Issue 1011

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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. Assessing hail damage to corn

Severe thunderstorms and hail are nothing new to Kansas farmers. The threat level is high during this time of year, and parts of Kansas have already seen some destructive hail events in late June and early July (Figure 1). Usually, after every storm, the first question is, how will this affect my crops?

Figure 1. Cornfield with hail damage from a severe storm in early July 2024 near Ingalls, KS. Photo courtesy of Alex Millershaski.

The first question you need to answer is:

How far along in development is your corn?

- At very early stages of the crop, there might not be enough of the plant above ground to sustain any damage.
- If the corn has less than five leaves before the hail, the growing point is likely still below ground. This is good because young corn has a great capacity to recover from early-season hail damage. The growing point of a corn plant is the top of the stem, which contains the cells that are actively dividing and elongating and will become the tassel. Even if the hail took the leaves off and pounded that little plant into the ground, it should grow out of it with few long-term problems.
- The current situation - If the growing point was out of the ground, there could be major

damage. Wait a few days, then go back out to look for these signs:

- If the main stem starts to grow again and new leaves come out of the main stem, then there is little damage.
- If you start to see tillers, you may be in trouble. Tillers on corn are vegetative or reproductive shoots that grow from the axillary buds on the lower stalk nodes of a corn plant. These tillers will start growing outward from the base of the damaged plant, and even though they look okay now, they will not be productive during tasseling and ear-forming. This plant should not be counted for stand count when evaluating whether to replant.

So, let's say you were hit by a hail storm last night, and you go out today to look at your crop. The best thing you can do is get back in the pick-up truck and drive away (*unless the crop is completely damaged!*). Don't make any decisions right away; time is your friend. Wait a few days and then come back to check the signs of growth. Even the little plants need a few days to grow so that you can get a stand count of the field.

An accurate estimate of plant survival should be done in the coming days to more precisely determine damaged plants that will survive vs. missing plants – causing stand reductions. Young corn has a great capacity to recover from early-season hail damage. Scout your fields and check for the final number of plants and potential problems associated with these weather events, such as lowered disease resistance (Figure 2).

Figure 2. Corn plants damaged by hail such as this one could be at a greater threat for disease. Photo provided by Kansas Corn.

For more information on hail damage on crop fields, check out the University of Nebraska's Hail Know website at https://cropwatch.unl.edu/hailknow.

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2. Cover crops grown post-wheat for forage

The time following wheat harvest presents an opportunity to incorporate cover crops. With recent rains in June and early July across many parts of Kansas, there is potential to grow a cover crop for substantial biomass production, which could also be a source of forage for livestock.

The following is a summary of "Cover Crops Grown Post-Wheat for Forage Under Dryland Conditions in the High Plains", a fact sheet produced in collaboration with extension specialists and research scientists at Kansas State University and Colorado State University. The comprehensive publication details recommended practices for species selection, adjusting stocking rates, and grazing management. The entire fact sheet can be viewed and downloaded at https://bookstore.ksre.ksu.edu/pubs/MF3523.pdf. A companion fact sheet titled "Managing Spring Planted Cover Crops for Livestock Grazing Under Dryland Conditions in the High Plains Region" can be viewed and downloaded at https://www.bookstore.ksre.ksu.edu/pubs/MF3443.pdf.

Quick Facts

- Post-wheat plantings would include warm-season species such as millets, sorghum-sudangrass, forage sorghum, sudangrass, cowpea, lablab, sunhemp, or sunflowers.
- Planting a cover crop for forage could be grazed late summer through fall.
- Warm-season grasses tend to dominate over broadleaf species when planting cover crop mixtures.
- Cover crops must be planted immediately after wheat harvest to ensure crop establishment before the soil dries out following harvest.
- Yield variability is high when growing cover crops post-wheat under dryland conditions, ranging from under 1,000 lb/ac in dry years to almost 9,000 lb/ac in wet years.
- Stocking rates must be flexible because of the large year-to-year variability in cover crop productivity.
- Cover crops planted post-wheat can provide an average of 30 to 45 days of grazing, but the timing of grazing in relation to frost is an important consideration.
- Take caution for prussic acid and nitrates when growing summer cover crops for forage.
- Be aware of volunteer wheat growing in summer cover crops and manage accordingly for risk of disease and insect pressure carrying over to wheat planted this fall.

Selection of Species

Determining what to plant can be difficult with all the varied species available for use as cover crops. For Kansas producers, local Land Grant Universities, including Kansas State University, and the Midwest Cover Crops Council, have developed a **decision tool** to help select species based on specified goals. When cover crops are grazed, one needs to choose species that will benefit soil health and be palatable and safe as forage for livestock. Fortunately, many species currently recommended for use as cover crops are also good for forage production. Factors such as nutritive content and potential toxicities must be considered.

While some potential risks (i.e., nitrates, prussic acid, alkaloids) exist, most can be managed. Members of the sorghum family (sorghum-sudan, sudangrass, grain sorghum, and forage sorghum) and millets are common nitrate accumulators. Environmental stress and excess nitrogen can increase nitrate levels in these plants. Producers should use caution when grazing forages with high nitrate potential and test before grazing. Although a hard freeze does not change nitrate content, prussic acid toxicity

can occur when grazing sorghums, particularly young plants and in the fall following a frost/freeze. Refer to publications on **nitrate** and **prussic acid** toxicities for more information. For a complete overview of forage crops with potential toxicities, please see the publication "Grazing Management: Toxic Plants" at https://www.bookstore.ksre.ksu.edu/pubs/MF3244.pdf.

Goals for the timing and length of grazing are considerations in species selection. For early to late summer planting, crops can be grazed late summer through early fall. Warm-season species such as millets, sorghum-sudangrass, sudangrass, forage sorghum, sunflowers, cowpeas, lablab, or sunn hemp should be considered potential species to grow. Sudangrass and sorghum-sudangrass have good regrowth potential and could be grazed a couple of times from summer through fall if ample moisture is available for regrowth and planted early enough in the year. Another option is to allow biomass to accumulate and delay grazing until 7 to 10 days following a hard freeze to minimize prussic acid risk. If grazing at this time of the year, cattle may trample a large portion of the biomass produced depending on grazing management, but this may be a good strategy to satisfy soil health goals if part of the objective is to increase soil cover

Complex mixtures of 6 or more species, often called "cocktails," are commonly promoted. Research studies at Kansas State University and other universities have not found a benefit to cocktails compared to single species or simple mixtures of 2 to 4 species. Competitive warm-season grass species tend to be the highest biomass producers, which can maximize weed control and forage production. Mixtures are often used for benefits other than biomass production, such as providing nitrogen fixation by including legumes or soil pest suppression by including brassicas. Seldom is there a measurable increase in soil nitrogen by growing a legume species from studies conducted in the High Plains. From a grazing perspective, mixtures can produce forage with a range of palatability that can provide benefits and limitations. However, herbicide options are greatly limited when growing a mixture of grass and broadleaf species as a cover crop.

Variability in Forage Production

Under dryland conditions, forage productivity will vary from year to year, which makes this one of the biggest challenges facing producers who graze cover crops in the High Plains Region because stocking rates will need to be adjusted annually.

Producers have several options to manage this variability in forage production. A flexible herd size where animals can be added or subtracted based on a given year's productivity is the ideal situation. However, it is difficult for most to adjust herd size, so the number of days a field can be grazed will have to be shortened or lengthened to achieve residue goals. In reality, expect to graze cover crops planted post-wheat for about 30 days in most years. This resource should be considered supplemental forage during the late summer and early winter to help relieve dependence on other forage resources such as native rangeland and baled hay. If excess forage is produced, putting some up as hay or silage to preserve forage for dry years may be a good option. However, removing hay and silage could reduce the amount of residue left in the field, negating soil health goals compared to grazing. Resting native pasture going into the fall is the most critical time for native species to store carbohydrates. This is always a good time to rest native pasture, especially following the drought years. By using summer annuals in the fall, native pasture can be stockpiled and grazed later in the winter after the grass is dormant, reducing winter feed expense.

As a final note, in years with minimal precipitation and forage productivity (i.e. ~1,000 lb/ac or less), the best choice might be not to graze at all if your primary goal is soil protection. Ideally, you want to

maintain a minimum of 30% ground cover or approximately 1,000 lb/ac.

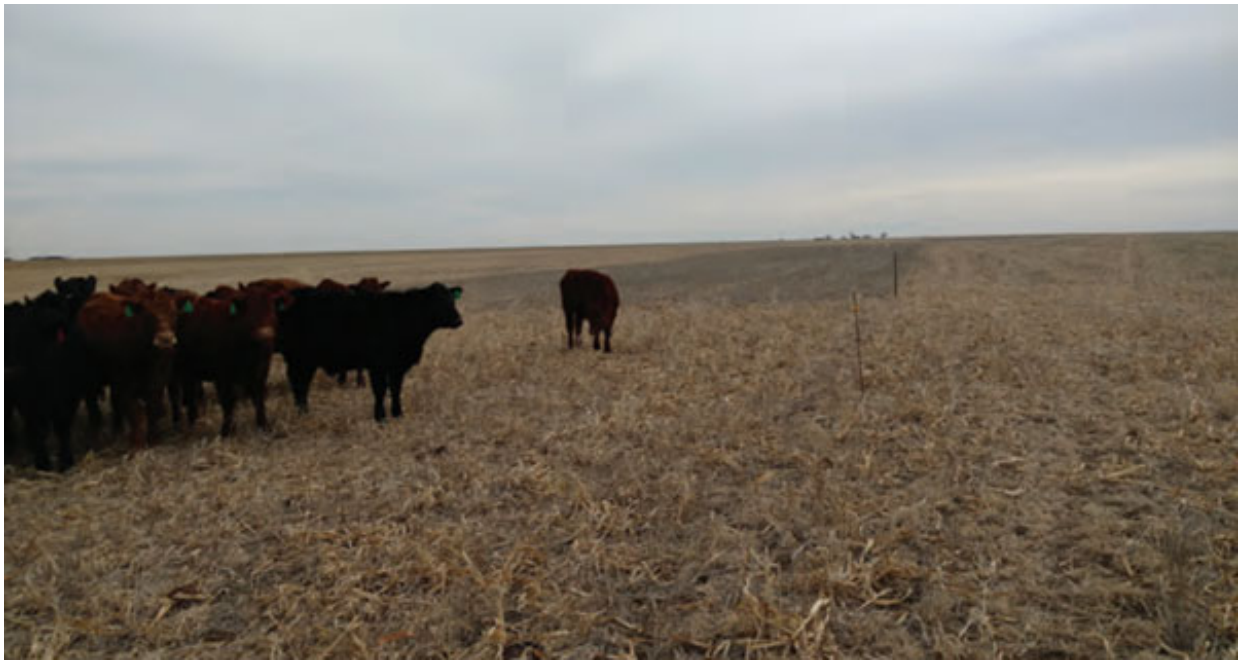


Figure 1. Top image was taken August 13 during a field day at a study field north of Bird City, Kansas. Bottom image was taken at the end of the grazing period that started in January. The heifers are standing at the end of the grazing area. The previously grazed strip is to the right of the fence line.

Grazing Management

When managing grazing of cover crops, numerous options can be considered. The ultimate strategy chosen will be influenced by your overarching goal(s) for the cover crop. Cover crops are generally grown for more reasons than just achieving high levels of harvest efficiency (i.e., percent utilization of available forage), as you would if this were a dedicated forage crop. You want to leave enough residue to maintain most of the benefits associated with planting cover crops.

Grazing management options include:

- Continuous grazing: Calculate a stocking rate based on the estimated yield and put the whole herd in one large field to graze. Advantages associated with this grazing system are that no fences are moved and only one water source is needed (i.e., labor and inputs are minimal). However, if the field is large, livestock will tend to overgraze the forage closest to the water source while underutilizing the forage farthest from the water unless you can move the watering location. Harvest efficiency will generally be around 30% with continuous grazing.
- Rotational grazing: A large field is divided into two or more smaller units, or paddocks, and the animals are rotated from one paddock to the next. This is also a good option that has some advantages and disadvantages. The more paddocks the field is divided into, the higher the stocking density (i.e., the number of animals per acre). Maintaining residue levels and minimizing soil compaction are two issues to consider with this method. The need to move fences every day or every few days and how to handle watering the animals are two of the biggest hurdles to overcome that keep many producers from practicing rotational grazing.
- Strip grazing: Similar to rotational grazing, where a temporary fence is set up to allow animals access to one to a few days' worth of feed, but differs in that there is no back fence, and animals can graze both fresh, residual, and regrowth forage. This method is convenient for watering animals as the fence can be set up so they have continuous access to a single water point. One drawback is increased compaction near the water source. Unlike rotational grazing, little regrowth accumulates when strip grazing because animals continually search out and graze any new growth in the previously grazed strips.

Once you have settled on a grazing method, the next decision you need to make is when to start grazing your cover crop. The timing of grazing in relation to frost is an important consideration in post-wheat planted cover crops. The biggest concern is with plants in the sorghum family and the release of prussic acid after frost damages cell walls. A forage planted immediately after wheat harvest can provide 30 or more days of grazing before frost. In other cases, delaying grazing until after a hard frost may be easier, particularly when it may be time-consuming to move animals on and off the field and difficult to predict frost timing. Grazing should be suspended for 7 to 10 days after a frost to avoid prussic acid poisoning. For plants with prussic acid potential, delay grazing until plants achieve 18 to 24 inches of growth because prussic acid is highest in small plants or regrowth.

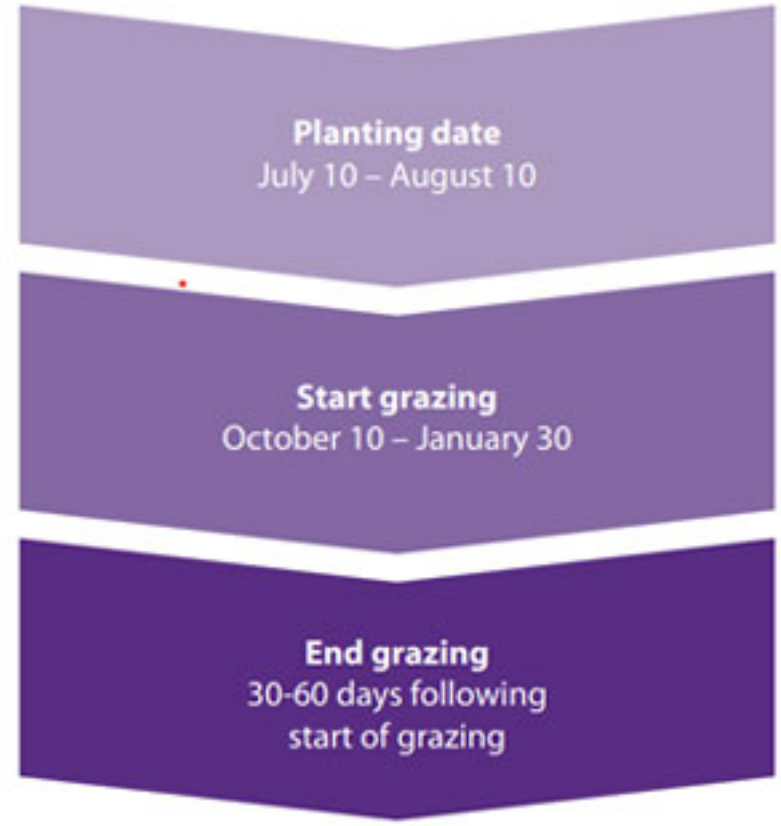
Determining Stocking Rates

Several key pieces of information are needed to estimate a stocking rate. The first is an estimate of the forage yield your field will produce during the period it will be grazed on a dry matter basis. How much forage will be consumed daily depends on animal body weight and forage quality. For green and growing forages, intake will run from 2.5 to 3% of body weight on a dry matter basis. Another key input is the percent utilization desired. In dryland systems, 30% is a conservative starting point unless it appears to be an excellent moisture year with above-average yields. Calculations can be made to estimate days of grazing for a given number of animals or the number of animals for a set grazing period. A **Carrying Capacity Calculator** is also available to help with these calculations.

Example calculations to determine stocking rates are detailed in the full publication linked in the first paragraph of this article.

Example Timeline

Below is an example timeline with suggested planting, start grazing, and end grazing dates for cover crops planted post-wheat. In good moisture years, grazing could occur in September and October. Depending on the species planted, livestock removal before the first hard freeze is recommended. Others may prefer to delay grazing until a week or more after the first killing frost.



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3. Southern rust is active in central and eastern Kansas

Southern corn rust continues to spread in the southern part of the US and is now detected in four counties across central and eastern Kansas (Figure 1). Unlike some other corn diseases, such as tar spot and gray leaf spot, southern rust does not survive in Kansas during winter months and blows in annually from more tropical regions. The severity depends on the weather, and southern rust likes 90-degree days, warm nights, and high humidity.

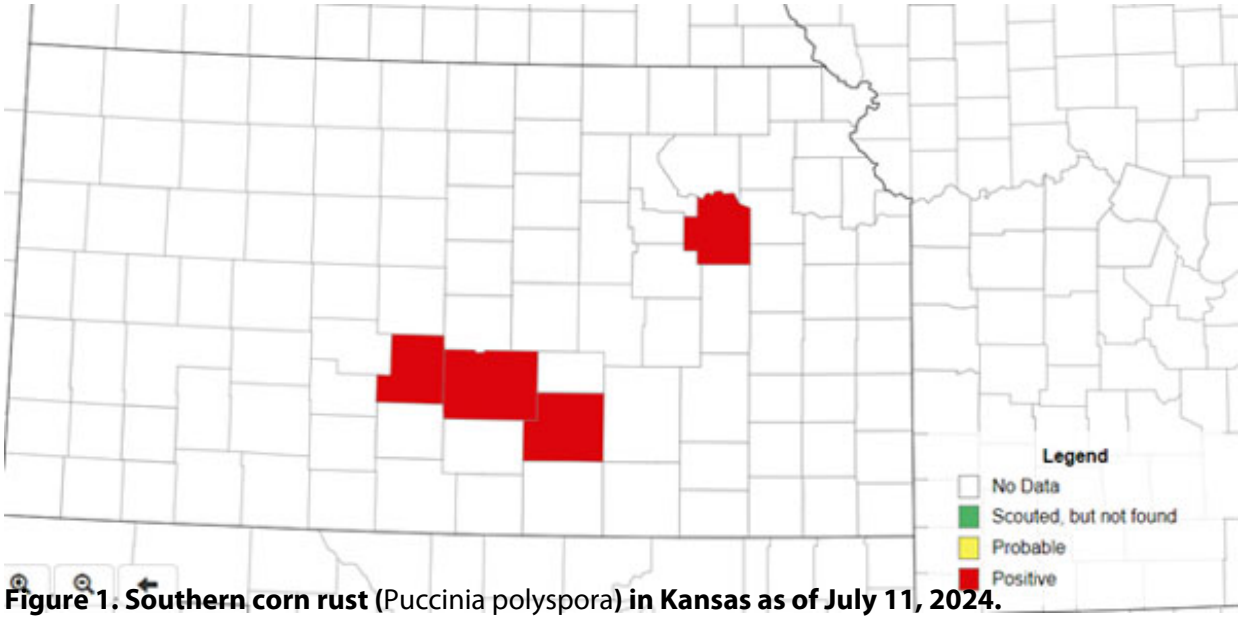

Figure 1. Southern corn rust (Puccinia polyspora**) in Kansas as of July 11, 2024.**
Source: https://corn.ipmpipe.org/southerncornrust/

Here are some frequent questions related to managing southern rust in Kansas.

Q1. Should I apply a fungicide prior to observing southern rust?

A1. Applying a fungicide to control southern rust is not recommended unless the disease has been observed in the canopy. Now that southern rust has been reported in Kansas, it is time to scout corn fields. Once pustules are observed, the pathogen can reproduce rapidly if temperatures and humidity are high.

Q2. What factors should I consider when making the decision to spray for southern rust?

A2. It is important to consider hybrid susceptibility, disease incidence (how many plants are affected), and the crop's growth stage. Infection early in the season on a susceptible hybrid, coupled with conducive weather conditions, poses the highest risk for yield loss.

Q3. If I apply a foliar fungicide at tasselling (VT) or silking (R1) to control tar spot and gray leaf spot, will this application have efficacy against southern rust?

A3. Yes. Most fungicides labeled for tar spot and gray leaf spot are also effective for southern rust. Depending on the product, they will have residual activity for approximately three weeks after application. Fields should be carefully monitored for disease development.

Q4. What fungicides are best to control southern rust?

A4. Efficacy ratings for corn fungicide management of southern rust have been compiled by a working group of corn researchers and can be found here:

https://cropprotectionnetwork.s3.amazonaws.com/corn-foliar-efficacy-2024-1709214762.pdf

Q5. How do I know if what I'm seeing is southern rust?

A5. Southern rust produces characteristic orange pustules of spores, primarily on the upper side of the leaf (Figure 2). If you run your finger across the pustules, the orange spores will be visible on your hand. The Kansas State Plant Disease Diagnostic Lab can also confirm southern rust by observing spores under the microscope. Additional information about sending in a sample can be found here: https://www.plantpath.k-state.edu/extension/diagnostic-lab/.

The K-State Plant Disease Diagnostic Lab will run a free testing program for Southern Rust in the 2024 growing season. If you have any questions, contact the lab at clinic@ksu.edu.

Figure 2. Southern rust on corn. Photo courtesy of Rodrigo Borba Onofre, K-State Plant Pathology.

For more information on identifying corn rusts, see K-State Research and Extension Bulletin MF3016, Corn Rust Identification and Management in Kansas.

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4. Tar Spot is active in five counties in northeast Kansas

Tar spot of corn, a disease caused by the fungus *Phyllachora maydis*, was confirmed in several fields in Doniphan (5/27/2024), Atchison (6/4/2024), Jefferson (6/14/2024), Nemaha (6/18/2024), and Brown (7/8/2024) counties. (Figure 1). Now is the time to intensify scouting efforts. If you wait until there is significant disease in the upper canopy then a fungicide application may be too late. The early disease onset that we're observing this year raises concern for yield loss. Generally, early observations of tar spot have corresponded with high yield loss. The recent rains likely helped to promote tar spot development.

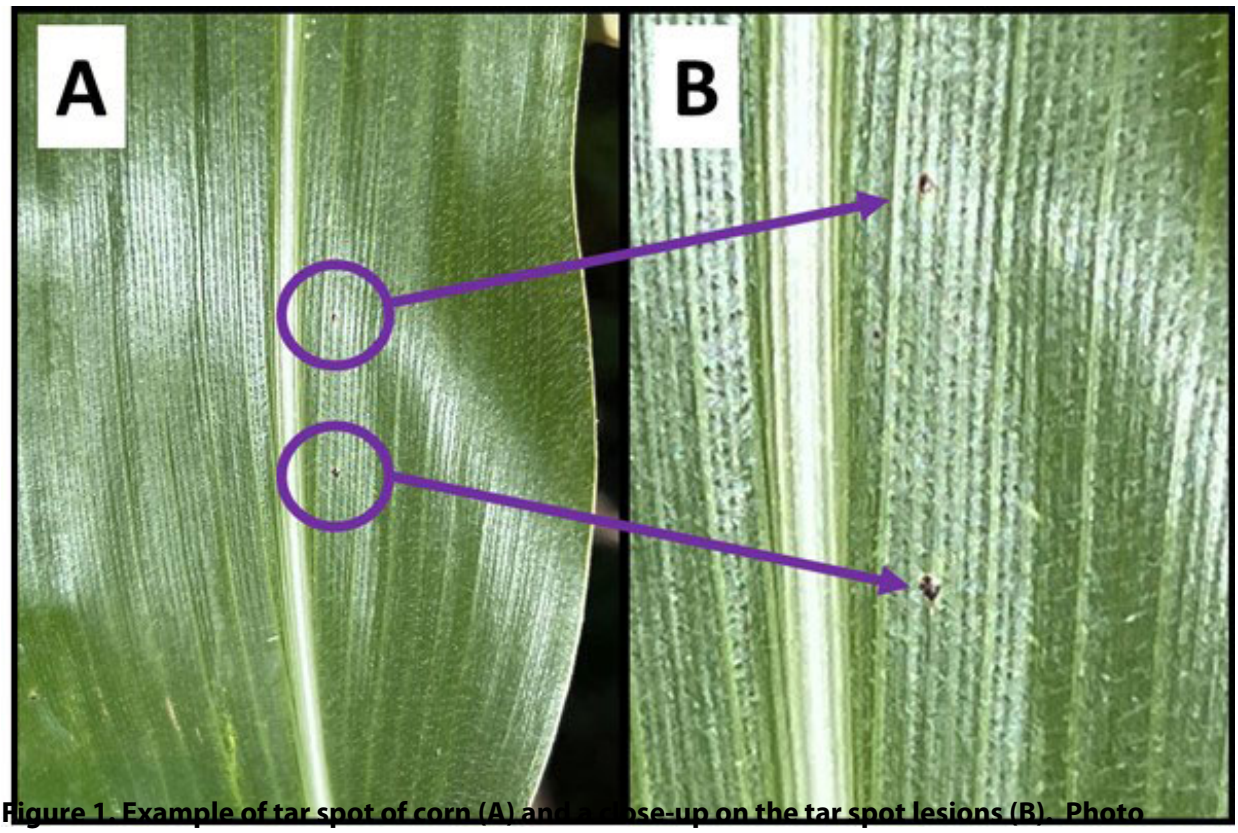

Figure 1. Example of tar spot of corn (A) and a close-up on the tar spot lesions (B). Photo courtesy of Rodrigo Onofre, K-State Research and Extension

Frequently Asked Questions about Tar Spot

What am I scouting for?

Tar spot develops as small, black, raised spots (circular or oval) that develop on infected plants, and may appear on one or both sides of the leaves, leaf sheaths, and husks. Spots may be found on healthy (green) and dying (brown) tissue. Tar spot can be easily confused with insect poop, which can appear as black spots on the surface of the leaf. If you would like assistance in confirming tar spot, you can contact Rodrigo Onofre (785-477-0171), your local county extension office, or the K-State plant diagnostic clinic (https://www.plantpath.k-state.edu/extension/plant-disease-diagnostic-lab/).

Is there a history of disease in this field or neighboring fields?

Tar spot overwinters on infested corn residue on the soil surface, which serves as a source of inoculum for the subsequent growing season. Spores can be dispersed by wind and rain splash and can move to nearby fields if conditions are favorable.

What counties and when was Tar Spot reported in Kansas during the 2023 corn season?

During the 2023 corn season Tar spot was confirmed in Doniphan (6/26/2023), Atchison (6/30/2023), Jefferson (6/30/2023), Brown (7/05/2023), Nemaha (7/28/2023), Jackson (8/8/2023), Marshal (8/22/2023), Leavenworth (8/28/2023), Pottawatomie (9/8/2023), Wabaunsee (9/8/2023), Washington (9/21/2023), and Douglas (9/21/2023) counties. Overall, during the 2023 season, Tar spot prevalence and severity were much higher than in the 2022 season, which led to severe yield impact in several fields in the northeast part of Kansas.

What growth stage is the field?

Research has shown that making an application just after first detection and at or after VT is effective if lesions are detected early. If you wait until there is significant disease in the upper canopy, then a fungicide application may be too late. Here you can find a guide for growth stages in corn: https://bookstore.ksre.ksu.edu/pubs/MF3305.pdf

How does moisture influence disease development?

The recent rains likely helped to promote tar spot development. Additionally, irrigated corn may be at particularly high risk for yield or silage loss. Forecasted rainfall and high humidity will favor tar spot development and spread.

Should I apply a fungicide?

Fungicides are an effective tool for controlling tar spot if they are timed well. Research has shown the best return on investment from a fungicide application on corn occurs when **fungal diseases are active** in the corn canopy. A **well-timed, informed fungicide application** will be important to reduce disease severity when needed, and we recommend holding off until the disease is active in your field and corn is at least V10 growth stage. Scouting will be especially important if wet weather continues. When applied from tassel (VT) to R2 (milk), several fungicides are highly effective at controlling tar spot. I would recommend picking a product with multiple modes of action. The National Corn Disease Working Group has put together efficacy ratings for fungicides labeled for the control of tar spot, which can be found at the Crop Protection Network website at https://cropprotectionnetwork.org/publications/fungicide-efficacy-for-control-of-corn-diseases.

A second application may be warranted if there is high disease pressure early in the season. Fields should be scouted 14-21 days after the first application to see if tar spot has become active again. Fungicides will not provide benefits after R5. Always consult fungicide labels for any use restrictions prior to application.

Where has tar spot been reported in the 2024 season?

Tar Spot has only been detected in five counties in Kansas: Doniphan (5/27/2024), Atchison

(6/4/2024), Jefferson (6/14/2024), Nemaha (6/18/2024), and Brown (7/8/2024) counties (Figure 2.)

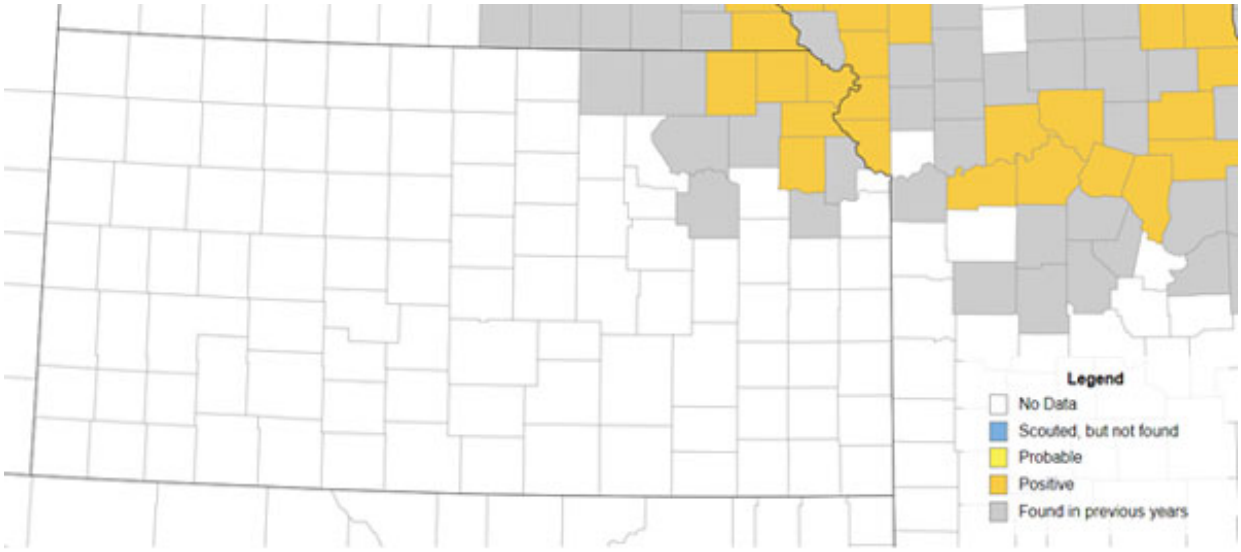

Figure 2. Tar Spot of Corn (Phyllachora maydis**) in Kansas in 2024. Source:** https://corn.ipmpipe.org/tarspot/

Help us track tar spot – Free tar spot testing is now offered for this season

If you suspect a field has tar spot, contact Rodrigo Onofre directly at 785-477-0171 and/or submit a sample for free testing during the 2024 growing season to the K-State Plant Disease Diagnostic Lab at: https://www.plantpath.k-state.edu/extension/diagnostic-lab/documents/2021_PP_DiseaseLabChecksheet.pdf.pdf. This will help us monitor the situation in the state.

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5. Mid-season insect management for cotton production

As cotton in Kansas begins setting squares, our attention shifts from monitoring thrips to monitoring cotton fleahoppers and lygus bugs (also known as tarnished plant bugs). Cotton should be scouted for these insects from the six-leaf stage until square production stops. Feeding damage from fleahoppers and lygus bugs is very similar, and both cause squares to drop (Figure 1).

Figure 1. Missing squares as the result of cotton fleahopper/lygus bug damage. Photos courtesy of Rex Friesen.

Scouting for cotton fleahoppers and lygus bugs

Cotton fleahoppers are a 1/8-inch long and yellowish-green insect with an elongated, oval-shaped body that is slightly flattened over the top (Figure 2). Adult fleahoppers have a few dark spots near the rear of the upper surface of the back. Fleahopper nymphs are small and white to light green. Begin scouting for fleahoppers when cotton reaches the six-leaf stage. Alternate hosts are croton and silverleaf nightshade, so damaging infestations are more likely where these weeds are abundant. If small squares (immature flower buds) turn brown and drop to the ground (Figure 1), the damage may be caused by fleahoppers. If more than 10 to 20% of small squares are lost in pre-bloom cotton, plants should be examined for the presence of fleahoppers.

Figure 2. Adult cotton fleahopper (left) and lygus bug (right). Photo courtesy of J.P. Michaud.

Scouting for cotton fleahoppers may be difficult because adults jump from plants if they see a shadow. During the first three weeks of squaring, the economic threshold is approximately 25 to 40 fleahoppers per 100 terminals with 10 to 15% blasted squares. Other sampling techniques involve the use of a drop cloth or sweep net. When sampling with a drop cloth, place the drop cloth between the rows and shake plants vigorously over the cloth. Treatment should be considered when counts range between one and three fleahoppers per foot of row. With a sweep net, the threshold ranges between 1 and 1.5 fleahoppers per 10 sweeps. These insects attack the most immature squares, so if 75% or more squares are retained, there is probably no significant fleahopper population present.

Lygus bugs may present another problem for Kansas cotton growers especially where cotton is close to alfalfa. Lygus bug adults are approximately 1/4-inch long and 1/8-inch wide with flat, yellowish-brown bodies and reddish-brown and black mottling (Figure 2). Adults have a conspicuous yellow Y-shaped marking. Watch for lygus bugs to move into cotton fields following alfalfa cuttings, which occur at about the same time as fleahoppers. Alfalfa can be a significant reservoir for lygus bugs. So far this year, lygus bug populations in western Kansas alfalfa fields are notably high, so this is a pest that needs to be more alert during this cotton growing season. According to some references, one lygus bug equals about three fleahoppers.

Control options for fleahoppers and lygus bugs

In most cases, the limited potential for late-developing squares to enhance cotton lint and seed yields, coupled with the chance of unleashing bollworms by killing beneficial insects, offset the advantages of protecting late squares if a late-season fleahopper or lygus bug infestation occurs. Where significant numbers of fleahoppers or lygus are found, use insecticides that have the least effect on beneficial arthropods because they are important for the suppression of bollworms later in the season. Use lower rates and do not worry if you do not achieve 100% control. Many insecticides listed for fleahoppers are labeled for lygus bugs (Table 1).

Table 1. Insecticides labeled for fleahopper and lygus bug control in cotton.

Chemical Name	Product(s)
Acephate	Acephate, Bracket and Orthene
Acetamiprid	Intruder and Assail
Alpha-cypermethrin	Fastac CS (2.6 to 3.6 fl. oz./acre)
Beta-cyfluthrin*	Baythroid XL
Bifenthrin*	Numerous products including Annex, Bifenthrin, Brigade, Discipline, Empower 2, Fanfare, Sniper, and Tundra
Bifenthrin + abamectin	Athena
Bifenthrin + chlorantraniliprole	Elevest
Bifenthrin + imidacloprid	Brigadier and Tempest
Bifenthrin + zeta-cypermethrin	Hero
Chlorpyrifos	Multiple products
Chlorpyrifos +lambda-cyhalothrin	Cobalt Advanced
Chlorpyrifos+zeta-cypermethrin	Stallion
Cyfluthrin + imidacloprid	Leverage
Cypermethrin*	Ammo
Deltamethrin*	Delta Gold
Dicrotophos	Bidrin
Dimethoate	Dimate and Dimethoate
Endosulfan	Endosulfan, Phaser and Thionex
Esenfenvalerate*	Asana XL
Flonicamid	Carbine
Gamma-cyhalothrin*	Proaxis
Imidacloprid	Alias 4F, Couraze 1.6F, Imida E-AG 4F, Nuprid, Pasada, Provado, Sherpa, and Widow
Indoxacarb	Steward
Kaolin	Surround
Lambda-cyhalothrin*	Numerous products including Warrior II with Zeon Technology, Silencer, Taiga Z, and Lambda T
Lambda-cyhalothrin + chlorantraniliprole	Besiege
Lambda-cyhalothrin + thiamethoxam	Endigo ZC
Methamidophos	Monitor
Methomyl	Lannate LV and Lannate SP
Novaluron	Diamond
Oxydemeton	MSR and Metasystox-R
Oxamyl	Vydate
Phosmet	Imidan
Potassium salts of fatty acids	M-Pede
Thiamethoxam	Centric
Thiodicarb	Larvin
Zeta-cypermethrin*	Mustang MAXX, etc.

*Pyrethroid insecticides should be used judiciously, especially if there is a chance that they will be needed to control bollworms later in the season.

Other mid-season insect considerations for cotton

The bollworm (corn earworm or sorghum headworm) is a serious pest across much of the US cotton belt. However, damage has been limited in Kansas even when significant infestations have developed in corn and grain sorghum. Growers should watch for developing infestations during fruiting and boll development. Bollworm management is based on scouting for eggs or small larvae. Treatment is recommended in cotton that does not express Bt traits when ten eggs or five small worms per 100 plants are present during early bloom in late July and early August. The use of Bt cotton (Bollgard II® and Widestrike™) in Kansas is common. However, bollworm resistance to

currently used Bt traits has been documented. It may take up to five days from ingestion to death when susceptible bollworm feed on Bt cotton. Bt cotton should be scouted every 2 to 3 days to determine if young bollworms are being controlled. Consider spraying if fruit and boll damage are excessive, as indicated by ten small worms (1/4- to 3/8-inch long) per 100 plants or six small worms in 100 flowers.

For more information on insect pest management in cotton, see the 2024 Cotton Insect Pest Management bulletin available from the KSRE Bookstore: https://bookstore.ksre.ksu.edu/item/cotton-insect-pest-management-2024_MF2674

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 insecticide label for the most current use requirements.

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6. World of Weeds - Purple threeawn

Purple threeawn (*Aristida purpurea*) is a warm-season perennial grass native to Kansas and the Great Plains that can be a challenging weed in fields under long-term no-till management. This species may be found invading fields along with tumble windmillgrass and tumblegrass – other problematic native perennial grasses.

Ecology

Purple threeawn (Figure 1) is primarily found in the western 2/3 of Kansas and prefers dry sites with sandy or rocky soils. This grass readily reproduces by seed and invades disturbed sites or waste places. Because of its iconic awns that can cause eye, nose, and mouth injuries in livestock and wildlife, it is rarely eaten and is an indicator of overgrazing on rangelands.

Identification

Like tumble windmillgrass and tumblegrass, purple threeawn leaves are primarily located near the base of the plant, forming a clump. Leaves are rolled inward to flat and typically 12 inches long. They are rough textured and curved at maturity. The leaf sheath, mostly longer than the internodes, is round and slightly rough to smooth. The ligule consists of a short, fringed membrane, while the auricle (leaf collar) consists of long, tufted hairs (Figure 2).

Culms (stems) are erect, hollow, and six to 30 inches tall. Seed heads are narrow, often nodding, loose, purple to red panicles one and one half to 12 inches long. Spikelets have three nearly equal awns one to three inches long (Figure 3), from which this grass receives its common name.

Figure 1. Purple threeawn growing in fallow field in Finney County. Note the nodding purple to red seed heads. Photo by Logan Simon, K-State Research & Extension.

Figure 2. Purple threeawn ligule is a short and fringed membrane and the auricle is two tufts of long hairs on either side of the leaf blade. Photo by Mike Haddock, kswildflower.org.

Figure 3. Purple threeawn's iconic spikelets have three nearly equal awns one to three inches long. Photo by Mike Haddock, kswildflower.org.

Management

Very little information is available on controlling purple threeawn in croplands, and unfortunately, very few herbicides are labeled for its control. Practices that avoid overgrazing can help prevent the invasion of rangelands. Research from USDA-ARS has shown that controlled burning can be an effective control strategy, with the greatest control from summer or fall burns.

An upcoming article will address the best management options for warm-season perennial grasses. Stay tuned!

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