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eUpdate

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

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1. Starter fertilizer considerations for soybeans on low-testing soils

Soybeans can remove significant amounts of nutrients per bushel of grain harvested compared to other row crops (Table 1). Because of this, soybeans can respond to starter fertilizer applications on low-testing soils, particularly phosphorus.

Table 1. Phosphorus and potassium crop removal values. Source: MF2586 Soil Test Interpretations and Fertilizer Recommendations in Kansas, K-State Research and Extension.

Crop	Unit of Yield	P_2O_5	K_2O
Corn	Bushel	0.33	0.26
Grain sorghum	Bushel	0.40	0.26
Wheat	Bushel	0.50	0.30
Soybeans	**Bushel**	**0.80**	**1.40**

Typically, corn shows a greater response to starter fertilizer than soybeans. Part of the reason for that is that soils are generally warmer when soybeans are planted than when corn is planted. The typical response in early growth observed in corn is usually not observed in soybeans. However, yield response to direct soybean fertilization with phosphorus and other nutrients can be expected in low-testing soils.

K-State guidelines for soybeans include taking a soil test for phosphorus (P), potassium (K), sulfur (S), zinc (Zn), and boron (B). If soil test results recommend fertilizer, it should either be applied directly to the soybeans or indirectly by increasing fertilizer rates to another crop in the rotation by the amount needed for the soybeans.

The most consistent response to starter fertilizer with soybeans would be on soils that are very deficient in one of the nutrients listed above or in very high-yield-potential situations where soils have low or medium fertility levels. Furthermore, starter fertilizer in soybeans can be a good way to complement nutrients that may have been removed by high-yielding crops in the rotation, such as corn, and help maintain optimum soil test levels.

Banding fertilizer to the side and below the seed at planting is an efficient application method for soybeans. This method is especially useful in reduced-till or no-till soybeans because P and K have only limited mobility into the soil from surface broadcast applications.

However, with narrow-row soybeans, installing fertilizer units for deep banding may not be possible. In that situation, producers can surface-apply the fertilizer. Fertilizer should not be placed in-furrow in direct seed contact with soybeans because the seed is very sensitive to salt injury.

Soybean seldom responds to nitrogen (N) in the starter fertilizer. However, some research under irrigated, high-yield environments with sandy soils suggests a potential benefit of small amounts of N in starter fertilizer.

Summary

- Soil testing is essential to identify nutrient deficiencies.
- Phosphorus and potassium are key nutrients that have higher crop removal values.
- Application method matters.
- In most conditions, soybeans don't respond to N in starter fertilizer.
- Consider the crop rotation (previous high-yielding crops).

Dorivar Ruiz Diaz, Nutrient Management Specialist
ruizdiaz@ksu.edu

2. Soybean seed treatments: Avoiding seedling diseases

As producers start planting soybeans in Kansas, it is important to consider common causes of seedling damping off and potential management strategies. This article addresses some frequently asked questions concerning the use of seed treatments.

What causes poor soybean stand establishment?

Although a few diseases may cause poor stand establishment, it is important to also consider other factors that may be causing it, including herbicide damage, soil compaction, high residue, flooding, cold stress, drought, planting depth, and seed quality. Proper identification of the cause of poor stand establishment will be crucial for current and future management decisions.

What are the main soybean seedling diseases in Kansas and what seed treatments are effective?

The most common pathogens causing seedling diseases in Kansas are: *Phytophthora, Pythium, Fusarium,* and *Rhizoctonia*. Although they have different names, the symptoms can be similar. Each of these may result in post-emergence damping off (Figure 1). Although there are seed treatments that are effective against each of these diseases, it is important to remember that these species often require different fungicide products. It is important to carefully check the label of seed treatments and to select a seed treatment product with multiple active ingredients that have efficacy against these common pathogens.

For example, if *Phytophthora* and *Pythium* have been a problem in the past, products should be selected with the active ingredients mefenoxam, metalaxyl, or ethoboxam. For Rhizoctonia, the active ingredient sedaxane has shown excellent efficacy. Strobilurin active ingredients such as

azoxystrobin, trifloxystrobin, or pyraclostrobin are effective against other fungal pathogens.

Figure 1. Characteristic symptoms of Pythium damping off. Photo from Kiersten Wise, University of Kentucky.

Seed treatments are not the only tool for managing seedling diseases. Variety selection, crop rotation, high seed quality, proper drainage, and seed treatments all comprise the best management practices for seedling diseases in Kansas. A combination of these factors will help ensure a high-quality soybean stand.

What conditions favor seedling diseases?

Each disease has slightly different environmental requirements, but seedling diseases are generally favored by planting in cool soil with poor drainage. Spotty occurrences of infected plants may be most pronounced in low or poorly drained portions of the field. When soil temperatures are cool, soybeans planted early should always consider a seed treatment to avoid early-season losses.

Are there any other diseases to consider when using seed treatments?

Seed treatments are not only effective against the pathogens that cause early-season emergence problems. Two products on the market, ILEVO® and SALTRO™, also provide protection against sudden death syndrome (SDS; Figure 2). These products should be considered for fields with a previous history of SDS.

Figure 2. Classic soybean sudden death syndrome foliar symptoms development. Infection typically occurs early in the season, but foliar leaf scorch symptoms are most visible at reproductive growth stages. Photos by Rodrigo Borba Onofre, K-State Research and Extension.

Rodrigo Onofre, Row Crop Plant Pathologist
onofre@ksu.edu

3. Early weed control is crucial for cotton success in Kansas

Early-season weed control is essential in cotton because it can be slow to canopy relative to other crops grown in Kansas and is, therefore, less competitive early in the growing season (Figure 1). Weeds compete with cotton for water, nutrients, and sunlight during the growing season and contribute to trash and discoloration of the lint at harvest, resulting in reduced quality grades and lint value.

Figure 1. Residual herbicides applied at planting are needed to prevent early-season weed competition in cotton. Photo by Logan Simon, K-State Research and Extension.

Tillage is often used to provide a "clean slate" for early-season weed control; however, most Kansas cotton acreage is in conservation tillage systems, so effective herbicides are needed before planting. Glyphosate is often used in burndown herbicide applications in combination with other products. Low rates of flumioxazin (Valor, others) can be applied 14 to 30 days before planting and have some residual activity. Paraquat (Gramoxone, others) and glufosinate (Liberty, others), which only control actively growing weeds, are also effective for pre-plant burndown herbicide applications. A newer herbicide labeled for burndown applications in cotton is tiafenacil (Reviton). It is a Group 14

herbicide applied 7 to 14 days before planting at 1 to 3 fluid ounces per acre and works best when applied with glyphosate for grass control.

If dicamba-resistant cotton is planted, approved dicamba formulations (XtendiMax, Engenia, or Tavium) can be used in a burndown program with no waiting period before planting. There is a 21- to 28-day waiting period if non-dicamba-resistant cotton is planted and/or other labeled dicamba formulations are used. Producers should be aware that there are dicamba products labeled for over-the-top application to cotton in 2025. Similarly, the 2,4-D formulations Enlist One and Enlist Duo may be applied pre-plant with no waiting period in 2,4-D-resistant cotton, but there is a 30-day waiting period if non-2,4-D-resistant cotton and/or other labeled 2,4-D formulations are used.

Residual herbicides applied at planting are the foundation of any good weed management program. Not only are they necessary to prevent yield loss, but they are also recommended to manage or delay the development of herbicide-resistant weed populations. Some effective residual herbicides for early-season use in cotton include Group 15 herbicides like acetochlor (Warrant, others), S-metolachlor (Dual, others), dimethenamid-P (Outlook), and pyroxasulfone (Zidua). These herbicides only control weeds that have not yet germinated, and they require about ½ inch or more of rainfall for maximum activity. Group 5 herbicides like fluometuron (Cotoran), and prometryn (Caparol) generally require less rainfall for activation; however, these herbicides have some limitations regarding rotation restrictions to crops like corn, grain sorghum, and wheat. Similarly, pyrithiobac-sodium (Staple) will prevent rotation to grain sorghum in the following year. This restriction and the prevalence of ALS-resistant weeds have resulted in little Staple use in Kansas.

Layered residual herbicides can be especially important in cotton because it is slow to canopy (Figure 2). Group 15 herbicides can also be applied over the top of cotton if the maximum application rate for the season is not exceeded at planting. Pyroxasulfone (Zidua) can be applied postemergence to cotton in conjunction with a split nitrogen application if impregnated on dry fertilizer. This approach can help manage plant growth in irrigated production systems and extend residual herbicide activity. It is important for these, and all herbicide applications, to be made when cotton is at a growth stage allowed on the herbicide label.

Figure 2. Residual herbicides applied post-emergence prevent late-season weed competition in cotton. Photo by Logan Simon, K-State Research and Extension.

For more detailed information, see the "2025 Chemical Weed Control for Field Crops, Pastures, and Noncropland" guide at https://www.bookstore.ksre.ksu.edu/pubs/CHEMWEEDGUIDE.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.

Sarah Lancaster, Weed Management Specialist
slancaster@ksu.edu

Logan Simon, Southeast Area Agronomist – Garden City
lsimon@ksu.edu

Lucas Haag, Northeast Area Agronomist – Colby
lhaag@ksu.edu

4. Should you spray? Stripe rust and other wheat diseases to watch for in Kansas

It's late April and the wheat crop is barreling into the flag leaf growth stages in many parts of the state. The rainy weather over the last week has had many wondering what the stripe rust outlook is for the season. Some producers are likely considering the need for a flag leaf fungicide application.

The good news is that, even though we've received some moisture, the risk for stripe rust in the state remains low. We should continue scouting efforts over the next two weeks. In this article, we'll walk through some of the reasons for the current low stripe rust risk and other diseases we should be thinking about in wheat right now.

The risk of stripe rust in Kansas remains low for 2025

On March 27, we reported that it was shaping up to be a low stripe rust year in Kansas (https://bit.ly/4iQPIP8). That trend still appears to be holding true. Stripe rust has been active at low levels in Texas since February, but conditions have not been favorable for disease development (Figure 1). This is important because stripe rust does not survive the winter in Kansas and needs to work its way up from the south annually. Low disease pressure in Texas means fewer spores are available to make their way north to Kansas. Additionally, at the time of this report, only trace levels of stripe rust were reported in Oklahoma. Additionally, there have been no reports of stripe rust yet this year in Kansas. For reference, in years when stripe rust is an issue, we generally detect the disease in Kansas before April 15. With all of this in mind, we believe it will be difficult for stripe rust to establish and "catch up" at this point in the season. Because of this, the risk of stripe rust remains low in the state. As a reminder, the probability of a positive return on a fungicide application greatly diminishes when disease pressure is absent. That said, producers should continue to scout and report any occurrences through the remainder of the season. These next two weeks will be critical for much of the state.

Figure 1. Typical symptoms of stripe rust. Spores are limited by the leaf veins, so they typically appear as yellow-orange stripes on leaves. Photo by Kelsey Andersen Onofre, K-State Research and Extension.

Should we be worried about leaf rust?

Reports from Texas indicate that leaf rust is active. As a reminder, leaf rust is a disease that typically shows up late in the season in Kansas (heading to flowering) due to its preference for slightly warmer temperatures (Figure 2). It is possible for leaf rust to occasionally survive the winter in Kansas. Watching for leaf rust development over the next few weeks will be important. Now is also a good time to check your variety resistance level to this disease: https://bookstore.ksre.ksu.edu/pubs/kansas-wheat-variety-guide-2024_MF991.pdf.

Figure 2. Typical symptoms of leaf rust. Note the cinnamon brown color of the spores. Unlike stripe rust, spores do not produce stripes on leaves. Photo by Erick DeWolf, K-State Research and Extension.

Let's turn our attention to the scab risk over the coming weeks

Wet weather over the next couple of weeks will be critical for determining our scab risk in the state. As a reminder, scab infection occurs at flowering, but symptoms are often not visible for 14-21 days after infection (Figure 3). Because of this, we cannot scout for scab the way we would stripe rust or other foliar diseases. Fungicide decisions need to be made according to weather-based risk and the field's yield potential. Wheat fields planted into corn residue are at the highest risk.

Fungicides such as Prosaro, Sphearex, Prosaro Pro, Proline, or Miravis Ace are known to suppress scab

(head blight). Specific fungicide performance for scab and other diseases can be found here: https://bookstore.ksre.ksu.edu/pubs/EP130.pdf. Other fungicides are not labeled or not recommended for scab control, particularly products containing strobilurin (FRAC group 11 – azoxystrobin, pyraclostrobin, etc.)

Fungicides are most effective against scab when applied at early flowering (Feekes 10.5.1), but can provide protection even when used later in the flowering window. It is important to pay attention to pre-harvest intervals at this point of the season and follow guidelines provided on product labels. The products listed above either have a 30-day pre-harvest interval (cannot be applied within 30 days of harvest) or cannot be applied after Feekes 10.5.4 (end of flowering, watery ripe growth stage).

Figure 3. Fusarium head blight (scab) infection often begins with bleaching of infected spikelets and will progress throughout the head. When humidity is high, orange fungal structures are visible on the outside of the spikelet. The grain from infected heads may appear lightweight, white, or pink. Photo by Kelsey Andersen Onofre, K-State Research and Extension.

Wheat streak mosaic virus is active across the state

Wheat streak mosaic virus (WSMV) is active in the state (Figure 4 - right), with samples from 20

counties testing positive for this disease (Figure 4 - left). This season, the sister virus to WSMV, Triticum mosaic virus, has also been detected in 10 Kansas counties. Symptoms should be visible in affected fields now that the weather has warmed. A close inspection of symptoms and field pattern should help distinguish symptoms of WSMV from those of nutrient or other stresses. You can find a more complete article on wheat viruses from April 3, 2025, at https://bit.ly/43EGoJo.

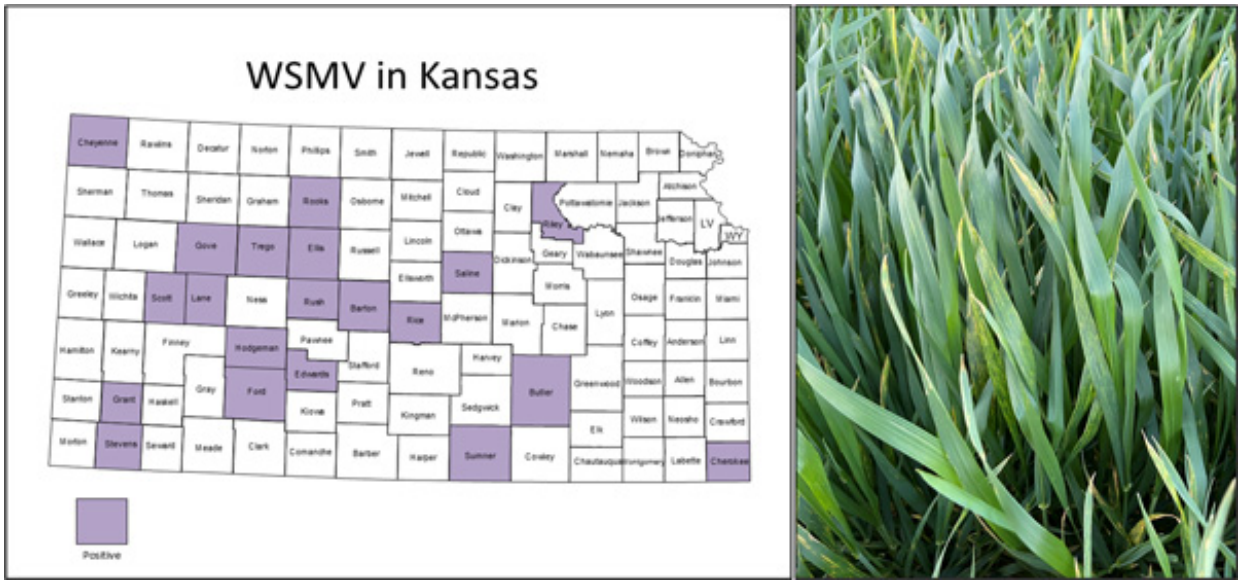

Figure 4. Wheat streak mosaic virus occurrence (positive samples) as of April 23, 2025. The right panel shows wheat streak mosaic symptoms. Map by Chandler Day, K-State Plant Disease Diagnostic Clinic.

The K-State Plant Disease Diagnostic Laboratory can test for wheat viruses and other plant diseases. Please see this recent article for more detailed fees and sample submission information: https://bit.ly/4ilAmMe.

Kelsey Andersen Onofre, Extension Plant Pathologist
andersenk@ksu.edu

5. World of Weeds - Waterpod

A photo was recently submitted of an "unfamiliar" weed that was found while scouting a field. The weed was identified as waterpod (*Ellisia nyctelea*). Waterpod is a member of the same botanical family a corn gromwell and is also called Aunt Lucy.

Ecology

Waterpod is an annual weed that is native to North America. It can be found throughout Kansas across a range of soils, often in the shaded, moist soils of open forests. It is also found in shady lawns that are poorly maintained.

Identification

Waterpod emerges in early spring with oblong cotyledons. The first leaves are opposite, but leaves become alternately arranged along the stem. They are oblong, about 1 to 3 inches long, with deep lobes that create 5 to 13 segments (Figure 1). Both leaf surfaces are covered in bristly hairs. Stems reach approximately 4 to 20 inches long and are bristly and angled, with many branches. Waterpod has a weak taproot.

Figure 1. Waterpod growing in wheat stubble. Note the many branches and deeply lobed leaves. Photo by Sarah Lancaster, K-State Research and Extension.

Single bell-shaped flowers, approximately 3/8 inch long, are produced opposite leaves or at the branches along the stem. Flowers have 5 white to lavender petals with dark purple spots and purple veins. Beneath each flower is a leaf-like calyx with 5 pointed lobes covered in bristly hairs. Four dark brown, spherical seeds approximately 1/10 inch long are contained in round capsules that are about ¼ inch long and covered in bristly hairs.

Figure 2. Waterpod flower with purple spots on petals. Photo by Sarah Lancaster, K-State Research and Extension.

Figure 3. Waterpod capsule and calyx. Photo by Sarah Lancaster, K-State Research and Extension.

Management

Waterpod is generally not competitive with crops. Prior to summer crops, it is controlled by field preparation such as tillage or burndown applications that include herbicides like glyphosate and 2,4-D.

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.

Sarah Lancaster, Extension Weed Management Specialist, Manhattan
slancaster@ksu.edu

Jeanne Falk Jones, Multi-County Agronomist
jfalkjones@ksu.edu