



**K-STATE**  
Research and Extension

## **Extension Agronomy**

# eUpdate

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*02/22/2024*

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](mailto:kgehl@ksu.edu), or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 [dpeterso@ksu.edu](mailto:dpeterso@ksu.edu).

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<b>1. Late winter kochia control in fields going to corn or grain sorghum.....</b>	<b>3</b>
<b>2. Wheat streak mosaic virus confirmed in three counties in Kansas in 2024.....</b>	<b>6</b>
<b>3. 2023 Kansas Performance Tests reports for corn, soybeans, grain sorghum, and sunflowers.....</b>	<b>12</b>
<b>4. Corn management in Kansas for 2024.....</b>	<b>14</b>
<b>5. Wheat Rx seminars - Get your prescription for next year's wheat crop.....</b>	<b>16</b>
<b>6. K-State Crop Talk webinar series kicks off on February 20.....</b>	<b>18</b>

## 1. Late winter kochia control in fields going to corn or grain sorghum

Last week, we shared some general information about applying [pre-emergence herbicides for kochia control](#). This week, we will focus on specific recommendations for fields going to corn or grain sorghum this growing season. Next week, we'll discuss fields going to soybean, sunflower, and wheat.

### **Kochia control in fields going to corn**

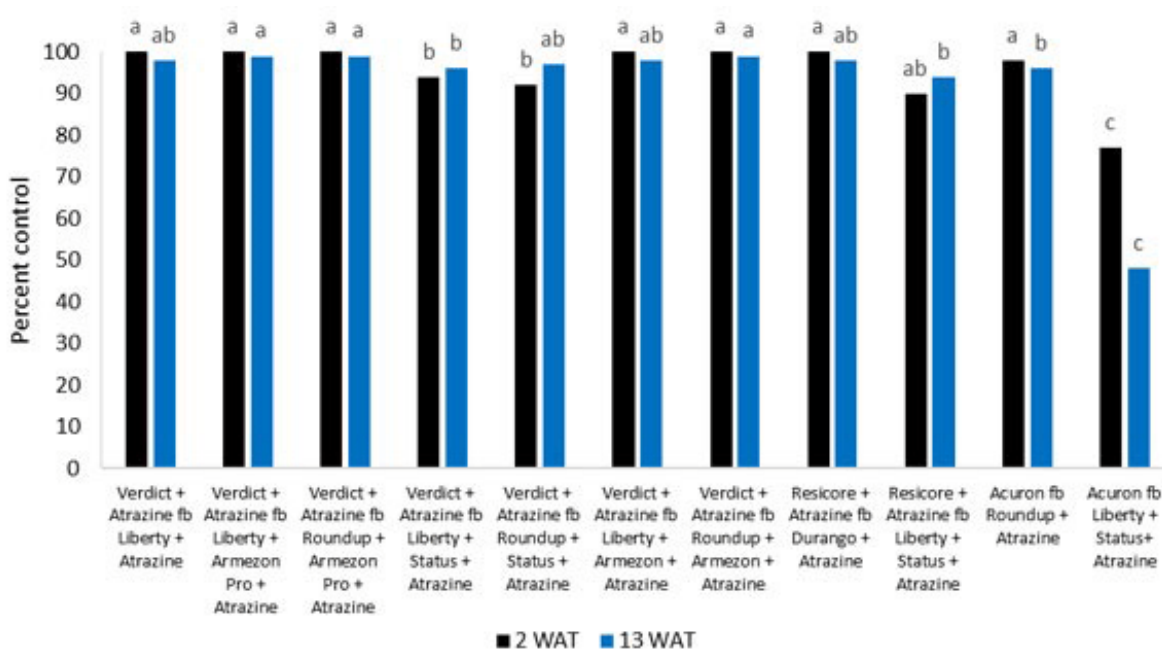
Kochia starts emerging from mid-February to early March and continues from spring into summer (Figure. 1). It is critical to start the growing season with clean fields. Therefore, any effective kochia control plan for fields going to corn should include early spring application of a burndown herbicide with an effective soil-residual herbicide for controlling early flushes. For example, an application of dicamba alone can control susceptible kochia; however, a combination of 1 to 2 pints of atrazine and 8 to 16 oz. dicamba will control existing broadleaf and grass weeds and provide extended residual activity, often into late spring. This combination will address dicamba-resistant biotypes, but other options are needed for triazine-resistant biotypes.



**Figure 1. A young kochia seedling in wheat residue. Photo by Sarah Lancaster, K-State Research and Extension.**

A study published in 2019 by weed scientists from across the Great Plains reported excellent control (99%) of glyphosate-resistant kochia can be attained in corn by Degree Xtra followed by Impact, Verdict followed by Status, or Balance Flexx followed by Laudis + atrazine. These data support the

recommendation to add atrazine to group 27 herbicides like Balance Flexx or Laudis and are likely the result of greater uptake of the group 27 herbicide. Data from Hays, KS, are shown in Figure 2. All treatments evaluated provided acceptable control, except for Acuron applied pre-emergence followed by Liberty + Status + Atrazine. Corn yields ranged from 88 to 111 bushels/acre, with the greatest yields obtained in Verdict + atrazine pre-emergence followed by Liberty + Atrazine, Roundup + Armezon Pro + atrazine, Liberty + Status + atrazine, or Roundup + Status + atrazine; Resicore + atrazine applied pre-emergence followed by Durango + atrazine; and Acuron applied pre-emergence followed by Roundup + atrazine. Pre-emergence programs based on Verdict plus atrazine could also be considered for fields going to grain sorghum. Regardless of the herbicide program, frequent scouting is essential to ensure postemergence herbicides are applied when kochia is small.



**Figure 2. Kochia control in field studies conducted at Hays, KS. PRE, EPOST, and LPOST treatments were applied on April 23, June 11, and June 23, respectively. Similar letters indicate similar weed control.**

### Kochia control in fields going to sorghum

As sorghum planting in western Kansas generally begins in mid-May, conserving soil moisture by controlling kochia and other weeds before sorghum planting is of utmost importance. Like corn, kochia control in fields going to sorghum can be achieved with tank-mix application of dicamba (8 to 16 oz/a) with atrazine (1 to 2 pints/a) in early spring. If fields are infested with glyphosate-, triazine, and/or dicamba-resistant kochia, Sharpen (2 oz/a) or Gramoxone (2 to 4 pints/a) can also be used to control resistant kochia biotypes. An application of PRE herbicides such as DegreeXtra (64 to 96 oz/a), Lexar (96 oz/a), or Verdict (5 to 10 oz/a) at planting can help control kochia in sorghum.

Reference: Sbatella et al. 2019

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## 2. Wheat streak mosaic virus confirmed in three counties in Kansas in 2024

Wheat streak mosaic virus has been confirmed in Russel, Barton, and Ellis counties in 2024. Now is a good time to start scouting for this disease. Factors such as hail and delayed harvest in 2023 may contribute to higher-than-expected disease pressure in 2024. Wheat streak mosaic virus is just one of several viruses that we need to keep an eye out for in the Spring. While wheat viruses can sometimes be difficult to distinguish by eye, they behave differently in the field. Here is a review of some key facts about wheat viruses and some timely reminders for sample submission to the [K-State Plant Disease Diagnostic Lab](#).

### **Wheat Streak Mosaic Virus Complex**

The viruses that cause **wheat streak mosaic** need no introduction in many parts of western Kansas. Wheat streak mosaic is one of Kansas's most economically devastating wheat diseases. While this disease is most common in western Kansas, we have seen an uptick in affected fields in the central corridor over the last couple of years. This disease can be caused by several viruses, including *wheat streak mosaic virus*, *triticum mosaic virus*, and *wheat mosaic virus (high plains)*. These viruses are vectored by the tiny wheat curl mite, which survives between seasons on volunteer wheat and other grassy hosts. Infections can occur in the fall or spring but can result in more severe yield loss when they occur in the fall after planting. Unlike soilborne mosaic virus or spindle streak mosaic virus, which slow down at temperatures of about 70°F, wheat streak mosaic symptoms develop most rapidly at temperatures above this threshold. We often see symptoms appear when temperatures warm in the spring. We expect to see an increase in samples in the diagnostic lab over the coming weeks as the crop moves into the jointing stages of growth. Symptoms appear as green and yellow streaks on wheat leaves (Figure 1). The best management strategy is to destroy nearby volunteer wheat within two weeks of planting. Some varieties carry some resistance to these viruses. More info: <https://bookstore.ksre.ksu.edu/pubs/MF3383.pdf>





**Figure 1. Stunted plants infected with the wheat streak mosaic virus exhibit classic green and yellow mosaic symptoms. Photo: Kelsey Andersen Onofre, K-State Research and Extension.**

### **Wheat Soilborne Mosaic Virus**

**Wheat soilborne mosaic virus** is most common in the eastern two-thirds of Kansas and typically first appears as large, irregular patches of stunted, yellowing wheat in a field. From the road, these can be confused with a number of other production problems, such as winter injury or nutrient deficiencies. Upon closer inspection, leaves appear to have a yellow background with irregular green blotches (Figure 2). Optimal temperatures for symptoms of this virus are cool (around 60 F). The symptoms fade when daytime temps rise into the mid-70s. Because of this cool temperature preference, we typically see symptoms at the tillering through jointing growth stages and not later in

the season.

This virus is vectored into wheat by a fungal-like organism called *Polymyxa graminis* that can survive in the soil for up to 30 years. When soil moisture is high, this organism produces spores that can swim and attach themselves to wheat roots. After they attach, they shepherd in the virus, and infection occurs. Infection may be the worst in areas of the field with higher moisture (such as low spots) and in continuous wheat fields. Equipment has the potential to move soil-infested spores to new locations.

Luckily, many of the varieties available in the eastern part of Kansas have resistance to this virus. Susceptible varieties are at risk of yield loss caused by the disease. Much of this yield loss is attributed to lower kernel weight and fewer kernels per spike. To check if your variety is resistant, please see the Kansas Wheat Variety Guide: <https://bookstore.ksre.ksu.edu/pubs/mf991.pdf>. For more information on this virus, check out this publication: <https://bookstore.ksre.ksu.edu/pubs/ep166.pdf>.



**Figure 2. Wheat with symptoms of wheat soilborne mosaic virus. Photo by Erick DeWolf, K-State Research and Extension.**

### **Wheat Spindle Streak Mosaic Virus**

Wheat soilborne mosaic virus can be confused with a second virus known as **wheat spindle streak mosaic virus**. It is not uncommon to see plants infected with both soil-borne mosaic and spindle



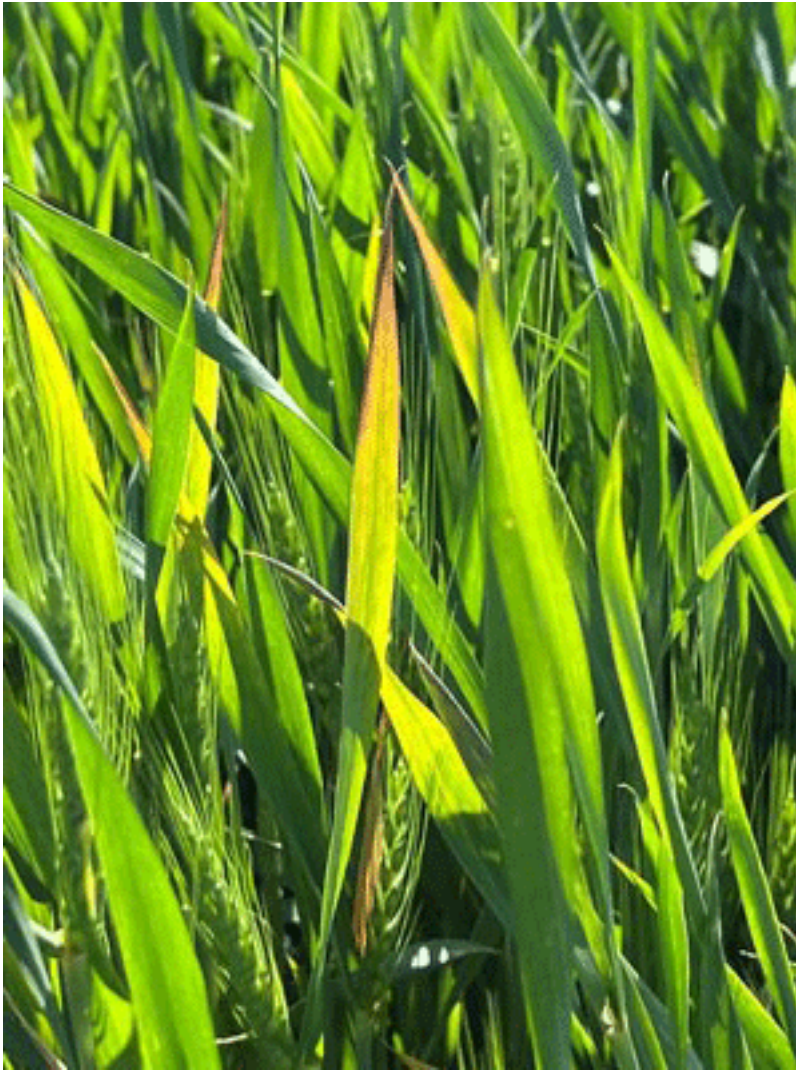
streak mosaic. This virus is also most common in eastern Kansas. This virus is also transmitted by *Polymyxa graminis* and the conditions for infection (cool, wet soil) are similar. This virus will also show up first as yellowing patches in the field. There are subtle symptom differences between these two viruses, with spindle streak symptoms appearing as thin yellow streaks or dashes on green leaves (Figure 3). Spindle streak can result in reduced tillering, which may drive yield reductions. As with soilborne mosaic virus, variety resistance is really our only management tool, but it can be highly effective. To check if your variety is resistant, please see the Kansas Wheat Variety Guide: <https://bookstore.ksre.ksu.edu/pubs/mf991.pdf>.



**Figure 3. Wheat with symptoms of wheat spindle streak mosaic. Notice the yellow, linear lesions that are tapered at both ends. Photo by Erick DeWolf, K-State Research and Extension.**

### **Barley Yellow Dwarf**

Unlike the two viruses mentioned above, **barley yellow dwarf virus** is transmitted by several species of aphids while they feed, including bird-cherry-oat aphids, English grain aphids, and greenbugs. Infection can occur in the fall or the spring, with fall infections resulting in the highest potential for yield losses. Avoidance of early planting, variety resistance, and systemic insecticide seed treatments are the best ways to manage this virus. Symptoms usually appear as purple to yellow leaf tip discoloration, and plants will appear stunted (Figure 4). The symptoms of barley yellow dwarf are most visible between jointing and early stages of grain development when warm temperatures favor disease development. Heads of infected plants may be darkened before harvest, and grain can be shriveled, resulting in yield losses.



**Figure 4. Classic red/purple leaf tips of wheat infected with barley yellow dwarf. In some cases, symptoms will appear more yellow. Photo by Kelsey Andersen Onofre, K-State Research and Extension.**

#### **Important considerations for submitting wheat samples to the diagnostic lab**

Testing for each of these viruses is available in the K-State Plant Disease Diagnostic Clinic. High-quality samples are critical for an accurate diagnosis.

A recent eUpdate article discusses some key points and gives detailed instructions about sample submissions that are especially important when submitting wheat to the clinic:

<https://bit.ly/3OKgBHb>.

#### **Reminders and Updates**

- High-quality samples lead to high-quality diagnoses.
- New Services

- Molecular diagnosis (increased detection capability)
  - Sudden Death Syndrome
  - Bacterial Leaf Streak of Corn
- Triticum mosaic virus (TriMV) added to wheat virus screen (ELISA)
- Wheat Virus Screen (6 viruses – WSMV, **TriMV**, HPWMoV, WSSMV, SBWMV, BYDV-PAV)
  - Submit samples before 5 pm on Wednesdays for results on Fridays
  - \$50 for extension clients
  - \$70 for non-extension clients

If you have any questions, comments, or concerns, please get in touch with us by email at [clinic@ksu.edu](mailto:clinic@ksu.edu) or by phone at 785-532-6716.

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### 3. 2023 Kansas Performance Tests reports for corn, soybeans, grain sorghum, and sunflowers

The 2023 Kansas Performance Test Reports for corn, soybeans, grain sorghum, and sunflowers are now available online. These reports include the results of the crop performance trials. Each report also includes a summary of the 2023 crop, with a detailed discussion summarizing the statewide growing conditions, diseases, and insects.

The crop performance tests are conducted annually by the Kansas State University Department of Agronomy. The Kansas Agricultural Experiment Station distributes the annual reports to provide farmers, extension workers, and seed industry personnel with unbiased agronomic information on many of the hybrids marketed in Kansas. Entry fees from private seed companies finance the tests. Because entry selection and location are voluntary, not all hybrids grown in the state are included in tests, and the same group of hybrids is not grown uniformly at all test locations.

The online versions of the 2023 Kansas crop performance test reports can be found at the following links.

**Corn:** <https://bookstore.ksre.ksu.edu/pubs/SRP1181.pdf>

**Soybeans:** <https://bookstore.ksre.ksu.edu/pubs/SRP1180.pdf>

**Grain sorghum:** <https://bookstore.ksre.ksu.edu/pubs/SRP1182.pdf>

**Sunflowers:** <https://bookstore.ksre.ksu.edu/pubs/SRP1184.pdf>

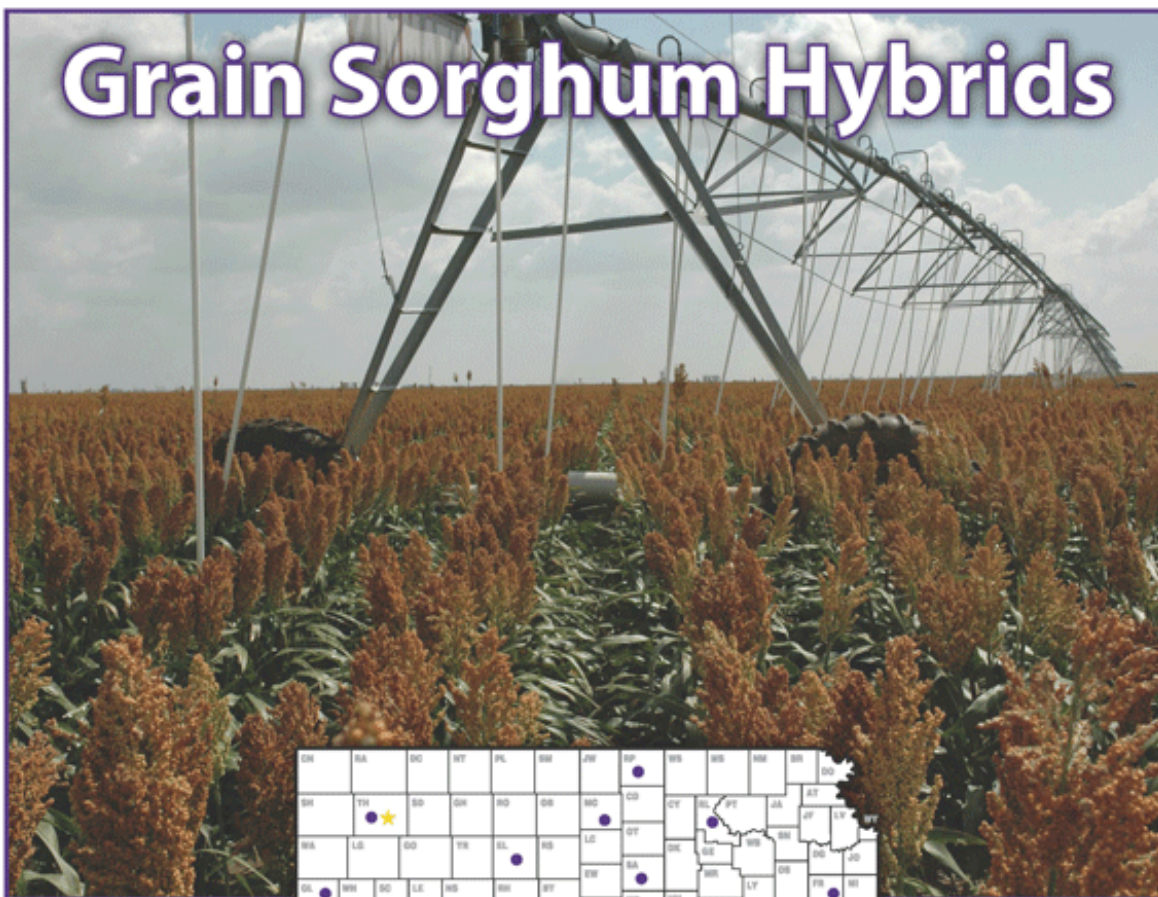
Test results for all the crops can also be found at <https://www.agronomy.k-state.edu/outreach-and-services/crop-performance-tests/>. Entry forms for the upcoming 2024 season are available at the Crop Performance Test website.

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## 2023 Kansas Performance Tests with

# Grain Sorghum Hybrids



### Report of Progress 1182



Kansas State University Agricultural Experiment Station and Cooperative Extension Service



## 4. Corn management in Kansas for 2024

K-State Research and Extension has released a popular publication updated for the 2024 growing season: [MF3208 Kansas Corn Management](#).

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## Kansas Corn Management 2024

MF3208

Crop Production

This publication advises producers, crop consultants, and agronomists to manage Kansas corn crops as efficiently and profitably as possible. The recommendations provide guidelines and must be tailored to each producer's cropping conditions.

This comprehensive guide is written specifically for Kansas and includes valuable, up-to-date information on:

- Planting practices
- Plant density and yield gain
- Dry down before harvest
- Weed management
- Nutrient management
- Diseases
- Insect management
- Machinery
- Irrigation

Visit the KSRE Bookstore to order paper copies of this publication or to view/download the online version: <https://bookstore.ksre.ksu.edu/Item.aspx?catId=221&pubId=18439>.



**Contributors to the 2024 version of this publication**

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## 5. Wheat Rx seminars - Get your prescription for next year's wheat crop

A prescription for producing high-yielding and high-quality wheat is just what the doctor ordered for Kansas wheat producers — referring to expertise from Kansas State University like Drs. Romulo Lollato, Carlos Bonini Pires, Kelsey Andersen Onofre, Dorivar Ruiz Diaz, Dan O'Brien, and others.

[Kansas Wheat Rx](#) combines suggested management practices for the economical and sustainable production of high-quality winter wheat in Kansas.

Mark the calendar now for two upcoming seminars in Dodge City and Wichita. Speakers will discuss cover crops and soil health, the role of wheat in a cropping system, soil fertility, fungicides, and economics of wheat production. The program will qualify for certified crop advisor (CCA) continuing credit units (CEUs).

"We cannot change the impact of weather on each year's crop, but we can arm wheat producers with the knowledge they need to maximize profitability through utilizing the genetic potential of new varieties and best management practices," said Aaron Harries, vice president of research and operations for Kansas Wheat. "We're excited to share with Kansas wheat producers what we've learned through the Kansas Wheat Commission's research investments — from the importance of variety selection to the practices and tools farmers can use to improve quality."

These programs are part of Wheat Rx, a partnership between Kansas Wheat and K-State Research and Extension, to disseminate the latest research recommendations for high-yielding and high-quality wheat to Kansas wheat farmers. This effort includes a series of extension publications at [kswheat.com/wheatrx](https://kswheat.com/wheatrx) and educational outreach like the upcoming seminars.

Kansas Association of Wheat Growers members receive one free registration to these full-day seminars. The nonmember registration fee is \$110. To take advantage of this benefit, join or renew your membership today at <https://kswheat.com/join>. Lunch will be provided.

These programs are scheduled for March 7, 2024, in Dodge City and March 8, 2024, in Wichita.

### **March 7, 2024 – Dodge City**

8:00 a.m. to 3:00 p.m.

7:30 a.m. Registration

Depot Theater, 201 E Wyatt Earp Blvd., Dodge City

Breakfast and lunch will be provided. View the full agenda and register for the event at <https://kswheat.com/dodgecity>.

### **March 8, 2024 - Wichita**

8:00 a.m. to 3:00 p.m.

7:30 a.m. Registration

Double Tree at the Airport, 2098 Airport Road, Wichita

Breakfast and lunch will be provided. View the full agenda and register for the event at <https://kswheat.com/wichita>.

Romulo Lollato, Wheat and Forages Specialist  
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## 6. K-State Crop Talk webinar series kicks off on February 20

The popular K-State Crop Talk webinar series is back and set to start on February 20, 2024. This year, Crop Talk will be focused on agronomic topics for producers across the western half of Kansas. Topics include management for wheat production, biological products concerning soil fertility, high pH soils, and fallow replacement options in dryland systems. 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 20.

Upon registration, participants will receive an email with instructions to attend via Zoom or YouTube. These webinars are open to all, and there is no cost. Visit the K-State Northwest Research and Extension Center's website to register: <https://www.northwest.k-state.edu/events/>.

Please contact your local KSRE extension office or the Northwest Research and Extension Center at 785-462-6281.

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

February 20 – Management Tactics for Wheat Production  
Romulo Lollato, K-State Wheat and Forages Specialist

**February 27 - Biological Products and their Role in Soil Fertility**  
Dave Franzen, North Dakota State Soil Specialist

**March 5 – Managing Areas of Fields with High pH**  
Dorivar Ruiz Diaz, K-State Soil Fertility Specialist

**March 12 – Fallow Replacement Options in Dryland Rotations**  
Lucas Haag, K-State Northwest Area Agronomist





# Crop Talk

## Webinar Series

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

**February 20**

**Management Tactics for Wheat Production**  
*Romulo Lollato, K-State Wheat Specialist*

**February 27**

**Biological Products and Their Role in Soil Fertility**  
*Dave Franzen, North Dakota State Soil Specialist*

**March 5**

**Managing Areas of Fields with High pH**  
*Dorivar Ruiz Diaz, K-State Soil Fertility Specialist*

**March 12**

**Fallow Replacement Options in Dryland Rotations**  
*Lucas Haag, K-State Northwest Area Agronomist*

**Register to attend at  
[www.northwest.ksu.edu/events](http://www.northwest.ksu.edu/events)**

Links for joining will be sent after registration.



Certified Crop Advisor (CCA) Credits have been applied for.

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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