Issue 1045

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eUpdate

03/20/2025

These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy eUpdate Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Kathy Gehl, 785-532-3354 kgehl@ksu.edu, or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 dpeterso@ksu.edu.

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1. First hollow stem update - March 17, 2025

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's crew measure FHS on a weekly basis in 16 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 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 March 17, all varieties had started to elongate their hollow stem, although none had yet reached the 1.5 cm threshold for cattle removal from wheat pastures.

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 split per variety. Photo by Romulo Lollato, K-State Research and Extension.

Table 1. Length of hollow stem measured between February 17 and March 17, 2025 of 16 wheat varieties sown mid-September 2024 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). Value(s) in bold indicate the highest FHS group.

Variety	First Hollow Stem (cm)				
	2/17	2/24	3/6	3/10	3/17
AP Sunbird	0	0	0	0.00	0.41
AP24 AX	0	0	0	0.03	0.70
AR Iron Eagle AX	0	0	0	0.06	0.44
AR Turret 25	0	0	0	0.04	0.51
CLH10-153.022	0	0	0	0.00	0.37
CLH10-1853.014	0	0	0	0.03	0.37
CP7017AX	0	0	0	0.01	0.50
CP7869	0	0	0	0.03	0.29
Kivari AX	0	0	0	0.09	0.58
KS Ahearn	0	0	0	0.01	0.34
KS Bill Snyder	0	0	0	0.00	0.29
KS Mako	0	0	0	0.02	0.35
KS Providence	0	0	0	0.01	0.55
KS Territory	0	0	0	0.00	0.29
KS21H36	0	0	0	0.01	0.22
Sheridan	0	0	0	0.01	0.35

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 monitor their wheat pastures closely.

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. Still, it is extremely important to monitor FHS from an ungrazed portion of each individual wheat pasture to make the decision to remove cattle from wheat pastures.

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2. Considerations for early fungicide applications on wheat in 2025

Wheat is greening up across Kansas and producers are preparing to topdress nitrogen or apply herbicides. We commonly receive questions about the value of including a fungicide in the mix with those applications. This can be an economical option, but there are a few things to remember.

Research at K-State and in other regions continues to demonstrate that fungicides applied between flag leaf emergence and heading growth stages provide the largest level of yield protection against foliar diseases. The yield response to this later fungicide application is influenced by the level of disease risk (amount of disease and predicted weather conditions), variety resistance to the most threatening fungal diseases, crop yield potential, foliar fungicide efficacy, and other factors.

Fungicides can also be applied as an early application made between "spring green-up" and jointing. This application may provide some yield benefits in some fields and years but often doesn't achieve the same level of yield protection as post-flag leaf emergence applications. Early fungicide applications may result in a yield advantage due to a reduction in early disease establishment in the lower canopy. This may be particularly true for "leaf spot diseases" such as tan spot or Septoria leaf blotch that survive in wheat residue and can establish early in the year. Yield benefits are most likely in wheat fields planted back into wheat stubble and when weather conditions are wet enough to favor fungal disease development. There can also be some rust suppression with early applications, particularly when disease levels are high later in the season (Figure 1). The challenge is that it is difficult to know if rust disease will be a threat during these early growth stages.

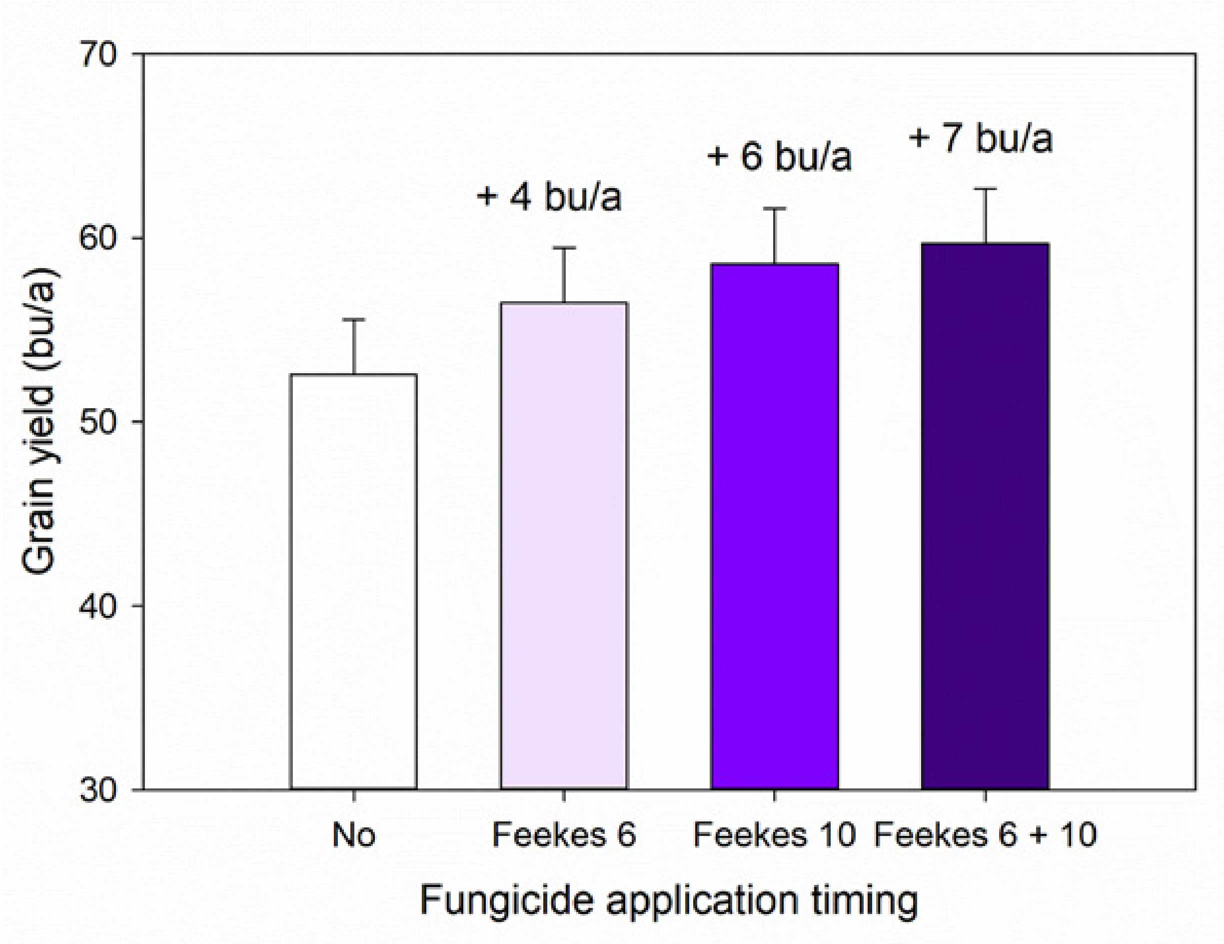

Figure 1. Yield benefit of Feekes 6 (first node visible) solo application, Feekes 10 (boot) application, and a two-application program. Data represents the average of 20 trials conducted under naturally occurring disease pressure.

If you decide to make an early application, it is important to factor that into the full-season fungicide program. Many active ingredients have use restrictions, where a limited amount of an active ingredient can be applied during a single season. It is important to ensure that early fungicides do not limit options for fungicide applications at flag leaf (which have the potential for higher yield protection in conducive disease years). Some fungicides have special "2ee" labels that allow for lower-rate applications early in the season for winter wheat. Double-checking labels when choosing a fungicide product is always a good idea.

Since the payoff for an early application is less certain than with later applications, it is perhaps best to consider using a low-cost fungicide for the early application and saving more expensive products, if desired, for the later application.

Producers considering the use of split applications must pay close attention to label restrictions. Every active ingredient in a fungicide has a maximum total amount that can be applied during the season.

For example, if an early application of a generic form of tebuconazole is applied at 4 oz/acre, a subsequent application of any fungicide containing tebuconazole alone or in combination with other ingredients (e.g., premix) around heading could put you over the limit for the crop season. Thus, be sure to read the label to determine the maximum amount of a chemical that can be applied in a single season and the exact amount of a chemical(s) that is in a fungicide.

For information on the efficacy of different foliar fungicide products, refer to the K-State Research and Extension publication *Foliar Fungicide Efficacy Ratings for Wheat Disease Management 2024*, EP130.

Conclusions

The main conclusions we can draw from recent studies in Kansas:

- In K-State studies, the greatest average profit has come from the flag leaf application of fungicides. Fungicides applied prior to or around jointing can provide some yield benefit when disease is present, but they do not provide as much protection as a flag leaf application.
- The likelihood of profit for an early-season fungicide application is greatest for susceptible varieties in continuous wheat systems with a high level of surface wheat residue.
- Fields with hot spots of tan spot, septoria leaf blotch, and stripe rust prior to flag leaf emergence are candidates for an early fungicide application, provided environmental conditions are conducive for further disease development and crop yield potential. These applications are often most effective when made around the jointing stages of growth.

Additional resources

KSRE publication *Foliar Fungicide Efficacy Ratings for Wheat Disease Management 2024*.

For information on assessing the need for wheat foliar fungicide, refer to the KSRE publication *Evaluating the Need for Wheat Foliar Fungicides*, MF3057.

Another publication providing good information, from which a few excerpts were used in this article, is Oklahoma State University's *Split Versus Single Applications of Fungicides to Control Foliar Wheat Diseases*, PSS-2138.

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3. Optimal corn seeding rate recommendations

When determining the optimal seeding rate for corn, it is important to remember the level of management, hybrid, and environment all interact with one another on the planted population. Producers may look back to their corn crop from the previous growing season or wait until the current growing season is nearly complete to evaluate whether the corn seeding rate they have used was adequate. Management factors often overlooked include planting date, nitrogen fertilization, row spacing, and crop rotation. All affect optimal planting rates differently.

Although specific hybrids can respond differently, the following guidelines may help decide if the selected corn seeding rates need to be adjusted.

1. **Few kernels per ear**: if more than 5% of the plants are barren or most ears have fewer than 250 kernels per ear, the corn seeding rate may be too high.
2. **Too many kernels per ear**: if there are consistently <u>more than 600 kernels per ear</u> or most plants have a <u>second ear</u> contributing significantly to grain yield, the corn seeding rate may be too low. The growing conditions can influence ear number and ear size, making it important to consider the growing conditions for that season when interpreting these plant responses.
3. **Tipping back**: don't be too concerned if a half-inch or so of the ear tip has no kernels. If kernels had formed to the tip of the ear, there may have been room in the field for more plants, which would have contributed to higher grain yield. Again, this "tipping back" will vary with the hybrid, management, and growing environment interaction.
4. **Irrigation**: If fertilizer or irrigation rates are significantly increased or decreased, optimal corn seeding rates may need to be adjusted. For example, research at the Irrigation Experiment Field near Scandia (North Central KS) has shown that corn seeding rates also have to be increased to attain the maximum yield benefit if fertilizer rates are increased.
5. **Nutrient status**: in addition to the growing conditions, nutrient status can also influence the final number of grains per ear. For example, severe nitrogen (N) deficiency will greatly impact the final number of grains, ear size, and ear number.

Keep in mind that the potential ear size and the potential number of kernels (1,000-1,200 per ear) are set before silking (R1), but the actual final number of kernels is not determined until after pollination and early grain fill (R2-R3) due to relative success of fertilization and degree of early kernel abortion.

Always keep long-term weather conditions in mind. In a drought year, almost any corn seeding rate is too high for the available moisture in some areas. Although it's not a good idea to make significant changes to seeding rates based only on recent events, it is worthwhile considering how much moisture is currently in the soil profile and the long-term forecasts for the upcoming growing season.

For this growing season, if you think weather conditions will be more favorable for corn this year than in past years, stay about in the middle to the upper part of the range of seeding rates in the table below. If not, and you expect dry subsoils, you might want to consider going towards the lower end of the range of recommended seeding rates, with the warning that if growing conditions improve, you will have limited your top-end yield potential.

The recommended corn seeding rate and final plant population in the following tables attempt to factor in these types of questions for the typical corn growing environments found in Kansas. Adjust within the recommended ranges depending on the specific conditions you expect to face and the hybrid you plan to use. Consult your seed dealer to determine if seeding rates for specific hybrids should be at the lower or upper end of the recommended ranges for a given environment.

Table 1. Suggested dryland corn seeding rates and target plant populations for six cropping regions in Kansas.

Region	Seeding Rate	Target Plant Population
Northwest	19,000 – 24,000	16,000 – 20,000
Southwest	16,000 – 24,000	14,000 – 20,000
North Central	24,000 – 26,000	20,000 – 23,000
South Central	21,000 – 26,000	18,000 – 22,000
Northeast	Medium: 26,000 – 30,000	Medium: 22,000 – 25,000
	High: 28,000 – 33,000	High: 24,000 – 28,000
Southeast	Short Season: 24,000 – 26,000	Short Season: 20,000 – 22,000
	Full Season: 28,000 – 30,000	Full Season: 24,000 – 26,000

Table 2. Suggested irrigated corn final populations and seeding rates.

Environment	Hybrid Maturity	Final Plant Population (plants per acre)	Seeding Rate* (seeds per acre)
Full irrigation	Full-season	28,000-34,000	33,000-40,000
	Shorter-season	30,000-36,000	35,000-42,500
Limited irrigation	All	24,000-28,000	28,000-33,000

* Assumes high germination and that 85 percent of seeds produce plants. Seeding rates can be reduced if field germination is expected to be more than 85%.

K-State research on corn seeding rates

An intensive review of a large database from Corteva Agriscience (2000-2014 period) was utilized to synthesize yield response to plant population under varying yield environments (<100 bu/acre to >200 bu/acre). Overall, yield response to plant population depended on the final yield environment (Figure 2). In yield environments below 100 bu/acre, yield response to plant population was slightly negative. Yield response to plant population tended to be flat when the yield environment ranged from 100 to 150 bu/acre, positive and quadratic with the yield environment improving from 150 to 180 bu/acre, and lastly, increasing almost linearly with increasing plant populations when the yield environment was more than 200 bu/acre (Figure 2).

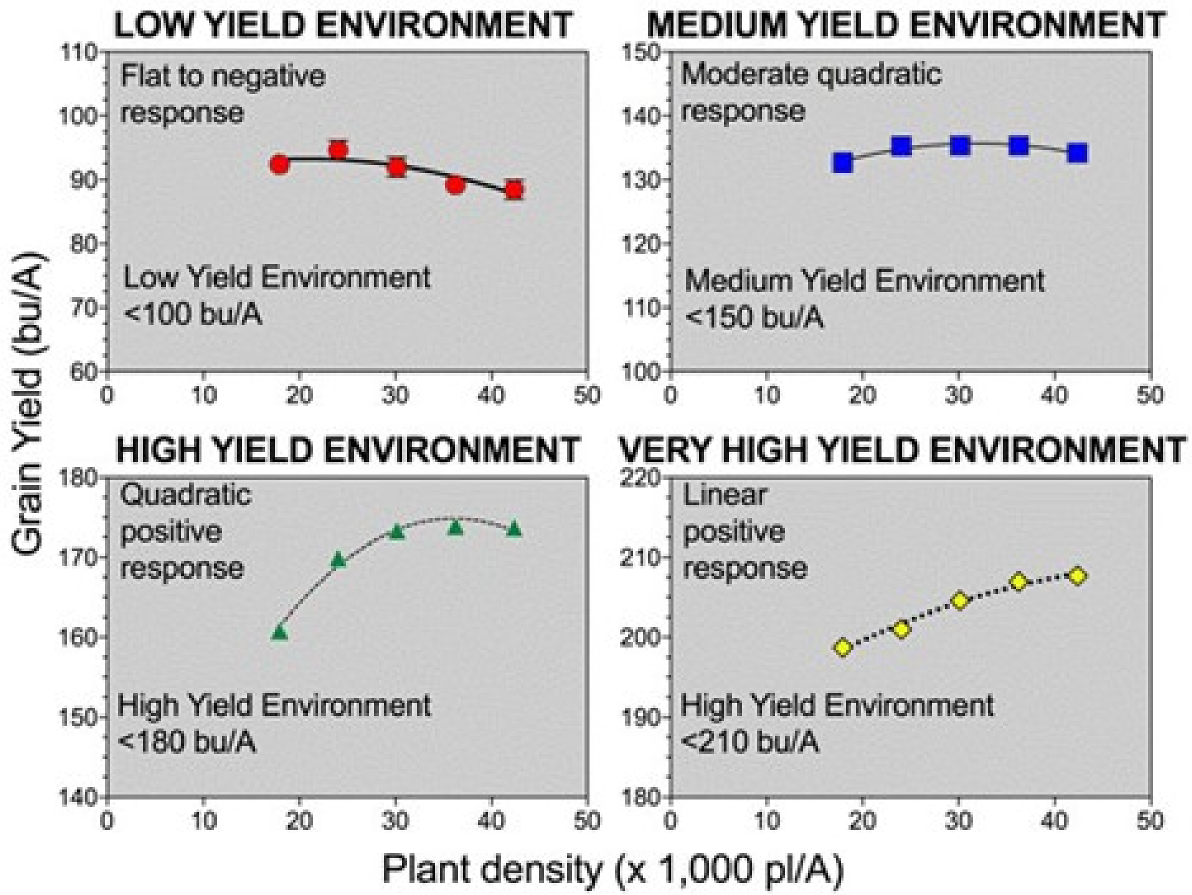

Figure 2. Corn grain yield response to plant density in four yield environments, a) <100; b) 100-150; c) 150-180; and d) > 180-210 bu/acre (Assefa, Ciampitti et al., 2016, Crop Science Journal). Figure created by I.A. Ciampitti, K-State Research and Extension.

As a disclaimer, the "agronomically" optimum plant population does not always match with the "economically" optimal plant population. The final seeding rate depends on the genetics (hybrid), the environment, and other production practices (e.g., planting date, crop rotation, tillage). Also, keep in mind the corn yield response to plant density curves is merely indicative as it represents simplified models that carry uncertainty (error).

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4. Marestail in soybeans: Strategies for the best control

Controlling marestail in soybeans can be a challenge for Kansas no-till producers. Application timing and weed size are critical factors for successfully controlling this weed germinating in the fall or early spring. Research has shown that up to 80% of marestail can die over the winter as a result of cold temperatures and/or lack of adequate moisture. In addition, a well-established cover crop in the fall can reduce marestail establishment and survival. However, marestail that does survive is often robust and can be difficult to control with herbicides, especially later in the spring. Herbicide options are also limited by widespread resistance to glyphosate and/or ALS-inhibiting (group 2) herbicides in marestail.

Figure 1. Glyphosate-resistant marestail in soybeans. Photo by Dallas Peterson, K-State Research and Extension.

Early spring options

In the early spring, using a Group 4 (growth regulator) herbicide such as 2,4-D and/or dicamba is an inexpensive and effective option to control rosette marestail (Figure 2, left). Dicamba provides better marestail control than 2,4-D and will also provide some residual control, especially at higher use rates. Haluxifen (Elevore) is a newer group 4 herbicide that can provide similar marestail control to dicamba. Making these applications in March generally allows adequate time ahead of planting soybeans to meet required pre-plant intervals, but more importantly, spraying weeds before they bolt (Figure 2, right) will result in greater control. In general, marestail in Kansas will bolt in April, so now is the time for these applications.

Using herbicides with a longer residual helps control weeds that germinate between early spring applications and soybean planting. Products that include chlorimuron (Classic, Canopy), cloransulam (FirstRate), flumioxazin (Valor, others), saflufenacil (Sharpen, Optill, Verdict), or metribuzin, can help provide residual control against several broadleaf species, including marestail. However, it is very important to consult and follow the herbicide label guidelines for the required pre-plant intervals prior to planting soybeans, as well as the proper rate for your soil. Also, keep in mind that resistance may reduce the effectiveness of ALS-inhibiting herbicides such as chlorimuron and cloransulam.

Figure 2. Marestail in the rosette growth stage (left photo) versus bolted (right photo). Photos by Sarah Lancaster, K-State Research and Extension.

Pre-plant options

As soybean planting nears, existing marestail plants can become difficult to control because plants will have bolted and be considerably larger. Herbicides to apply as a burndown prior to planting include tank mixes of glyphosate with 2,4-D and the residual products listed above.

Be very careful to follow label directions regarding plant-back restriction when applying 2,4-D ahead of soybean varieties that are not resistant to 2,4-D choline. Enlist soybean varieties have no plant-back restriction for Enlist One or Enlist Duo. However, non-resistant varieties have plant-back restrictions that range from 0 to 30 days depending on the herbicide rate and formulation, as well as soybean variety, precipitation, and geography.

One additional herbicide to consider as a rescue burndown application to control bolting marestail prior to soybean planting is glufosinate (Liberty and others). Although, it would be better to control marestail at an earlier stage of growth, glufosinate has been one of the most effective herbicides to control bolting marestail. Glufosinate is a non-selective herbicide that has activity on other broadleaf and grass species. Glufosinate is a contact herbicide, so a spray volume of 15 gallons per acre or greater generally provides the most consistent weed control. Glufosinate tends to work best under higher humidity and warm, sunny conditions at application.

Post-emergence options

Controlling marestail in the growing soybean crop can be the biggest challenge for producers, especially in soybeans that are not resistant to 2,4-D. Enlist One or Enlist Duo will be effective control options in Enlist E3 soybeans. One final post-emergence option to consider is glufosinate. Glufosinate resistance is in Liberty Link and Enlist E3varieties.

For more detailed information, see the "2025 Chemical Weed Control for Field Crops, Pastures, and Noncropland" guide available online at https://bookstore.ksre.ksu.edu/pubs/SRP1190.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. Drought Resilience and Recovery Schools in Southwest Kansas

Join us in south central and southwest Kansas for a series of five Drought Resilience and Recovery Schools. Meetings will kick off with a weather update and outlook for 2025, followed by topics ranging from alternative grain and forage crops/cropping systems to pasture and pond management. Each meeting will have a meal provided.

See below for details by location:

Harper County - March 25, 2025 (9:00 AM)

- Location: Westview Lodge, 1100 W 14th St, Harper, KS 67058
  - Speakers:
    - Weather Update and Outlook – Chip Redmond, KSRE
    - Pasture Management and Stocking Rates – Lody Black, KSRE
    - Water and Pond Management – Joe Gerken, KSRE
    - Alternative Forage Selection – Jenni Carr, KSRE
- RSVP with Macaley Hall at (620)842-5445 or macaleyh@ksu.edu

Pratt County – March 25, 2025 (4:00 PM)

- Location: Pratt Area 4-H Center, 81 Lake Rd, Pratt, KS 67124
  - Speakers:
    - Weather Update and Outlook – Chip Redmond, KSRE
    - Water use and conservation – Jonathan Aguilar, KSRE
    - Alternative Crops/Cropping Selection – Logan Simon, KSRE
    - Water and Pond Management – Joe Gerken, KSRE
- RSVP with Jenna Fitzsimmons at (620)672-6121 or jbfitzsimmon@ksu.edu

Morton County – March 26, 2025 (4:00 PM)

- Location: Morton County Civic Center, 400 E Orchard St, Elkhart, KS 67950
  - Speakers:
    - Weather Update and Outlook – Chip Redmond, KSRE
    - Pasture Management and Stocking Rates – Keith Harmoney, KSRE
    - Alternative Forage Selection – Logan Simon, KSRE
    - Alternative Crops/Cropping Selection – Logan Simon, KSRE
    - Mental Health and Wellbeing – Crystal Bashford, KSRE
- RSVP with Megan Frownfelter at (620)697-2558 or mfrownfelter@ksu.edu

Wichita County – March 27, 2025 (9:00 AM)

- Location: Wichita County Community Building, 502 W St, Leoti, KS 67861
  - Speakers:
    - Weather Update and Outlook – Chip Redmond, KSRE
    - Alternative Crops/Cropping Selection – Logan Simon, KSRE
    - Water use and conservation – Jonathan Aguilar, KSRE
    - Pasture Management and Stocking Rates – Keith Harmoney, KSRE

- RSVP with Allen Baker at (620)675-2724 or abaker@ksu.edu

Hodgeman County – March 27, 2025 (4:00 PM)

- Location: Hodgeman County Fair Building, S Atkin St, Jetmore, KS 67854
    - Speakers:
        - Weather Update and Outlook – Chip Redmond, KSRE
        - Alternative Crops/Cropping Selection – Logan Simon, KSRE
        - Pasture Management and Stocking Rates – Keith Harmoney, KSRE
- RSVP with DeWayne Craghead at (620)357-5315 or hg@listserv.ksu.edu

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6. Cover Crop Schools in Southwest Kansas

Join us in south central and southwest Kansas for a series of three Cover Crop Schools. The schools will feature discussions on productivity and water use efficiency, soil health, and grazing considerations from K-State Research and Extension specialists Logan Simon, Augustine Obour, and Jaymelynn Farney. Each meeting will have a meal provided.

See below for details by location:

Kearney County – April 1, 2025 (Noon)

- Location: Kearny County Fair Building, 1482 Rd R, Lakin, KS 67860
- RSVP with Jessica Sharp at (620)355-6551 or jessicasharp213@ksu.edu

Ford County – April 1, 2025 (6:00 PM)

- Location: Ford County Fair Building, 901 W Park St, Dodge City, KS 67801
- RSVP with Andrea Burns at (620)227-4542 or aburns@ksu.edu

Kingman County – April 2, 2025 (6:00 PM)

- Location: The Hangar, 126 N Main, Kingman, KS 67068
- RSVP with Grace Schneider at (620)532-5131 or gschei@ksu.edu

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