling and runoff.

Trees can burn quite hot and for an extended period of time if they catch fire. Eastern red cedar trees, among others, may be killed by a wildfire. On rangeland, this would normally be considered a good thing. Smoldering trees can continue to throw off burning embers until the fire is completely out; use

caution that these smoldering trees can reignite a fire in the area.

Good precipitation during the early growing season following the wildfire will hasten recovery and lessen the immediate impact of the fire.

Native Warm-Season Grass Rangeland

Between **mid-March and June**, wildfires generally do not reduce forage production as much as fires later in the year. However, if conditions are dry, regrowth will not occur, and the stocking rate must be reduced. Wildfires at this time may change the plant composition of the grazing land.

When wildfires occur between **late June and frost**, the primary concern is protecting plants from overuse. Immediate removal of the grazing animals is usually necessary. This will permit regrowth and allow plants to accumulate food reserves before winter.

Wildfires occurring between **fall and mid-March** leave the soil bare until spring growth. Forage yields will be reduced, and a reduction in stocking rate is advised.

On sandy soils, blowouts (eroded areas) should be controlled as soon as possible. Mulching with manure, straw, or hay free of noxious weeds, along with reseeding can stabilize the blowout area. Fencing of blowouts will restrict livestock traffic and speed recovery. Much of the region in the Ranger Road Fire is sandy soils, and the large amount of acreage burned, combined with strong winds, has resulted in sandy native rangeland soil blowing and drifting within days. Please refer to the companion article in this eUpdate to learn more about wind erosion management options after a wildfire.

Grazing Management Options After Wildfire

For forage plants to recover, it will usually be necessary to reduce stocking rates on the burned area (Table 1). The main concern is the plants' inability to regrow. The plants must be given the opportunity for regrowth during drought. In fact, the drought during the 2022 growing season following the Four County Fire reduced average forage production more than the effects of the fire itself, so balancing expected forage production with animal demand is important to maintain plant vigor.

Table 1. Stocking rate guidelines for pastures burned by wildfire occurring any time other than late spring, from K-State Extension Publication “Rangeland Management Following Wildfire” (L514).

Area	Year after wildfire	Stocking Rate	Comments
Flint Hills and east	1	75-100%	Use lower rates during lengthy droughts
	2	normal	
Central Kansas	1	65-70%	Use lower rates during lengthy droughts
	2	90-100%	
	3	normal	
Western Kansas	1	50%	Use lower rates during lengthy droughts
	2	75%	
	3	normal	

If a wildfire occurs where prescribed burning is generally practiced, burn the areas that were untouched by the wildfire in late spring, when the desirable grass species have 1 to 1.5 inches of new growth. This will encourage grazing of the entire pasture. Observe where the animals are grazing and use grazing distribution tools, such as salt, mineral, and oilers, to attract cattle to underutilized areas.

If a wildfire occurs where prescribed burning is not practiced, management decisions should be based on when the grassland was burned, how much of it was burned, and where livestock water is located. Below are some example scenarios paired with management options.

Example 1: If there is a livestock-watering source in both the burned and unburned portions of the grassland, divide the burned and unburned areas (using an electric fence, for example) and reduce the stocking rate in the burned area.

Example 2: If there is only one livestock-watering source in the grassland area, the decision is whether to manage the burned or the unburned area.

- If the unburned area is larger, separate the two areas with an electric fence and stock the unburned area at the normal rate.
- If the burned area is larger, either manage only the burned part by reducing the stocking rate or establish an alternate water source, fence the area, and reduce the stocking rate on the burned portion.
- If the sole watering source is in the burned portion, the unburned portion would not be utilized unless the area was fenced and another water source established, or a lane is fenced off to allow watering from the unburned area.

Example 3: If only a small portion of the grassland is burned, fence it off and reduce the stocking rate on the unburned portion accordingly.

Example 4: In areas where prescribed burning is commonly practiced, a partial burn of one-third of the pasture may provide an opportunity to try patch-burn grazing. Livestock will concentrate on the recently burned area, but the next year, a different third of the pasture will be burned, and the livestock will change their grazing habits. Patch-burn grazing will result in rotational grazing without using a fence.

Mowing unburned areas in the early spring can encourage livestock to move from the burned area. However, don't mow in August or September. Early intensive grazing is another option for burned areas. Removing all livestock from the grassland by mid-July provides late-season rest and time for

the desirable grasses to replenish root reserves.

Tamegrass Hay Meadows

Hay meadows burned by wildfires will likely produce less hay as this grass type does not positively react to burning, especially as we move out of February. To return hay meadows to their former production, cut the meadow in early to mid-July to allow regrowth and replenishment of root reserves. Be cautious about late cutting of cool-season tamegrass (e.g., smooth brome), as it may leave it more susceptible to fall armyworm damage.

For more information, see:

Rangeland Management Following Wildfire, K-State Research and Extension publication L-514 at: <https://bookstore.ksre.ksu.edu/Item.aspx?catId=364&pubId=385>

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6. Cropland, Soil, and Nutrient Impacts After Wildfire

Wildfires that burn growing crops or remove protective residue from cropland create immediate challenges: crop injury, elevated erosion risk, altered nutrient status, and difficult planting decisions. This article covers wheat injury assessment, options for fields left bare after wildfire, nutrient implications, soil behavior, and emergency tillage for wind erosion control.

Injury to Growing Wheat

Wheat in the jointing stage or beyond can be injured by fire or superheated air. This injury will be most severe on the edge of the field closest to the fire or super-heated air. It is not uncommon to have some injury to growing wheat on the edge of a field if the field is adjacent to a prescribed burn. The injury symptoms may be bleached or scorched leaves and possibly damaged growing points. The extent of injury from a wildfire depends on how quickly the fire moved through the field or around the field.

Research has found that the lethal high temperature for wheat is about 120°F (<http://jxb.oxfordjournals.org/content/35/11/1603.short>).

A wildfire can easily heat the air or the plants themselves to well over those temperatures, depending on how close the fire is to the wheat, possibly resulting in irreparable damage to the affected plants.

Wildfire injury to wheat will most likely be quite variable through the field. The only way to accurately assess any possible injury is to slice open the stems and examine the growing points 10-14 days after the fire. As with freeze damage, if the growing point is green and turgid (crisp) and light green, it is fine. If it is white, off-white, or yellowing and soft, it is damaged. If there was extensive damage, the ability of the wheat to recover will be similar to the ability to recover from spring freeze injury.

Managing Burned Stubble or Residue

In many instances, fields of wheat or row-crop residue intended for seeding are left barren after a wildfire. There are many considerations and options for managing these fields moving forward. The first consideration should be how to protect the field from potential wind and water erosion by the use of emergency tillage (details are presented later in this article).

Farmers generally have several options:

- Summer-fallow the land until seeding of the winter wheat crop
- Plant a summer cash crop
- Plant a cover crop. Options may be limited by timing and the amount of precipitation received after the wildfire.

Summer-Fallow. Summer-fallowing the land is a straightforward option, but with zero residue present to buffer erosion by wind and water, care should be taken to use tillage operations that maintain surface roughness as long as possible up until seeding time.

Planting a summer cash crop. As wildfires typically follow long periods without precipitation, it's

likely that little soil water exists in the profile. While profile water at planting is important, data from long-term rotation studies in western Kansas have consistently shown that surface residue plays a very important role in maximizing the utilization of in-season precipitation. The reduced precipitation use efficiency, combined with low levels of profile water, makes cropping with a summer cash crop a particularly risky option. The larger challenge is that, if the cash crop fails and produces little above-ground biomass, the producer is entering the typically dry, windy winter quite vulnerable to further wind erosion.

Planting a cover crop. If sufficient precipitation is received to establish a stand, a producer may consider a cover crop to grow some biomass as soon as possible and potentially serve as a feed resource if enough growth occurs. In general, a farmer should select species that produce the most biomass per inch of water consumed. For cool-season species, this would include spring triticale and oat. Millets and sorghums are warm-season species. In the early spring, a producer may want to plant a blend of cool-season and warm-season species to get some cover more quickly from the cool-season crop, followed by higher amounts and more durable residue from the subsequent warm-season crop.

Keep in mind that soil temperatures will be warmer with no residue, so millets and sorghums will generally germinate earlier than what is considered normal at a typical planting date. If planting a blend, it's important to select a planting depth that both places the seed in moisture and is acceptable for the species selected.

Some potential cover crops, such as oats and some millets, will require shallower seeding than other potential species. At the time of this writing, most producers should consider moving towards seeding cool-season covers. If a producer has access to a hoe-drill, that method of seeding may offer some benefits for erosion reduction, protection of the emerging cover crop, and -- if done on the contour of sloping land -- reduction of soil erosion by runoff.

Nutrient considerations

About half of the nitrogen and sulfur in the crop residues are lost to combustion during a fire. In extremely hot fires (the occurrence of white ash is an indicator), more than 25% of the phosphorus in the residue may be lost. Remaining nutrients would be in the ash, which can easily be lost from the field by wind or runoff. If nitrogen had been surface-applied and was not yet incorporated by precipitation or tillage, it is likely that a significant portion will have been lost. It will take time for nutrient cycling to return to normal. It's recommended that soil sampling be conducted prior to the next cash crop and thereafter to detect and address deficiencies.

Erosion Risk After Wildfires

The number one issue regarding the impact of a wildfire on soil quality is susceptibility to erosion from water or wind. Past research, mainly on forest soils after a fire, indicates there is nothing to worry about regarding long-lasting chemical or biological effects in the soil. Managers and landowners may notice a hardening of the soil surface, but there is no reason to be concerned that the fire will make the soil hydrophobic (reduced water infiltration). That can happen in forest soils, but is unlikely in grassland soils. Any surface hardening caused by the wildfire will likely be shallow and temporary.

If the vegetative cover on the soil surface is completely burned off, this increases the potential for

wind erosion during the early spring months, when wind erosion rates are often at their highest (Figure 1).

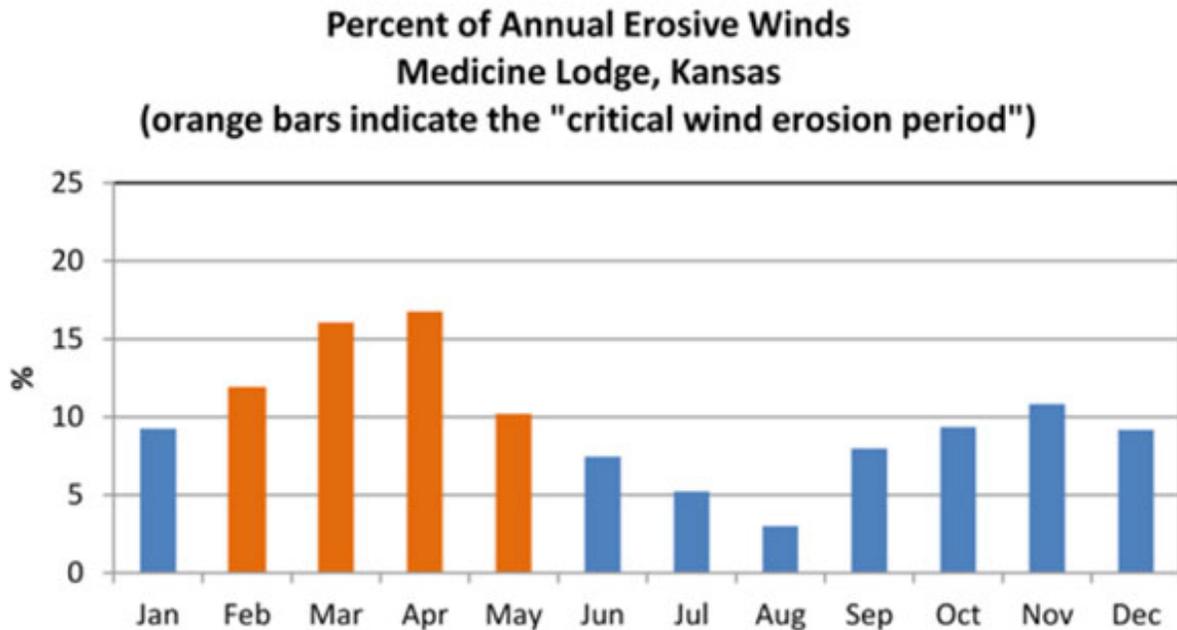


Figure 1. Percent of annual erosive winds by month for Medicine Lodge, KS. Source: John Tatarko, USDA-ARS Agricultural Systems Research Unit, Ft. Collins, Colo.

Vegetation growth within a week or two of the fire would reduce the potential for erosion problems. However, this isn't likely with February fires on warm-season grasslands. When vegetation or residue cover is insufficient, ridges and large soil clods (or aggregates) are frequently the only means of controlling erosion on large areas. In grasslands, seeding a temporary cover crop is another option for small areas, if the permanent grasses and forbs do not seem to be growing back with the onset of the growing season and receiving some moisture. If there is no soil moisture, however, planting a cover crop will likely fail.

Using Emergency Tillage to Control Wind Erosion

One option for cropland or smaller tracts of grassland left bare after wildfire is to roughen the soil surface using ridges and clods. A rough, cloddy surface slows wind at ground level and traps moving soil particles, reducing erosion. While this approach is not practical on large rangeland acreages, it can be very effective on cropland and smaller burned areas. Surfaces that are both ridged and cloddy provide the best wind protection.

Crosswind ridges, created by tilling or planting across the prevailing wind direction, are particularly useful. In Kansas, early spring winds predominantly come from the south, so ridges should generally run east–west to protect against both southerly and northerly winds. When burned cropland borders burned grassland, placing ridges along field edges can help prevent soil from drifting into fencerows or roadside ditches.

In fields with terraces, continuous east–west or southeast–northwest passes may not be possible. In these cases, tillage can be used to roughen the terrace faces most exposed to prevailing winds, with

additional contour passes between terraces if blowing persists. Contour tillage on terrace backsides can also reduce water-driven soil movement until vegetation or residue is re-established.

Tillage tools create ridges and depressions that disrupt wind flow. Depressions help capture saltating particles (soil grains that bounce along the surface) and can contribute to erosion further downwind (Figure 2). However, ridges also protrude higher into turbulent air and face stronger wind forces, so it is important that the clods on top of ridges are large and durable enough to resist breakdown. Ridges made of sand, for example, provide little benefit because sandy clods erode quickly.

Clod-forming tillage is most effective when it produces aggregates large enough to resist wind and withstand abrasion throughout the erosion season. Over time, as smaller particles blow away or are trapped, a surface with strong clods becomes increasingly stable or “armored.” The longevity of this protection depends on clod durability and wind variability.

Soil texture strongly influences the ability to form stable clods.

- **Sandy and coarse-textured soils** lack the silt and clay needed to bind particles together and are therefore highly susceptible to erosion.
- **Loams, silt loams, and clay loams** tend to form stronger aggregates.
- **Clays and silty clays** can break into fine granules that are still prone to movement.

Adequate soil moisture is also important. If the soil is extremely dry, clods may not form well, and deeper tillage might be needed to bring up more cohesive material.

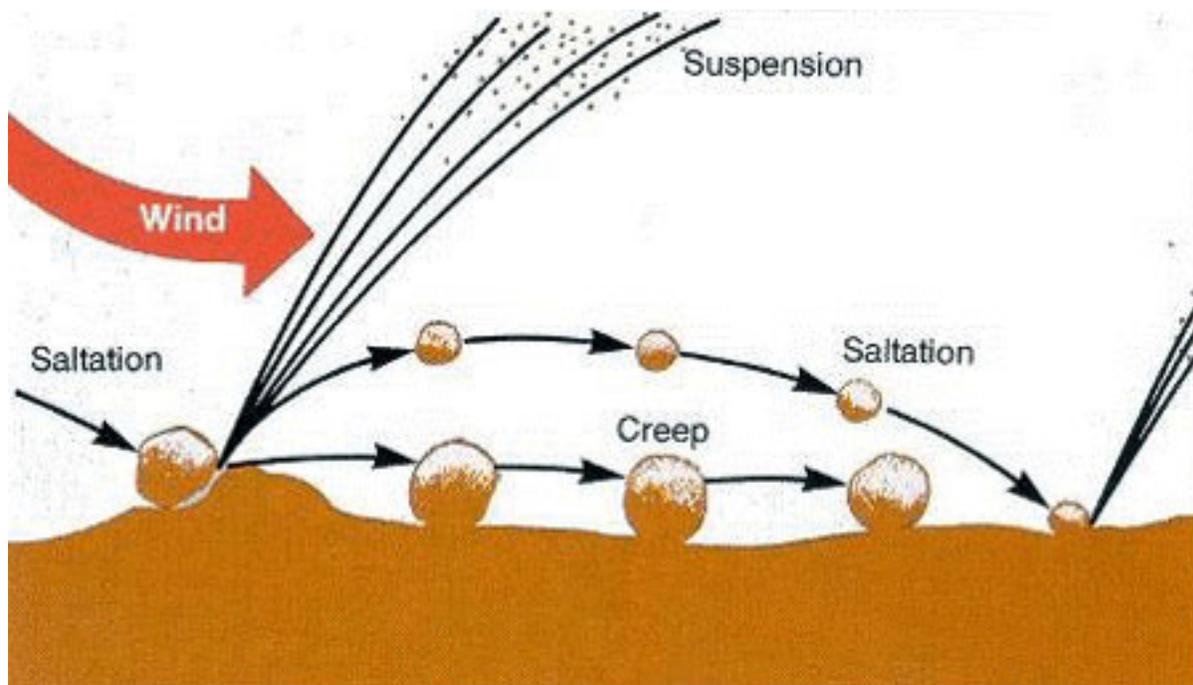


Figure 2. Soil particles can move through saltation, creep, and suspension. Source: Principles of Wind Erosion and Its Control, K-State Research and Extension publication MF-2860: <http://www.bookstore.ksre.ksu.edu/pubs/MF2860.pdf>

Emergency Tillage Equipment Selection

Selecting the proper tillage implement for emergency tillage is critical to achieving meaningful, lasting results. Chisels, aggressive rippers, and listers are useful implements when they can be run deep enough to bring large clods to the surface. Any type of rolling basket or firming wheels on a ripper or harrows on a chisel should be completely raised to maximize surface roughness. Sweep (blade) plows, field conditioners, discs, and vertical tillage machines are not useful in reducing wind erosion and in many instances can make the situation worse by exposing even more fine, erodible, soil particles than would be exposed on a post-fire soil surface.

For more information, see:

Principles of Wind Erosion and Its Control, K-State Research and Extension publication MF-2860 at:
<http://www.bookstore.ksre.ksu.edu/pubs/MF2860.pdf>

Emergency Wind Erosion Control, K-State Research and Extension Publication MF-2206 at:
<https://bookstore.ksre.ksu.edu/pubs/mf2206.pdf>

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7. Topdressing Canola: How to Maximize the Benefits

To maximize the yield potential of winter canola, producers should topdress with nitrogen (N), sulfur (S), and possibly boron in the winter. Producers should make topdress applications with consideration for the environmental conditions, the nutrients needed, and the application method.

Environmental conditions

The typical time to topdress winter canola is during the rosette stage. Usually, this can be accomplished in January or February since temperatures are cold enough to keep the canola at the rosette stage.

Late winter temperatures may have been cold enough to trigger the typical winter color change, with leaves turning white and brown as chlorophyll is lost. When these leaves are pulled back, the majority of plant crowns are green and firm, indicating that the plants are alive. However, final winter survival ratings should not be taken until the crop begins to break dormancy and after the threat of further cold temperature loss has passed.

Producers should check their fields for surviving plants before applying a topdress application, even if there is no concern about poor winter survival (Figure 1). Where stand thinning is observed, it may be advisable to wait until canola is actively growing again before topdressing. This will ensure that there is an adequate spring stand to take to harvest.



Figure 1. Canola beginning to break dormancy at the appropriate time for topdressing. Photo by Mike Stamm, K-State Extension

Nutrients

A combination of nitrogen and sulfur can be used in the topdressing blend.

Nitrogen. Canola responds to nitrogen fertilizer applied in late winter while the plants are still dormant. About two-thirds of the total N needed by the canola crop should be applied as a winter topdress. This can be done at dormancy or as plants begin to show increased growth, but before the plants bolt. The reason is that N uptake increases rapidly before bolting. Topdress applications should be based on an updated assessment of yield potential, less profile residual N, and the amount of N applied in the fall.

Suggested N rates for five yield levels and a soil with 2 percent organic matter and varying residual nitrate-N levels is shown in Table 1.

For soils with 1 percent organic matter, add 15 pounds N for each yield and nitrate level. For soils with 3 percent organic matter, subtract 15 pounds N for each yield and nitrate level.

Table 1. Total nitrogen fertilizer needs for canola as affected by yield potential and soil test nitrogen levels in the southern Great Plains (from Great Plains Canola Production Handbook: <http://www.ksre.ksu.edu/bookstore/pubs/mf2734.pdf>

Profile N test lb/acre	Canola yield potential lb/acre				
	1,500	2,000	2,500	3,000	3,500
0	75	100	125	150	175
20	55	80	105	130	155
40	35	60	85	110	135
60	15	40	65	90	115
80	0	20	45	70	95
100	0	5	25	50	75

Either solid or liquid forms of N can be used. Once the weather warms and growth begins, applications using streamer bars or solid materials are preferred for broadcast applications to prevent/avoid leaf burn.

Controlled-release products such as polymer-coated-urea (ESN) might be considered on very sandy soils prone to leaching, or poorly drained soils prone to denitrification. Generally, a 50:50 blend of standard urea and the coated urea -- which will provide some N immediately to support bolting and flowering and also continue to release some N in later stages of development -- works best in settings with high loss potential.

Sulfur. If canola is deficient in S, the consequences can be very serious because the crop needs S to produce protein in the seed. For this reason, soils having less than 20 lb/acre sulfate-S in the upper 24 inches should receive supplemental S. A good rule to follow is to keep S-to-N availability at a ratio of about 1 to 7. Another simple guideline is to apply 20 lb S per acre, which will be sufficient for low and

medium yield levels. Sulfur can be applied in the fall and incorporated into the seedbed or surface-applied with N in the winter topdressing. Canola growers may consider using elemental S, or sulfate forms (e.g. ammonium sulfate, or liquid ammonium thiosulfate). Since elemental S must oxidize to become plant available, it should only be applied in the fall. Ammonium thiosulfate or ammonium sulfate can be applied in the spring or fall, but thiosulfate should not be topdressed directly on green tissue or placed with seed to avoid short-term phytotoxicity.

Boron. If deficient, boron is one micronutrient that can have negative consequences on canola yield. Typically, boron deficiency is not something we have seen in Kansas. However, if there are micronutrients that could influence yield, then boron would be one of them. The most important thing is to know what your soil sample states. Applying boron may help to reduce flower abortion and enable efficient pod filling. However, there is not much room for error when comparing adequate boron fertility levels and toxic levels that might result from over application. Because of this, application rates of boron are often 1.0 lb per acre or less. Soil and foliar applications of boron are effective. Foliar applications can be made with herbicides, and soil-applied boron can be either broadcasted or banded. Make sure applications are uniform across the field to avoid toxicity, and avoid contact with the seed for band-applied boron.

Application method

It is important to avoid crushing winter canola with wide applicator tires. Crushed plants will lodge and maturity will be delayed, which can slow harvest and increase the risk of shattering losses. For this reason, applicators with narrow tires are preferred. As for the question of whether broadcast or banding is best, if temperatures are cold and the plants are dormant, topdress fertilizer can be broadcast. If temperatures are mild enough that the canola plants have resumed active growth, it may be best to use streamer bars or some other form of banded application to avoid foliar burn.

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8. Help Improve Irrigation Management for Kansas Soybeans – Take this Survey

Much of the irrigation research in Kansas has focused on cropping systems in the western part of the state. However, as irrigated acres shift eastward, there is limited data on how irrigated soybeans are managed across Kansas, especially when it comes to yield and pest management. Even less is known about the practices farmers use on irrigated soybean fields.

We are conducting a survey targeting on-farm practices related to cropping, irrigation, and pest management. Your input will help guide future research and refine recommendations for more effective and sustainable soybean production.

This survey is part of a project supported by the Kansas Soybean Board.

Interested in sharing your experiences? Please follow the link or scan the QR code to access the questionnaire.

https://kstate.qualtrics.com/jfe/form/SV_eA7EnuS3HoLprYq



ATTENTION SOYBEAN FARMERS
Survey Participants Needed

Anonymous Responses **10-15 minutes to complete** **Simple Questions**

Help drive irrigated soybean research

Scan the QR Code to Take the Survey Today!

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KANSAS SOYBEAN COMMISSION

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Tina Sullivan, Northeast Area Agronomist
tsullivan@ksu.edu

9. K-State Crop Talk Webinar Series Continues in 2026



The popular K-State Crop Talk online webinar series is back, kicking off on February 10 and continuing through March 10. The Crop Talk series will highlight several topics important to crop producers in north central and northwest Kansas. Topics include flex leases, soil water availability, wheat breeding efforts on mosaic viruses, fungicides for corn and sorghum, and insect control. Continuing education credits will be offered, with one credit for each session.

Each webinar will begin at 12:00 pm (CST) and last until 1:00 pm, beginning with the first one on Tuesday, February 10. If you missed the first one, you can still register to receive links for the upcoming webinars.

Upon registration, participants will receive an email with instructions to attend via Zoom or YouTube. These virtual webinars are open to all and free. Register online at <http://www.bit.ly/KSUCropTalk> or call your local extension office.

A complete list of webinars, with dates, topics, and speakers, is detailed in the flyer below.



CROPtalk

Broadcast Live from 12:00 – 1:00 pm CT
via Zoom and YouTube

February 10

Understanding Flex Leases

Robin Reid, K-State Extension Ag Economist

February 17

Available Soil Water At Planting and Related Management

John Holman, K-State Extension Cropping Systems Agronomist

Augustine Obour, K-State Professor of Soil Science

February 24

Wheat Conditions & Breeding Efforts on Mosaic Viruses

Allen Fritz, K-State Wheat Breeder

March 3

Fungicide Applications in Corn and Sorghum

Rodrigo Onofre, K-State Extension Plant Pathologist

March 10

What's Bugging You? Insects to Watch for in the Field

Anthony Zukoff, K-State Entomologist



Scan me!

Register to attend at
www.bit.ly/KSUCropTalk

Links for joining will be sent after registration.
One Certified Crop Advisor (CCA) Credit per session has been applied for.

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If you have questions, please contact your local Extension agent or the K-State
Northwest Research and Extension Center at 785-462-6281.

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