Issue 1052

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eUpdate

05/08/2025

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. Managing iron deficiency chlorosis in sorghum

Sorghum is a drought-tolerant crop well-suited for dryland and rain-fed cropping systems in Kansas. However, both grain and forage sorghum are highly susceptible to iron (Fe) deficiency chlorosis (IDC) when grown on high pH or calcareous soils. Iron is a catalyst needed for chlorophyll formation and photosynthesis to ensure optimal plant growth and development. Limited supply of Fe results in IDC with delayed crop maturity and reduced yields in susceptible grain sorghum hybrids. Iron is an immobile nutrient in plants, so IDC symptoms appear first on younger leaves with yellow streaks in the interveinal tissue, leaf tips, and margins. In severe conditions, younger leaves may turn pale green to bleached white. In typical sorghum fields, IDC development is non-uniform because soil chemical conditions vary across the field.

Causes of iron deficiency chlorosis

High soil pH, free calcium carbonate associated with calcareous soils, and low soil organic matter content are the major soil factors that reduce Fe availability. For instance, the solubility of Fe decreases when soil pH is greater than 7 because of the conversion of the ionic form of Fe to metal oxides or hydroxides that are relatively insoluble. High bicarbonates create alkaline soil conditions that affect the reduction of ferric form (Fe^{3+}) to ferrous form (Fe^{2+}) required for plant uptake and utilization.

Soils with less than 2.5 ppm DTPA-extractable Fe concentration are considered deficient and could result in IDC. Soil nutrient interactions can also result in IDC. High P concentrations in sorghum tissue can induce Fe chlorosis because of immobilization of Fe in the leaves. While manure application can supply nutrients, including Fe, manure containing high P concentrations and carbonates can interfere with Fe availability and uptake. High levels of soil nitrate can also induce IDC. When plants take up nitrate (NO_3^-), they release bicarbonate ions (HCO_3^-) into the root zone. The release of bicarbonates in exchange for nitrate uptake inhibits the conversion of Fe^{3+} to Fe^{2+} in the plant, resulting in iron chlorosis. Application of ammonium-based fertilizers can enhance Fe availability and uptake due to a reduction in pH near the root zone.

Environmental conditions such as low temperature and drought can reduce root growth, increase bicarbonate levels, and reduce Fe availability.

Managing iron deficiency in sorghum fields

Since IDC can vary significantly over time and within the same field, this complicates managing IDC. In mild chlorotic conditions, sorghum can grow out of IDC over the growing season when adequate moisture is available.

An effective management strategy for preventing IDC in grain sorghum should be a comprehensive approach that considers field history, application of Fe chelates, and selection of IDC-tolerant sorghum hybrids. The application of iron sulfate is not very effective because it quickly reacts with carbonates and becomes unavailable.

There are several Fe chelate products, including Fe-EDTA, Fe-HEDTA, Fe-DTPA, and Fe EDDHA, marketed to treat iron deficiency. However, not all chelate products are effective at pH > 7.5. The Fe-EDDHA forms are more effective in controlling IDC on high pH (> 7.5) soils.

K-State research on managing IDC in grain sorghum

We conducted field experiments in 2015-2016 to test iron chelate application in alleviating IDC in grain sorghum under both dryland and irrigation conditions in western Kansas. Treatments were Fe-EDDHA (6% Fe) application rates (0, 3, and 6 lb product/acre, and split application of 3 lb/acre applied at planting and another 3 lb/acre applied 2 weeks after planting). The treatments were applied to five commercial sorghum hybrids (two susceptible and three IDC-tolerant hybrids) as sub-plots. The Fe chelate was applied in-furrow at planting, except for the split treatment, where the chelate was applied at planting, plus an additional Fe chelate application 2 weeks after planting. Soil pH at the Tribune site was 7.9 and 8.0 near Garden City. The calcium carbonate equivalent of the soil varied from 2.5% at the SWREC in Garden City, 8.2% at the producer field near Garden City, and 8.6% at the SWREC near Tribune.

Results showed grain sorghum hybrids differed in tolerance to iron chlorosis. In general, the severity of iron chlorosis was less in tolerant sorghum hybrids and more severe in the two susceptible hybrids, regardless of location.

Severity of IDC scores decreased as the growing season progressed at SWREC at Garden City and at Tribune (under irrigation) but not in the producer's field near Garden City. The greater severity of IDC at the producer's farm was due to high carbonate concentrations in the soil and drought conditions.

Iron chelate application suppressed IDC in the susceptible hybrids at both the dryland and irrigated locations (Figure 1). Even in tolerant hybrids, applying 3lb/acre Fe chelate product improves growth and development (early flowering) compared to the control.

Grain yields were different among the sorghum hybrids at both dryland and irrigated sites. Applying 3 lb/acre Fe chelate increased sorghum grain yield by 27 bu/acre and 17 bu/acre compared to the control at both dryland sites near Garden City and the irrigated site near Tribune (Figure 2).

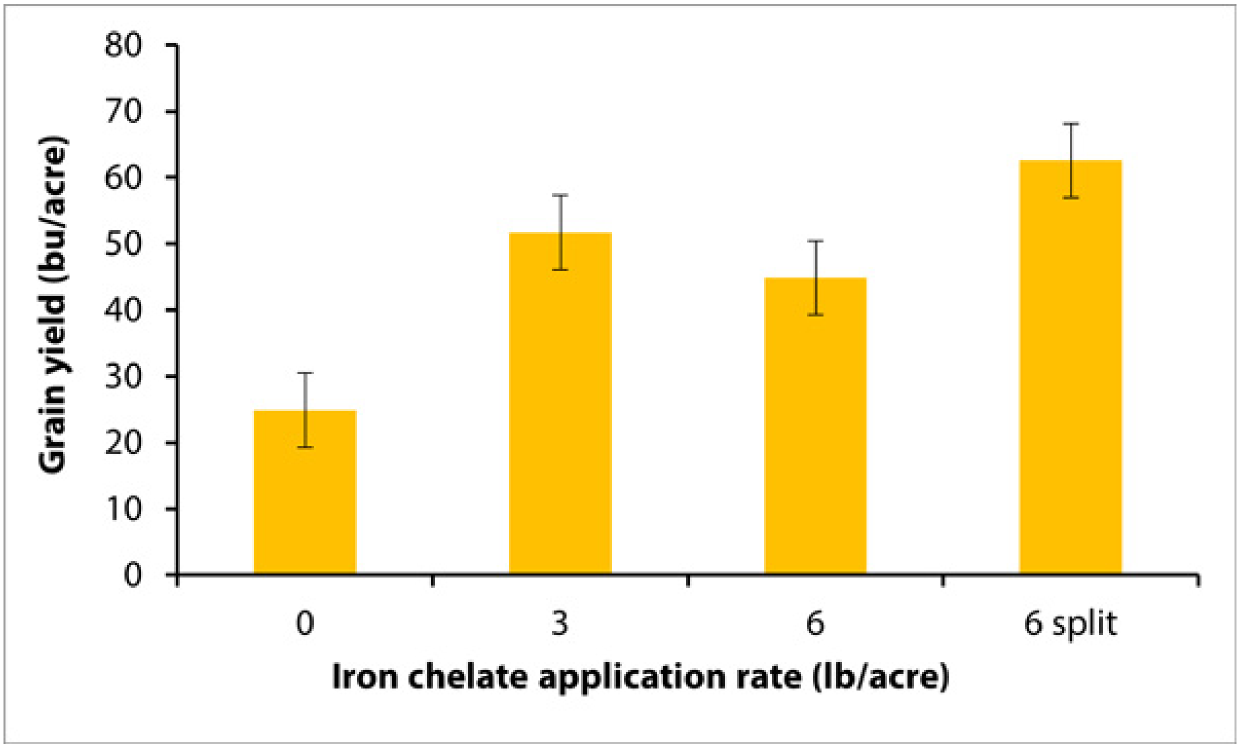
In another study, foliar application of 3 lb/acre Fe chelate to sorghum at the three-leaf stage was as effective as in-furrow application at planting. In that example, grain sorghum yield with the control treatment was 89 bu/acre, 101 bu/acre with in-furrow application compared to 107 bu/acre with the foliar application treatment. Details of past K-state research on managing iron chlorosis on sorghum can be found in this report:
https://newprairiepress.org/cgi/viewcontent.cgi?article=1236&context=kaesrr.

Other studies have shown that seed treatment with Fe-EDDHA can be effective at controlling IDC. Soil amendments with manure or pelleted manure can alleviate IDC on eroded soils with low soil organic matter content.

Applying acidifying soil amendments such as sulfur, sulfuric acid, or Fe pyrites is not feasible on a field scale because large amounts will be required to lower soil pH.

Limited trials have been conducted evaluating dry humic acid products for alleviating IDC. Four trials were conducted in Wallace and Thomas Counties in 2016. Both raw chipped dry humate (72% humic acid) and a granular prilled product (70% humic acid) were applied in-furrow, in 30-inch rows with the seed at 6 different rates. Rates evaluated were 0-70 lb/ac for the raw chipped product and 0-35 lb/ac for the granular product. Chlorosis was observed at the sites; however, no treatment differences were observed in visual rating, GreenSeeker NDVI measurement, or final grain yield. Further work is needed on this topic.

Figure 1. Application of Fe chelate suppressed IDC in susceptible hybrids. The control treatment (top) and a plot that received 3 lb/a Fe chelate (bottom) show the difference between treatments. Photos were taken on August 4, 2015 (60 days after planting near Tribune, KS).



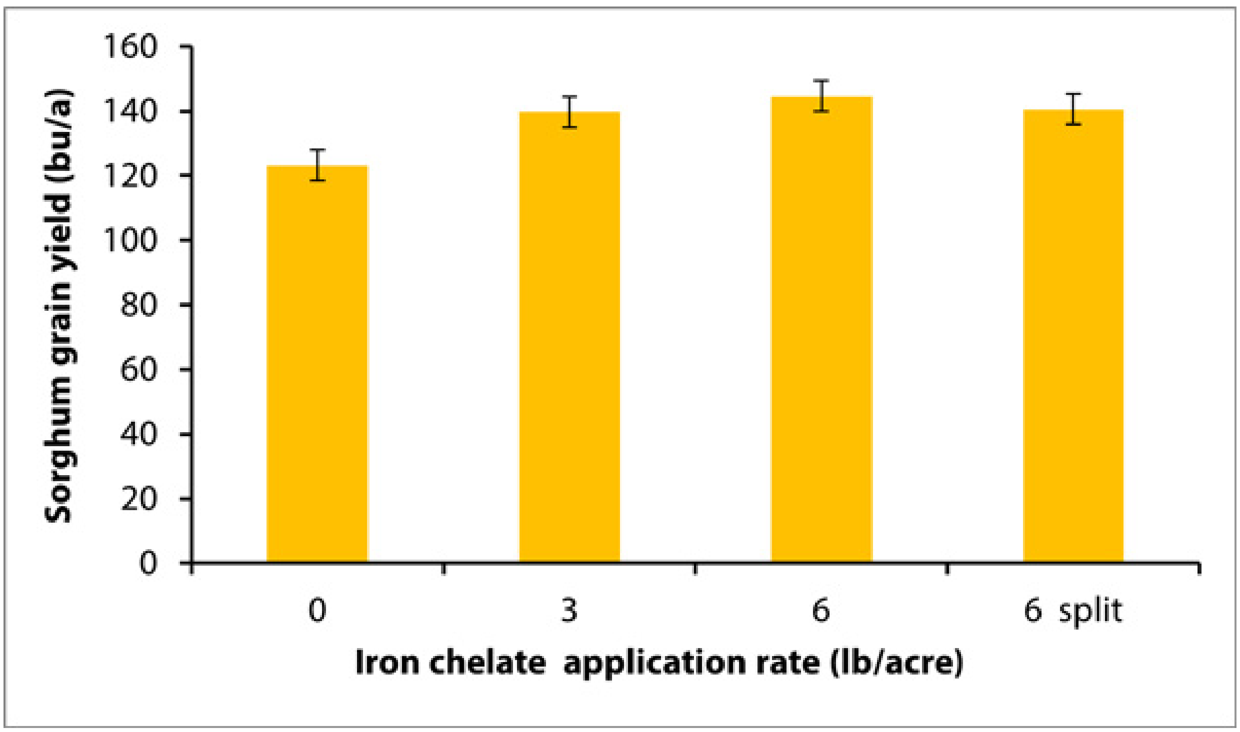


Figure 2. Sorghum grain yield as affected by iron chelate application across two dryland locations near Garden City, KS (top graph) and an irrigated location near Tribune, KS (bottom graph).

Summary of key points

- Planting IDC-tolerant sorghum hybrids is the most cost-effective strategy to managing iron deficiency.
- Apply Fe chelate in-furrow at sorghum planting in fields with known history of iron chlorosis to reduce IDC.
- High soil nitrates and P concentrations can exacerbate IDC in sorghum fields.
- Manure application can reduce IDC in fields with low soil organic matter content. However, manure containing high levels of P and carbonates can reduce Fe uptake.

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2. Temperature influences the performance of burndown herbicide applications

Spring burndown applications are an important part of field preparation, especially in no-till cropping situations. Such applications typically include glyphosate for grass control, along with dicamba and/or 2,4-D for broadleaf weed control, and a residual herbicide such as atrazine, metribuzin, or flumioxazin. Most years, this herbicide combination will result in effective weed control and a clean seedbed at planting time. However, this year, there have been several reports of poor control of grasses, especially weedy bromes and winter cereals following glyphosate applications that were made during the month of April (Figure 1).

Figure 1. An example of volunteer cereal rye not controlled by a herbicide application that included glyphosate plus dicamba. Photo by Sarah Lancaster, K-State Research and Extension.

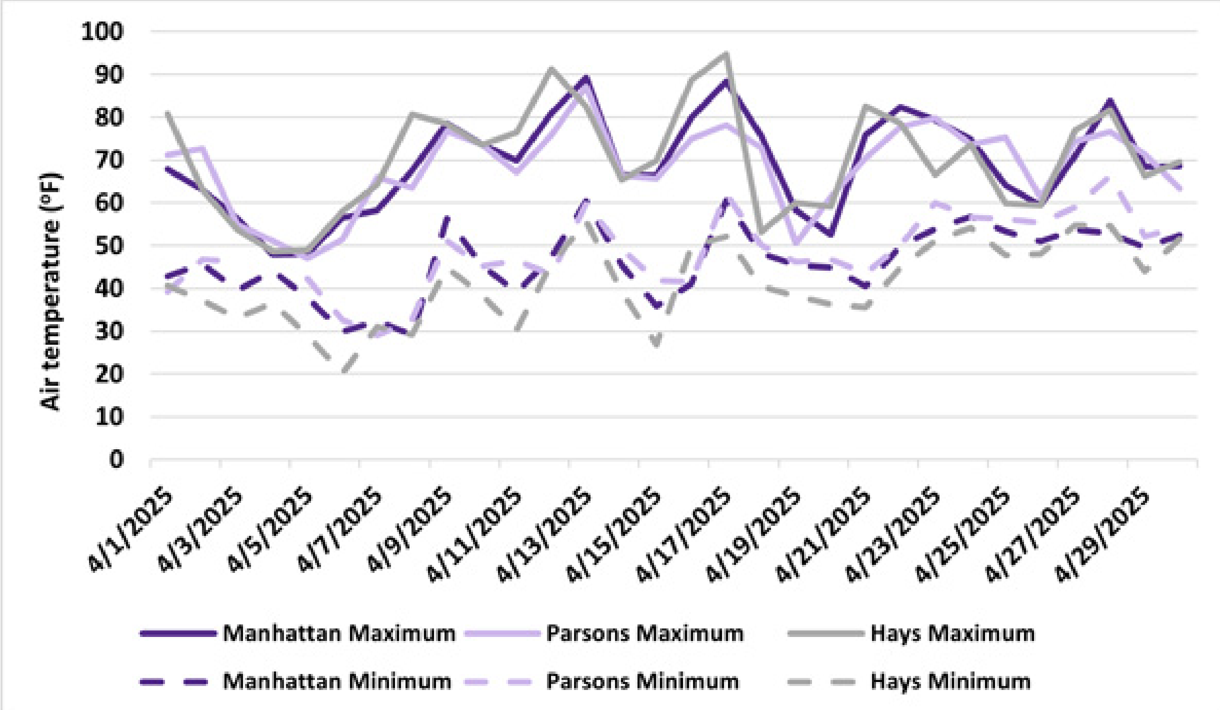

Figure 2. Daily maximum temperature and minimum temperature for the month of April 2025, recorded by the Kansas Mesonet stations at Manhattan, Parsons, and Hays, KS. Source: Kansas Mesonet.

Cool weather has been identified as the most likely cause of poor control in the situations we have discussed with farmers, applicators, and agronomists. Because active growth is required for maximum herbicide activity, consistently warm temperatures are necessary for optimal herbicide activity. In a recently published article, Chris Landau analyzed data from 14 states (including Kansas) and the province of Ontario to identify the characteristics of "successful" postemergence herbicide applications. The most important factors for a successful glyphosate application were temperature and precipitation during the 10 days before and after application. For large foxtail control by glyphosate, temperatures after application were the most important factor, with an optimum range of 66 to 77°F. Interestingly, cool temperatures (< 60°F) following application had a greater negative effect on giant foxtail control by glyphosate compared to other herbicide/weed combinations evaluated.

While the research mentioned above analyzed control of a summer annual grass, it is reasonable to apply this logic to the current challenges observed in controlling winter annual grasses, even though the base temperature for growth is less in winter annuals (32°F vs 50°F). For example, wild oat control by glyphosate was greater at 86°F compared to 68 or 77°F in greenhouse research. In many locations across the state, there have been few opportunities to make burndown applications with ideal temperatures. For example, at Manhattan, Parsons, and Hays, the longest span of days with temperatures above 60°F was 12 days from April 7 to April 18 at Parsons (Figure 2).

Other factors that may have contributed to the reduced control in the cases we are aware of include antagonism between glyphosate and tankmix partners such as dicamba and 2,4-D, lower (but still labeled) glyphosate rates, and lower rates of ammonium sulfate (AMS). Under ideal conditions, the tankmixes used would have likely provided acceptable weed control.

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3. Controlling volunteers in a soybean/cotton crop rotation

Volunteer plants of one crop growing in another can be considered weeds because they can reduce the yield, quality, and harvest efficiency of the current crop (Figure 1). In the cotton-producing regions of Kansas, cotton frequently follows soybeans in no-till or reduced-till cropping systems. In the past, the best way to control volunteer plants in this situation would be to rotate herbicide-resistance traits from year to year. The inability to use dicamba-containing herbicides over the top of cotton or soybeans in 2025 exacerbates the challenge of controlling volunteer soybeans in cotton fields (Figure 2), or the less common scenario of volunteer cotton in soybean fields.

Figure 1. Plant material in harvested cotton with volunteer soybeans can severely impede the ginning process and penalize loan values. Photo courtesy of Rex Friesen, Southern Kansas Cotton Growers.

Figure 2. Volunteer soybean in seedling cotton. Photo courtesy of Rex Friesen, Southern Kansas Cotton Growers.

Volunteer soybean in cotton

If Enlist cotton is planted, Enlist One or Enlist Duo will control volunteer soybeans, as long as it is not Enlist soybeans. However, there are very few options to control Enlist soybeans in Enlist cotton. Research from North Carolina suggests trifloxysulfuron (Envoke) effectively controls volunteer soybeans. However, STS soybeans must be planted in the following spring.

Volunteer cotton in soybean

Like the previous scenario, volunteer cotton can be controlled in Enlist Soybeans with Enlist One or Enlist Duo, as long as it is not Enlist cotton. Preemergence application of S-metolachlor + metribuzin (Boundary) will reduce volunteer cotton emergence. Controlling volunteer Enlist cotton in Enlist soybeans can be accomplished by postemergence applications of flufhiacet (Cadet) pyraflufen (Vida, others),

Other management options

If an applicator is willing to utilize hooded or post-directed application equipment, the following contact herbicides can be used to control either volunteer cotton or soybeans, no matter which of the currently available herbicide-resistance traits are present. Contact herbicides include: carfentrazone (Aim, others), linuron (Lorox, others), or paraquat (Gramoxone, others). In addition, hooded applications of flumioxazin (Valor, others) may be used in cotton.

If volunteers are a significant concern due to harvest conditions in the previous year, the best alternative may be to rotate to corn or grain sorghum, which would allow for more herbicide options for broadleaf control.

More information about weed management in soybean and cotton can be found in 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.

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4. Control options for buckbrush, roughleaf dogwood, and smooth sumac

Three common brush species native to Kansas and widely spread across the state are buckbrush (*Symphoricarpos orbiculatus*), roughleaf dogwood (*Cornus drummondii*), and smooth sumac (*Rhus glabra*).

Buckbrush is a shrub that can grow to over 6 feet tall with rhizomes and stolons. It has simple opposite leaves. Flowering occurs in June-July, with red fruit produced in the late summer. Buckbrush occurs in disturbed woodlands, along creek banks, old fields, and on rangelands and pastures.

Roughleaf dogwood is a shrub that can reach 15 feet in height. Flat-topped clusters of white flowers usually appear in late May to early June. The round white fruits appear from September to October. Roughleaf dogwood occurs in fencerows, along the edges of woods, along streams, and on open prairies. It provides cover for wildlife and nesting birds.

Smooth sumac will grow to a height of 5-7 feet and produces an open milo-like head in early June. Leaves are odd-pinnately compound and turn bright red in the fall. The round red fruits are produced from August to September. It grows on rocky soils in pastures and along fencerows. Some birds will eat the seed, and the plants provide cover for birds and mammals.

These shrubs can produce clumps that will shade out and reduce forage production. Cattle generally do not browse these species. Sheep and goats are more likely to utilize these woody plants.

Be on the lookout for buckbrush, roughleaf dogwood, and smooth sumac, and implement a control plan if needed.

Buckbrush control

For effective control of buckbrush, consider top removal after the plants have leafed out and the nonstructural carbohydrates stored in the roots are at a low level. A single mowing is likely to cause resprouting, so multiple cuttings at the appropriate time (generally early to mid-May) are necessary. Another effective method is prescribed burning for 2-3 consecutive years.

Herbicides can also be used to control buckbrush. The best time to spray occurs after the plants are fully leafed out (Figure 1), but before the leaves are too mature (generally mid-May to early June). A number of herbicides can be used, but 2,4-D low-volatile ester formulations at 1.5 to 2 lbs/acre are usually quite effective. Chaparral can be used alone at 3 oz/acre, but I prefer adding 2 pint/acre 2,4-D to 2 oz/acre Chaparral. Grazon P+D can also provide acceptable control. Caution should be used if treating cool-season grasses with Chaparral. Grazon P+D is a restricted-use pesticide. Always read the label when considering the use of herbicides.


Figure 1. Buckbrush. Photo by Walt Fick, K-State Research & Extension.

Roughleaf dogwood control

Roughleaf dogwood is rarely grazed and invades grassland in the absence of prescribed burning. Pastures that are frequently burned usually do not have a roughleaf dogwood problem. A Konza Prairie study near Manhattan indicated that roughleaf dogwood increases dramatically on grazed or ungrazed watersheds with a burning frequency of 4 years compared to annual burning. Once established, roughleaf dogwood is difficult to remove with fire alone as the plant usually leafs out after the burning season. Long-term late-spring burning may gradually reduce stands of roughleaf dogwood.

The optimum time to spray roughleaf dogwood is between the flower bud state and early seed production (Figure 2). A number of foliar-applied herbicides, including triclopyr (Remedy Ultra), dicamba (Banvel), and picloram (Tordon 22K) used alone or in combination with 2,4-D will defoliate roughleaf dogwood, but actual mortality is usually less than 25%.

Roughleaf dogwood can be difficult to control. High-volume treatments providing greater than 50% mortality include 0.5-1% PastureGard HL (triclopyr + fluroxypyr), 1% Surmount (picloram + fluroxypyr), and 1% Grazon P+D + 0.5% Remedy Ultra (picloram + 2,4-D + triclopyr). All these herbicides are applied with water. Adding a 0.25 to 0.5% v/v non-ionic surfactant may enhance control. Aerial applications should be applied to at least 3 gallons per acre of total spray solution to ensure adequate coverage.

A single application of any herbicide does not completely eliminate roughleaf dogwood but may open up the stand enough to carry a fire. In subsequent years, a combination of prescribed burning in the late spring followed by a herbicide application 4-6 weeks post-burning should provide good control.

Figure 2. Roughleaf dogwood in full bloom. Photo by Walt Fick, K-State Research & Extension

Smooth sumac control

Late-spring burning will keep smooth sumac shorter in stature, but generally increases stem density. The optimum time to spray smooth sumac is between the flower bud stage and early seed production (Figure 3). Smooth sumac is among the easiest woody plants to control with herbicides if applied at the proper time. With ground or aerial applications, smooth sumac is controlled with 2-3 pint/acre 2,4-D.

Figure 3. Smooth sumac in early seed production stage. Photo by Walt Fick, K-State Research & Extension

Measures that can mitigate control of buckbrush, roughleaf dogwood and smooth sumac

Soil-applied materials such as Spike 20P (tebuthiuron) and Pronone Power Pellets (hexazinone) can provide control of roughleaf dogwood and smooth sumac. Buckbrush is not listed on the Pronone Power Pellets label. Spike 20P should be applied during the dormant season at 0.75 ounces per 100 square feet of product. This is equivalent to 20 pounds of product per acre. Pronone Power Pellets should be applied when the soil is moist and rainfall is expected within 2 weeks of application. For plants 3-6 feet tall apply 2-4 pellets at the base of the plant. Expect to see grass damage following the use of Pronone Power Pellets. These dry soil-applied products may be useful in areas where spray drift may cause considerable non-target damage.

Growing season burns, e.g., in August, have the potential to reduce stands of roughleaf dogwood and smooth sumac.

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5. Soybean Gall Midge: What to watch for this season

In 2023, soybean gall midge was found infesting soybean and sweet clover in Marshall and Nemaha counties. Washington County was added to the list of soybean gall midge-positive locations in 2024. Since this pest can overwinter in Kansas, producers should be on the lookout for additional infestations in 2025.

The Soybean Gall Midge (*Resseliella maxima*) was first observed in Nebraska in 2011 but was not officially described as a new species until 2018 when this tiny fly established itself as an emerging pest of soybeans in South Dakota, Nebraska, Minnesota, and Iowa. New infestations have been documented every year since, and its range has expanded into Missouri. Soybean gall midge has been documented in Nebraska along the Kansas border as recently as 2021. This pest should be actively scouted for during the growing season, especially in counties along the Nebraska border.

Losses from soybean gall midge infestation are due to plant death and lodging (Figure 1). Heavily infested fields have shown the potential for complete yield losses from the edge of the field up to 100 feet into the field, and a 20% yield loss from 200 to 400 feet into the field.

Figure 1. Soybean field with damage from soybean gall midge. Photo by Justin McMechan, Univ. of Nebraska.

Identification and Lifecycle

Adults: tiny (2-3mm), delicate flies with an orange abdomen, slender bodies, and mottled wings. Long legs are banded with alternating light and dark markings (Figure 2).

Figure 2. Adult soybean gall midge. Photo by Mitchell Helton, Iowa State Univ.

Larvae: small, legless, maggots that are clear to white-colored when young but turn bright orange when mature (Figure 3).

Figure 3. Soybean gall midge larvae. Photo by Justin McMechan, Univ. of Nebraska.

Soybean gall midge overwinters as larvae in the first few inches of soil. After pupation in the early spring, adult midges emerge and lay their eggs on the lower portions of stems or at the base of soybean plants. The eggs hatch, and the larvae feed within the stems. Infestation does not occur until the V2 stage, when natural fissures and cracks appear in stems, allowing entry by larvae. Infestation can continue into the reproductive growth stages. So far, there appear to be at least two generations per growing season. The adult soybean gall midges do not feed on soybeans.

Scouting

Begin scouting soybean plants at the V2 growth stage. Symptoms of infestation include:

1. wilting or dead soybeans along field edges with decreasing damage into the center of the field (Figure 4),
2. darkening and swelling at the base of stems (Figure 5),
3. brittle stems that break easily near their base, and
4. small orange larvae are present in split-open stems.

Figure 4. Wilting soybean plant from gall midge infestation. Photo by Justin McMechan, Univ. of Nebraska.

Figure 5. Darkening and swelling of stem. Photo by Adam Varenhorst, South Dakota State Univ.

Management

Effective management recommendations for this relatively new pest continue to be evaluated. On-farm studies in impacted states are examining the effects of various cultural practices and insecticides on preventing losses. Seed treatments have not been shown to be effective.

Please report any occurrence of soybean gall midge to your local extension professional or contact the K-State Entomology Department. The Soybean Gall Midge Alert Network, https://soybeangallmidge.org/, can be used to track developments regarding this pest.

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6. World of Weeds - Catchweed bedstraw

A question recently came in about controlling catchweed bedstraw in a smooth bromegrass hay meadow (Figure 1). Catchweed bedstraw (*Galium aparine*), also known as cleavers, is a member of the madder family, which also includes coffee, gardenias, and several other ornamental plants. There are some other bedstraw species, but they are of little agronomic importance. As the name implies, this plant 'catches' and clings to objects as a result of bristles on stems, leaves, and fruits. Catchweed bedstraw and related species were historically used as mattress filling (bedstraw).

Figure 1. The growth habit of catchweed bedstraw. Photos by Sarah Lancaster, K-State Research and Extension.

Ecology

Catchweed bedstraw is a summer or winter annual weed native to North America and found throughout most of the world. It grows in a variety of habitats, including forests, prairies, and cultivated fields. Catchweed bedstraw is often found in moist, shady areas, but can tolerate dry soils once established. It can also tolerate freezing temperatures while in the vegetative growth stage. Catchweed bedstraw grows quickly and can flower in as little as eight weeks after germination.

Identification

Catchweed bedstraw cotyledons are 1/2 to one inch, oblong to egg-shaped, with slightly notched tips. Stems are square and grow up to 6 feet long, rarely branching (Figure 2). They grow along the ground and can climb over other plants as a result of being covered in bristles.

Figure 2. Catchweed bedstraw has square stems with few branches. The stems are covered in bristles. Photo by Sarah Lancaster, K-State Research and Extension.

Leaves are approximately ½ to 1 ¼ inches long by about 1/10 inch wide with a sharp point at the tip. They clasp the stem (sessile) and grow in whorls of four to eight. Leaves are covered in hooked bristles, especially the upper leaf surface, leaf margins, and lower midrib (Figure 3).

Figure 3. The midrib and leaf margins of catchweed bedstraw are lined with hooked bristles. Photo by Sarah Lancaster, K-State Research and Extension.

Inconspicuous, white or pale green flowers have four petals and measure about 1/10 inch across (Figure 4). They grow on short branches in groups of 3 to 5, found either at leaf axils or at the end of the stem. Fruits are brown to black, spherical to kidney-shaped, and are covered in hooked bristles, which hold them together in pairs. Seeds are retained inside the fruit.


Figure 4. Catchweed bedstraw has inconspicuous flowers. Also note the sharp points at the ends of the leaves. Photo by Sarah Lancaster, K-State Research and Extension.

Management

Prevention is an important management tactic for catchweed bedstraw. It can be introduced in seed, hay, or manure. Seeds remain viable after passage through the digestive tract of cattle, horses, pigs, goats, and birds.

Established catchweed bedstraw can be controlled by products that contain combinations of fluroxypyr (Starane, others), halauxifen (Elevore, others), quinclorac (Facet, others), dicamba, MCPA, carfentrazone (Aim), or glyphosate are labeled for catchweed bedstraw control. Group 2 herbicides sulfosulfuron (Outrider, others), and florasulam (Orion, others) are also labeled; however, resistance to ALS-inhibiting herbicides has been documented in catchweed bedstraw populations around the world.

Mowing alone is not an effective control option, as cutting at 2 to 3 inches may increase biomass accumulation. Likewise, tillage may increase the population density as a result of seed burial.

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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7. 2025 Kansas Wheat Plot Tours - Updated schedule

The Department of Agronomy and K-State Research and Extension will host several winter wheat variety plot tours in different regions of the state starting May 13, 2025. Please make plans to attend a plot tour near you to see and learn about the newest available and upcoming wheat varieties, their agronomics, and their disease reactions. Below is a preliminary list of plot tour dates, times, and locations with directions. This list will be continuously added to and updated in the coming weeks.

May 13 – Tuesday

Time	County	Location	Agent	Directions
8:00 AM	Harper		Jenni Carr	The location is ½ mile west of K2 on US 160
12:00 PM	Kingman	Kingman	Grace Schneider	Conrardy Seeds Test Plot. Location: 7681 SW 80 Ave, Kingman, KS 67068

May 14 – Wednesday

Time	County	Location	Agent	Directions
11:00 AM	Barber	Isabel	Matt Rhodes	North of Isabel on the intersection between Main Street and SE 120th St.
6:00 PM	Pratt	Pratt	Jenna Fitzsimmons	Begin at Bucklin Tractor Implement (BTI)-Pratt. Then travel 2 miles west and 1/2 mile south. All are invited to supper at the Blasi Farm after the tour.

May 15 – Thursday

Time	County	Location	Agent	Directions
~~7:30 AM~~	~~Marion~~	~~Hillsboro~~	~~Rickey Roberts~~	**CANCELED** ~~Highway 56 and Kanza Rd, just east of Hillsboro~~
10:00 AM	Comanche/ Kiowa		Levi Miller/ Madison Hansen	The field is the northwest corner at the intersection of HWY 183 and Avenue C, Coldwater, KS 67029. Lunch to follow tour at Scoular, 15240 183 HWY, Greensburg, KS 67054
12:00 PM	Harvey	Newton	Anne Pitts	Lunch at noon at Camp Hawk. Plot tour following lunch. Plot is at 3400-3494 SW 48th St., Newton, KS. From Camp Hawk, go 1.5 miles east to S. West Rd, turn 1 mile south to 48th St., turn west about 400 yards. The plot is on the north side of the road.
6:00 PM	Pawnee		Kyle Grant	US 156 Junction, Go 2 miles south, then 2 miles back west and ½ south. Legal SW Quarter 7-22-18 in Pheasant Ridge in

				Pawnee County

May 16 – Friday

Time	County	Location	Agent	Directions
9:00 AM	McPherson	Marquette	Shad Marston	PATRICK PLOT - Marquette. Marquette Rd & Highway 4
11:30 AM	McPherson	Moundridge	Shad Marston	A free lunch sponsored by MKC will be held at MKC Learning Center, 221 W Hirschler Str., Moundridge. GALLE PLOT - The plot tour will start at 1 PM in Moundridge. 1/8 West of 23rd Avenue on Cheyenne Road
1:00 PM	McPherson	Inman	Shad Marston	SCHROEDER PLOT - Inman. Between 4th & 5th Avenue on Cheyenne Road

May 19 – Monday

Time	County	Location	Agent	Directions
9:00 AM	Reno	Buhler	Patrick Bergkamp	1 mile north of Buhler
4:00 PM	Finney	Garden City	Logan Simon	Southwest research and extension center spring field day
6:00 PM	Sumner	Belle Plaine	Randy Hein	Belle Plaine- 2 miles East of Belle Plaine, South on Rock Rd 3 miles to E 60th, 1 mile East, NE corner

May 20 – Tuesday

Time	County	Location	Agent	Directions
8:00 AM	Sedgwick	Andale	Jeff Seiler	1/2 mile south of intersection 247th St W & 21st St N
8:00 AM	Parsons	Parsons	Gretchen Sassenrath	Southeast research and extension center
10:45 AM	Sedgwick	Haysville	Jeff Seiler	1901 E 95th St S, Haysville, KS 67060 (John C. Pair Center)
6:00 PM	Sumner	Caldwell	Randy Hein	Caldwell- Barry Bones Patton Research Farm, Hwy 81 & Sumner RD east of Caldwell, ¾ south, plots on east side north of lane

May 21 – Wednesday

Time	County	Location	Agent	Directions
7:30 AM	Dickinson	Abilene	Rickey Roberts	at the farm of Kevin Harris, S. of Abilene, just west of Hwy 15

8:30 AM	Barton	Hoisington	Stacy Campbell	North of Hoisington on HWY 281. Turn West on NW 190 Rd. (Galatia/Susank blacktop). Go 1 mile, turn south onto NW 50th Ave, go 1/8 mile on the West side. Cooperator/farmer Tim Maier.
11:30 AM	Ellsworth	Lorraine	Craig Dinkel	Lorraine Plot is located on Avenue W. From the black top 10th road, go 2.5 miles west.
6:00 PM	Russel	Russel	Craig Dinkel	Russell plot is located at the FFA field at North Copeland Street & East State Street.

May 22 – Thursday

Time	County	Location	Agent	Directions
10:30 AM	Smith		Sandra Wick	Turn south off of Highway 36 at Athol, Kansas. Go through town a couple of blocks, then turn west at Trinity Ag. Then south on the first road for about ¼ mile, the plot is on the west side.
1:30 PM	Jewell		Sandra Wick	Turn south off Highway 36 on 30th Road and go 3 miles. The plot is on the west side.
4:30 PM	Mitchell		Sandra Wick	South of Beloit on Hwy.14 to blacktop Hunter Road (X Road), then 4 miles west to 220 Road, then 1 mile south to Y Road, then east about ½ mile, on the south side.
6:30 PM	Sumner	Conway Springs	Randy Hein	Conway Springs- 922 W 140th Ave north of Conway Springs, 1 mile east on 140th, south on Springdale 0.01 mile, east side of road

May 23 – Friday

Time	County	Location	Agent	Directions
8:00 AM	Ottawa	Minneapolis	Jay Wisbey	1.5 miles west of K-106 Highway on Justice Road
11:00 AM	Saline	Solomon	Jay Wisbey	From Old 40 Highway West of Solomon. Go South on N Gypsum Valley Road 2.5 Miles and then West ½ mile on E Stimmel Road
5:00 PM	Edwards	Kinsley	Baley Doggett	Head West out of Kinsley on 1st Street (or L Road) ½ mile, the plot is on the North side of the blacktop—meal to

				follow tour.

May 28 – Wednesday

Time	County	Location	Agent	Directions
7:30 AM	Rooks	Plainville	Cody Miller	Phillipsburg tour starts with Breakfast at 7:30 at the Fair building north of town. 8:30 move to the plot located ¾ miles south of Phillipsburg on Highway 183 (East Side of the Highway).
11:00 AM	Phillips	Phillipsburg	Cody Miller	Rooks County plot starting at 1:00, location 5 miles East of Plainville on HWY K-18, turn south on 23 Road, ¼ mile south.
6:00 PM	Ellis	Hays	Stacy Campbell	From the Agricultural Research Center in Hays, south of town, go south on 240th Avenue, turn west on Bison Road, and keep driving until the road turns south. Field is about 1000 ft south, on the east side of the road.

May 29 – Thursday

Time	County	Location	Agent	Directions
9:30 AM	Rush	LaCrosse	Lacey Noterman	The plot is located 11 miles straight west of Casey's in LaCrosse on Hwy 4, turning into Avenue L. 1 Mile south on County Road 140, turn west on Avenue M for 1 and ½ miles. The plot is located on the South side.
2:00 PM	Ness	Ness City	Lacey Noterman	The plot is located at 17282 T Road. From Ness City, go north on Highway 283 for 4 miles and then turn east on road 170 for 1 mile, and then turn North on road 170 for 1 mile, and then turn North on Road T. The Plot is located north of Nichephor Farmhouse, approximately ½ mile.
5:00 PM	Washington	Palmer	Luke Byers	2 mi. East of Hwy 15 in Palmer
6:00 PM	Lane	Dighton	Lacey Noterman	The plot is located 7 miles west of Dighton to Eagle Road, 2 miles south to west Road 130, then 200 yards west toward Ehmke's farmstead, east of the scale.

Plots tours scheduled after May 29 are being finalized, and details will be updated soon. Stay tuned to the eUpdate for any changes to this schedule.

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8. High levels of wheat streak mosaic virus in parts of Kansas in 2025

Over the last several weeks, symptoms of wheat streak mosaic virus have been showing up in wheat fields across Kansas (Figure 1). This disease complex 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 wheat curl mite, a near-microscopic mite that survives between seasons on volunteer wheat and other grassy hosts. These grassy hosts serve as a "green bridge" for mites to survive from one wheat crop to the next. Infections may occur in the fall or spring, but fall infections typically result in the highest levels of yield loss. Although wheat streak mosaic infections can happen at any time, symptoms develop most rapidly at temperatures above 70°F. Symptoms have become more severe in Kansas over the last several weeks as temperatures have warmed. In this article, we walk through common questions about this complex of viruses.

Figure 1. Field view of a field turning yellow from wheat streak mosaic complex (top) and various symptoms of wheat streak mosaic complex (bottom two photos). Symptoms may vary based on the time of infection and the variety. Photos by Kelsey Andersen Onofre, K-State Research and Extension.

Will a fungicide help with my wheat streak infection?

No. There is no evidence that a fungicide application will do anything to stop the progression of wheat streak mosaic complex or preserve yield in infected fields. Fungicides are specifically formulated to kill diseases caused by fungi (rust, leaf spots, head scab, etc.) but have no activity against viral diseases like wheat streak mosaic. In addition, fields that have moderate to severe wheat streak mosaic infections will often have reduced yield potential that will diminish the economic return from a fungicide applied to control one of those other diseases (rust, leaf spots, or head scab).

Why is the wheat streak complex so severe and widely distributed this season?

Although we are still trying to understand the extent of the damage across the state, there are a few factors that came together this season that may have contributed to the outbreak. Wheat streak complex can be more severe in years where summer moisture that favors volunteer wheat establishment is followed by a warm fall that favors mite reproduction. In 2024, although August was relatively dry, precipitation in July and September would have supported late volunteer wheat emergence (Figure 2). Wheat curl mite populations prefer warm, dry weather and reproduce at high rates between 75-85°F. These mites only survive short periods (8-10 days) when conditions are warm, but during that time, they can lay up to 20 eggs. This rapid population growth can lead to a 25% increase in population size over the course of just two weeks. In 2024, Kansas experienced a very warm fall with higher-than-normal temperatures from September through November (Figure 3). These conditions may have sustained periods of time that were highly favorable for mite reproduction and movement across fields.

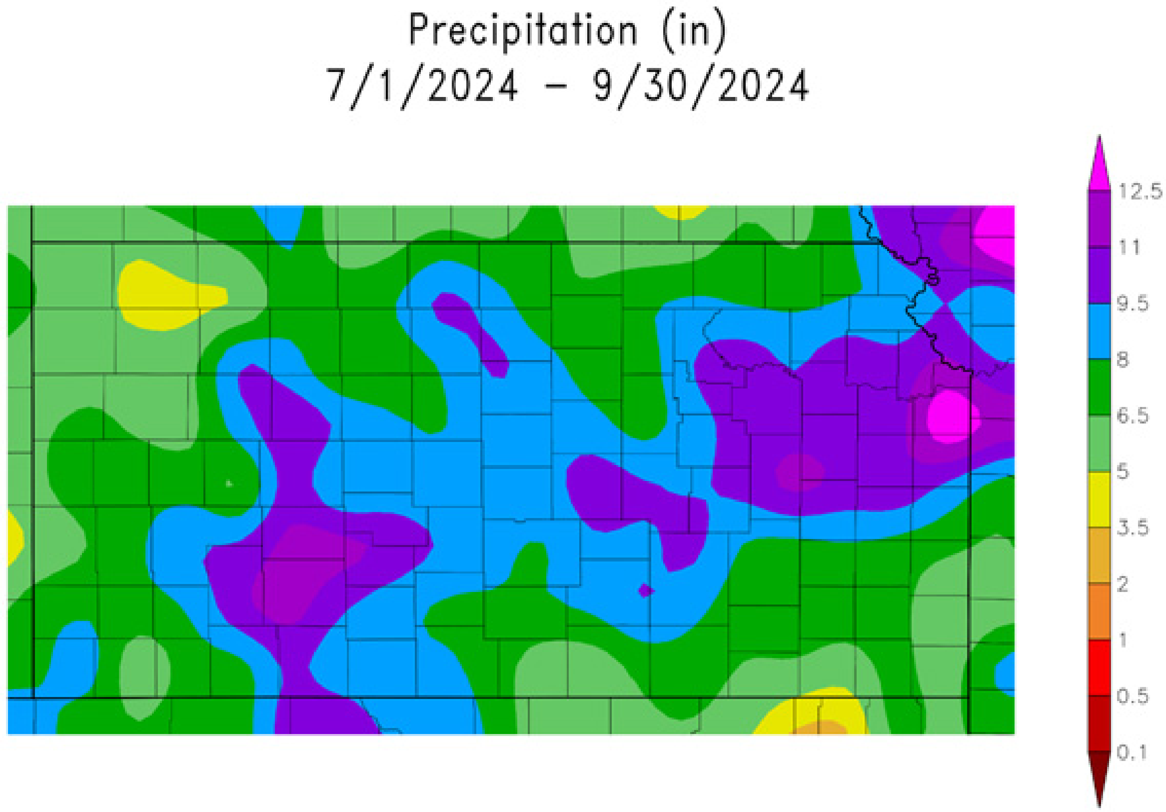

Figure 2. Total precipitation from July 1, 2024 to September 30, 2024. Source: NOAA Regional Climate Centers.

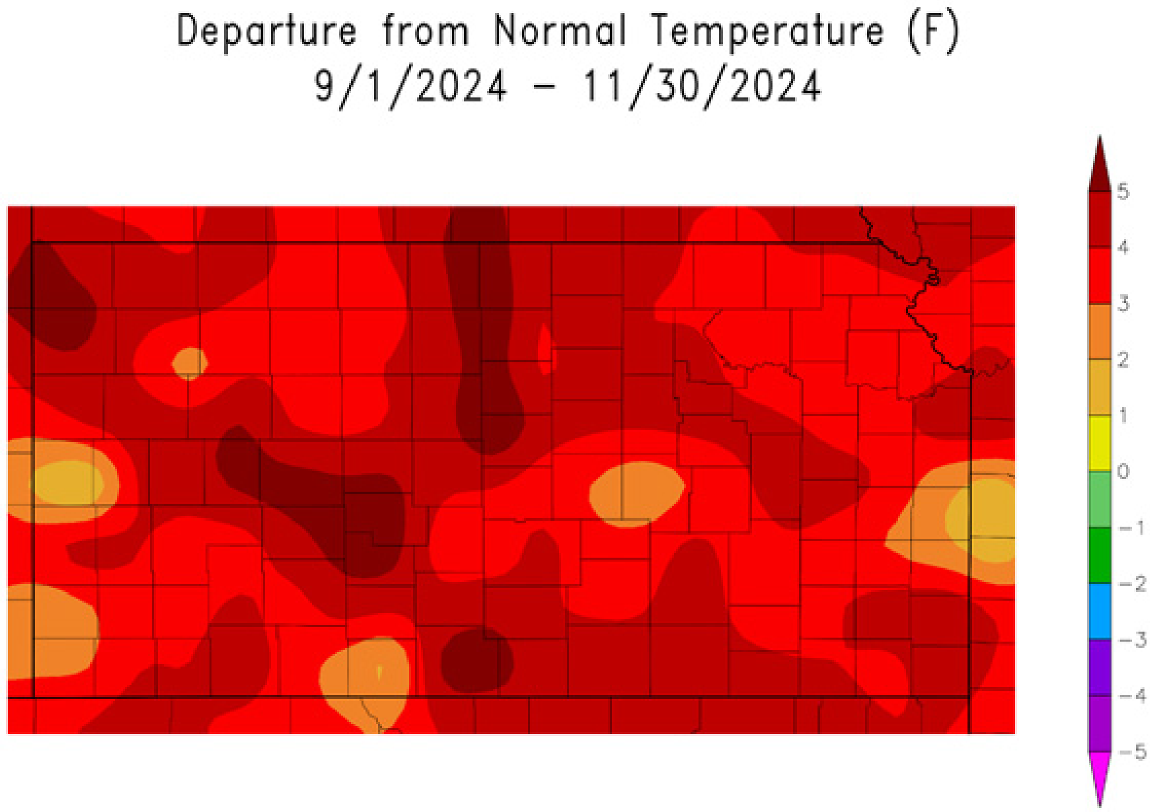

Figure 3. Departure from normal temperature for the period from September 1 to November 11, 2024. Source: NOAA Regional Climate Centers.

Is there anything I can do this season to help slow down the progression of the disease?

No. Efforts to control wheat curl mites with foliar miticides and/or insecticidal seed treatments have never proven effective and have not been shown to reduce the spread or severity of the viruses.

What can we do to prepare for the 2025 planting season?

The most critical way to prevent wheat streak complex infection is to **control volunteer wheat after harvest and continue to control any secondary flushes of volunteer prior to planting**. After harvest, there will be millions of wheat curl mites active in most wheat fields in Kansas. These curl mites will move off growing wheat as the green tissue dries down and dies. After moving off the existing wheat at or near harvest time, the mites need to find green tissue of a suitable host or they will die (death of the whole population will take approximately 2 weeks). The highest risk fields are those that have experienced hail and pre-harvest germination of volunteer wheat. We also need to watch for hidden volunteer wheat in summer crops and cover crops. Although curl mites prefer wheat, they can also survive the summer on other grass species (https://bookstore.ksre.ksu.edu/pubs/wheat-streak-mosaic_MF3383.pdf). Avoid planting wheat early to reduce the length of time mites have to increase their numbers and transmit disease.

How much yield loss can I expect from wheat streak complex?

Yield losses to wheat streak complex are influenced by several factors, including the timing of infection, variety, and the number of viruses affecting a field. Fall and early spring infections typically result in the highest levels of yield loss, while late infections result in the lowest yield reductions. We now know that infections with multiple viruses (WSMV + TriMV) result in higher yield losses than when plants are only infected with a single virus. Variety selection can also have an influence on yield losses. Although there are no perfect varieties, some hold up better than others under high disease pressure. K-State's most current ratings for the wheat streak mosaic complex can be found here: https://bookstore.ksre.ksu.edu/pubs/kansas-wheat-variety-guide-2024_MF991.pdf

How can I test for these viruses?

It can be important to distinguish wheat streak complex from other wheat diseases. See this recent eUpdate article for information on how to best submit a sample for wheat virus testing to the K-State plant disease diagnostic lab: https://eupdate.agronomy.ksu.edu/article/k-state-plant-disease-diagnostic-laboratory-fee-adjustments-634-7.

Additional resources for the wheat streak mosaic virus and triticum mosaic virus:

Wheat Streak Mosaic Virus: https://bookstore.ksre.ksu.edu/pubs/wheat-streak-mosaic_MF3383.pdf

Triticum Mosaic Virus: https://bookstore.ksre.ksu.edu/pubs/triticum-mosaic_EP145.pdf

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9. Wheat disease update: Stripe rust and head blight risks

It is the time of year when we are carefully tracking the risk for major diseases like stripe rust and fusarium head blight (scab) in our Kansas wheat crop. Last week, we reported that the weather was favorable for scab development in central Kansas (see last week's article with reminders about scab fungicide applications: https://eupdate.agronomy.ksu.edu/article/wheat-disease-update-fusarium-head-blight-and-leaf-spot-risk-elevated-in-kansas-639-12). As of today, scab risk has elevated slightly in parts of central and southwest Kansas (Figure 1).

As a reminder, scab infection occurs at flowering, but symptoms are not visible for 14-21 days after infection (Figure 2). 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 the weather-based risk and the field's yield potential. Not only can scab lower yield and test weights, it also produces a mycotoxin (vomitoxin, DON) and can produce grain that is "scabby" which can sometimes lead to discounts. Fungicide applications for scab are recommended at (or up to 7 days after) flowering.

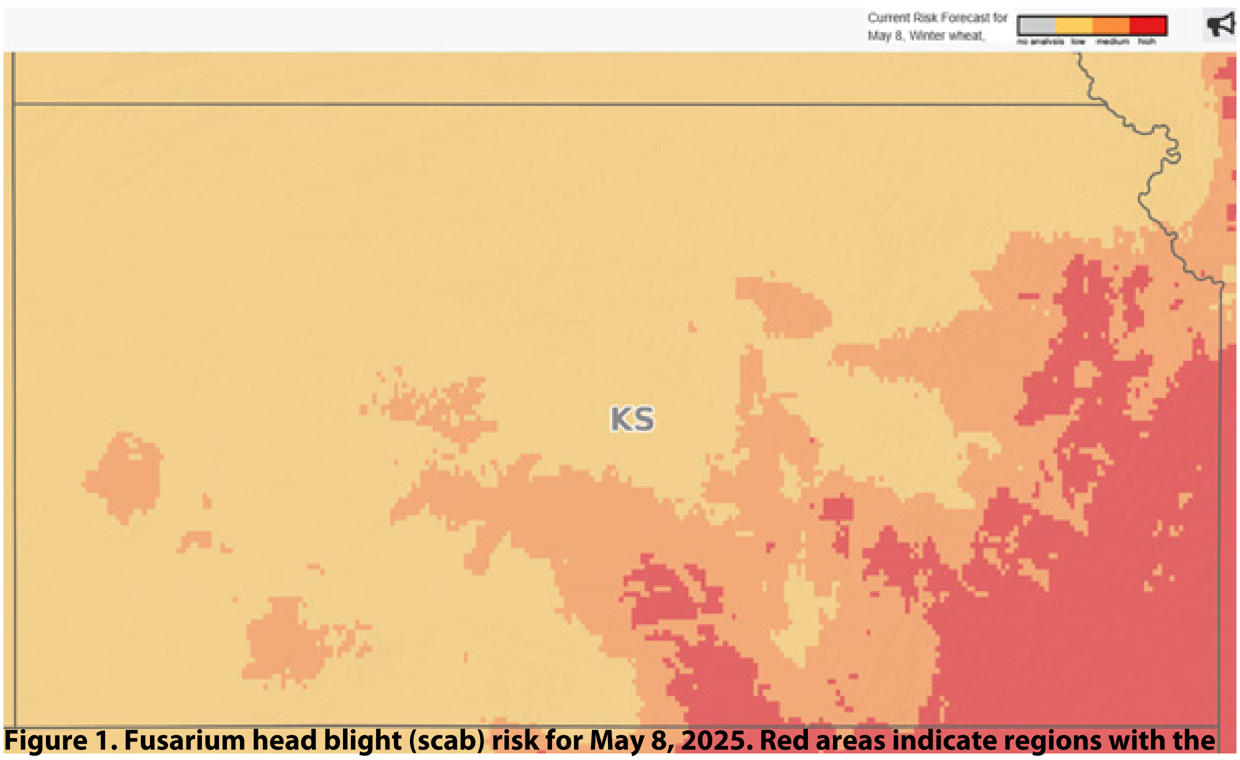

Figure 1. Fusarium head blight (scab) risk for May 8, 2025. Red areas indicate regions with the most favorable weather for scab over the last two weeks, and yellow indicates less favorable weather. This model is calibrated for susceptible varieties of winter wheat. This interactive map can be accessed at www.wheatscab.psu.edu.

Stripe rust update and outlook

Since last week, we have received three new reports of stripe rust in the state (Figure 2). To date, confirmed reports in Kansas have been at relatively low levels. We are continuing to scout and monitor the situation and will update the regional map with new observations: https://wheat.agpestmonitor.org/stripe-rust/.

Overall, the risk of widespread losses in Kansas remains low. It will be critical to continue scouting over the coming weeks. This will be particularly important for parts of the state where crop development is less advanced.

If you detect stripe rust, please contact me (andersenk@ksu.edu) so we can verify and update regional maps.

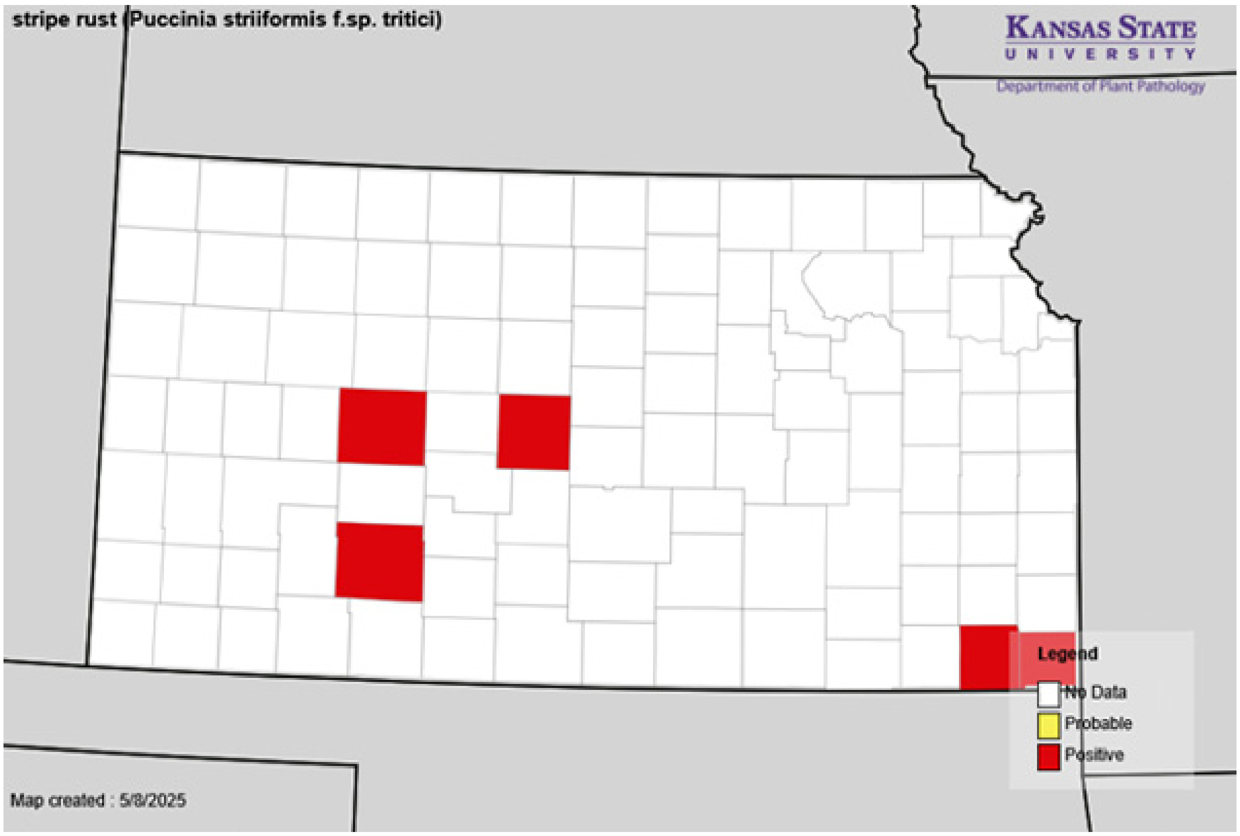

Figure 2. Counties where wheat stripe rust has been confirmed as of May 8, 2025. Real-time updates can be monitored at https://wheat.agpestmonitor.org/stripe-rust/.

Figure 3. Typical symptoms of stripe rust. Stripe rust produces orange spores that are limited by the veins of wheat plants and grow in characteristic stripes. Photo by Kelsey Andersen Onofre, K-State Research and Extension.

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