Issue 874

K-STATE Research and Extension

Extension Agronomy

eUpdate

09/23/2021

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. Considerations when planting wheat into dry soil

Soils in portions of western and central Kansas have become steadily drier through the late summer and early fall. Topsoil conditions are now very dry in many areas of Kansas (Figure 1). For wheat yet to be planted in these areas, producers are left with a few options.

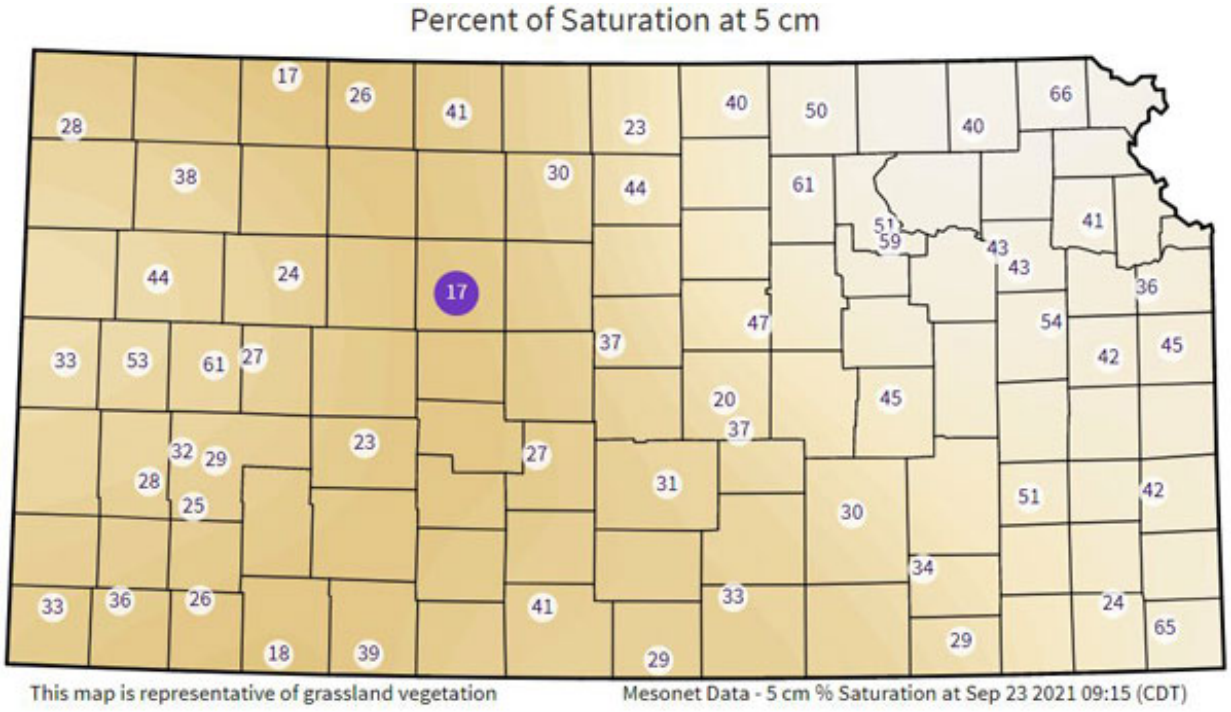

Figure 1. Topsoil moisture conditions at 2 inches (5 cm) reported as % saturation at the 5cm depth on September 23, 2021. Map by Kansas Mesonet found here: (https://mesonet.ksu.edu/agriculture/soilmoist**).**

Option 1: "Dust in" the wheat

Producers can choose to "dust in" the wheat at the normal seeding depth and normal planting date, and hope for rain (Figure 2). Some farmers may consider planting it shallower than normal, but this could increase the potential for winterkill or freeze damage. Planting the wheat crop at the normal depth and hoping for rain is probably the best option where soils are very dry. The seed will remain viable in the soil until it gets enough moisture.

Figure 2. Wheat dusted in near Belleville in October 2015. Photo by Romulo Lollato, K-State Research and Extension.

Before planting, producers should look at the long-term forecast and try to estimate how long the dry conditions will persist. Current short term outlook (8 to 14-day) favors slightly better chances at precipitation in the west. Looking long-term, the October outlook favors drier than normal conditions across most of Kansas (Figure 3).

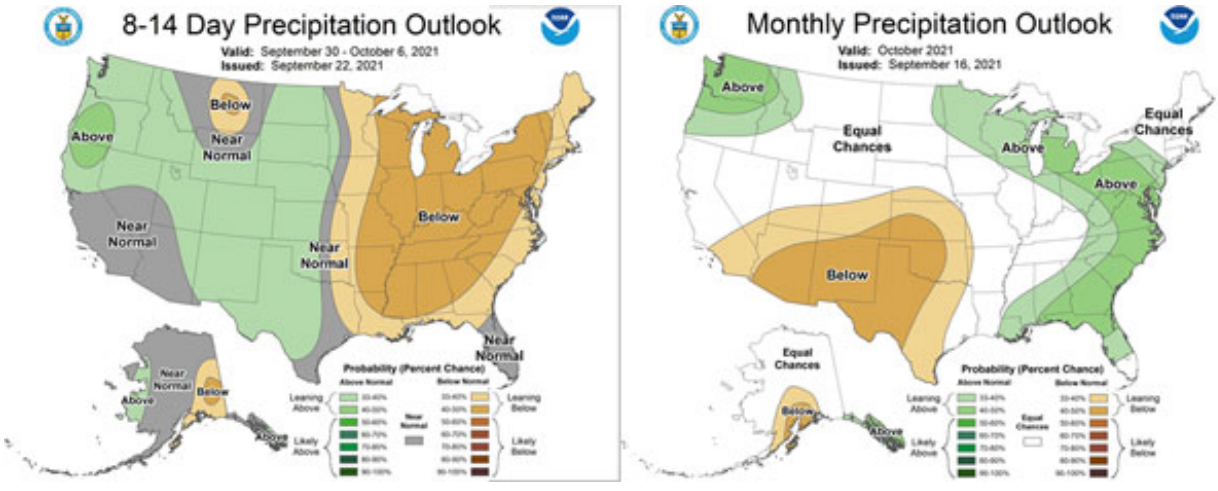

Figure 3. Precipitation outlook for the next 8-14 days (left) as of September 22, 2021 and for October (right) as of September 16, 2021.

If it looks like there's a good chance the dry weather will continue until at least the back end of the optimum range of planting dates, producers should treat the fields as if they were planting later than the optimum time, as the emergence date will be delayed. Rather than cutting back on seeding rates and fertilizer to save money on a lost cause, producers should increase seeding rates, consider using a fungicide seed treatment, and consider using a starter phosphorus fertilizer to improve early season development. However, producers should be cautious with in-furrow nitrogen or potassium fertilizers as these are salts and can make it more difficult for the seed/seedling to absorb water needed for germination. The idea is to make sure the wheat gets off to a good start and will have enough heads to have good yield potential, assuming it will eventually rain and the crop will emerge late. Wheat that emerges in October may still hold full yield potential, but wheat that emerges in November almost always has fewer fall tillers and therefore can have decreased yield potential.

There are some risks to this option. First, a hard rain could crust over the soil or wash soil off planting ridges and into the seed furrows, potentially causing emergence problems. Another risk is the potential for wind erosion if the field lies unprotected with no ridges. Also, the wheat may not come up until spring, in which case it may have been better not to plant the wheat at all and plant a spring crop instead. In fact, not planting wheat and allowing soil moisture to build for a summer crop planted next spring is an option.

Probably the worst-case scenario for wheat planted into dry soils would be if a light rain occurs and the seed gets just enough moisture to germinate but not enough for the seedlings to emerge through the soil or to survive very long if dry conditions return. Once the coleoptile extends to the soil surface, the plant must have enough moisture to continue growth otherwise it will perish. This situation may be worsened if producers are planting wheat following a summer crop such as corn, soybean, or sorghum, which depleted subsoil moisture through late summer. Without subsoil moisture to sustain growth, there can be a complete loss of the wheat stand. If late October brings cooler temperatures, dusting wheat in becomes a more interesting option as soil moisture from a possible rainfall event could be stretched further.

Option 2: Plant deeper than usual into moisture with hoe drill

Planting deeper than usual with a hoe drill can work if the variety to be planted has a long coleoptile, the producer is using a hoe drill, and there is good soil moisture within reach. The advantage of this option is that the crop should come up and make a stand during the optimum time in the fall. This would keep the soil from blowing. Also, the ridges created by hoe drills also help keep the soil from blowing.

The main risk of this option is poor emergence. Deep-planted wheat normally has below-normal emergence, so a higher seeding rate should be used. Any rain that occurs before the seedlings have emerged could add additional soil into the seed furrow, making it even harder for the coleoptile to reach the soil surface. Any time you increase the seeding depth, the seedling will have to stay within the soil just that much longer before emerging through the soil surface.

Delayed emergence leads to more potential for disease and pest problems. Additionally, deep-planted wheat generally results in reduced tillering and consequently a reduced number of heads, which directly reduces the yield potential of the crop. It's even possible that the wheat would get planted so deep that it would germinate but never emerge at all, especially if the coleoptile length is too short for the depth of planting. Generally speaking, it's best to plant no deeper than 3 inches

with most varieties. It is also important to keep in mind that ridges formed by narrow press wheels can make the effective planting depth much deeper if the seed furrows fill in during a heavy rainfall event.

Option 3. Wait for rain before planting

To overcome the risk of crusting or stand failure, producers may decide to wait until it has rained and soil moisture conditions are adequate before planting. Under the right conditions, this would result in good stands, assuming the producer uses a high seeding rate and a starter fertilizer, if appropriate. If it remains dry well past the optimum range of planting dates, the producer would then have the option of just keeping the wheat seed in the shed until next fall and planting spring crop next year instead.

The risk of this option is that the weather may turn rainy and stay wet later this fall, preventing the producer from planting the wheat at all while those who dusted their wheat in have a good stand. There is also the risk of leaving the soil unprotected from the wind through the winter until the spring crop is planted.

Crop insurance considerations and deadlines will play a role in these decisions. Another consideration is to delay the bulk of nitrogen application until topdress time in the spring, as wheat does not require much nitrogen in the fall. This would defer expenses until an acceptable wheat stand is assured.

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2. Check for stalk rots prior to grain sorghum harvest

It is important to check corn and sorghum fields for stalk rot diseases prior to harvest. The two most common types of stalk rot in grain sorghum and corn are charcoal rot and Fusarium stalk rot. Both diseases are known to survive in crop residue and can survive in the soil for many years. Stalk rots have somewhat similar symptoms so it is useful to be able to tell them apart.

Even in fields where lodging is has not yet occurred, producers should be prepared to deal with stalk rot issues. Stalk rot can be more problematic in sorghum than in corn due to generally thinner stalks in sorghum.

Figure 1. Sorghum lodging caused by Fusarium stalk rot. Photo by Kim Larson, Agronomist.

Annual losses are difficult to determine because, unless lodging occurs, the disease mostly goes unnoticed. The best estimates are that at least 5% of the sorghum crop is lost each year to stalk rot. The incidence of stalk rot in individual fields may reach 90 to 100% with yield losses of 50%. The most obvious losses occur when plants lodge. More important may be the yield losses that go unnoticed. In sorghum, yield losses are caused by reduced head size, poor filling of grain, and early head lodging as plants mature early.

Symptoms generally appear several weeks after pollination when the plant appears to prematurely ripen. The leaves become dry, taking on a grayish-green appearance similar to frost injury. The stalk usually dies a few weeks later. Diseased stalks can be easily crushed when squeezed between the thumb and finger and are more susceptible to lodging during wind or rainstorms. The most characteristic symptom of stalk rot is the shredding of the internal tissue in the lowest internodes of the stalk, which can be observed when the stalk is split. This shredded tissue may be tan colored (Fusarium stalk rots); red or salmon, (Fusarium and Gibberella stalk rots); or grayish-black (charcoal rot).

Table 1. Summary of stalk rots in grain sorghum.

Disease	Symptoms	Weather
Charcoal rot stalk rot	Internal shredding of lower nodes; black microsclerotia attached to the vascular tissue	High soil temperatures (>90 °F) and low soil moisture during grain fill
Fusarium stalk rot	Internal shredding of lower nodes; tan or pink-to-purple internal discoloration	Dry conditions early and warm (82-86 °F) wet weather 2 to 3 weeks after pollination

Charcoal rot

Hot, dry weather with soil temperatures in the range of 90 °F or more are ideal for the development of charcoal rot. Drought does not cause the problem, but it weakens the plants' defenses. Charcoal rot is usually less severe if drought stress is not a factor.

While it is difficult to separate the effects of charcoal rot from simple drought stress, a good rule of thumb is that plants infected with charcoal rot will die about two weeks earlier from dry weather than plants that do not have charcoal rot. Grain fill that would have occurred during this period is the amount of yield loss that can be attributed to charcoal rot.

The plants will die prematurely. When stalks are split, the typical shredded appearance in the lower stalk associated with all stalk rots will be present. Additionally, there will be a gray to black discoloration of the inner stalk caused by numerous sclerotia (small, black survival structures of the fungus) forming on the vascular bundles and decaying tissue.

Figure 2. Close-up of charcoal rot in grain sorghum. Photo by Doug Jardine, K-State Research and Extension.

Fusarium stalk rot

Fusarium root and stalk rot is generally found in the same areas where charcoal rot develops. The pith of Fusarium stalk rot infected plants will have a shredded appearance and is typically tan in color, but in some hybrids the pith in the lower stalk may be pink to red in color. Plants may die prematurely or lodge.

Fusarium stalk rot is favored by wet conditions early in the season when denitrification or nitrogen loss from leaching. Research has shown that mid-season dry weather may predispose plants to later season problems. Later in the season, following pollination, warm (82 to 86 °F), wet weather can leach remaining nutrients from the soil resulting in late-season nitrogen stress and an increase in stalk rot.

Figure 3. Fusarium stalk rot in grain sorghum. Source: Stalk Rots of Corn and Sorghum**, K-State publication L-741.**

The most recent drought monitor index map for Kansas (Figure 4) provides clues as to where stalk rot problems may occur. In the areas of the state currently under drought stress, charcoal rot may be more common. In other parts of the state where there have been alternating wet and dry periods throughout the growing season, Fusarium stalk rot may be more common.

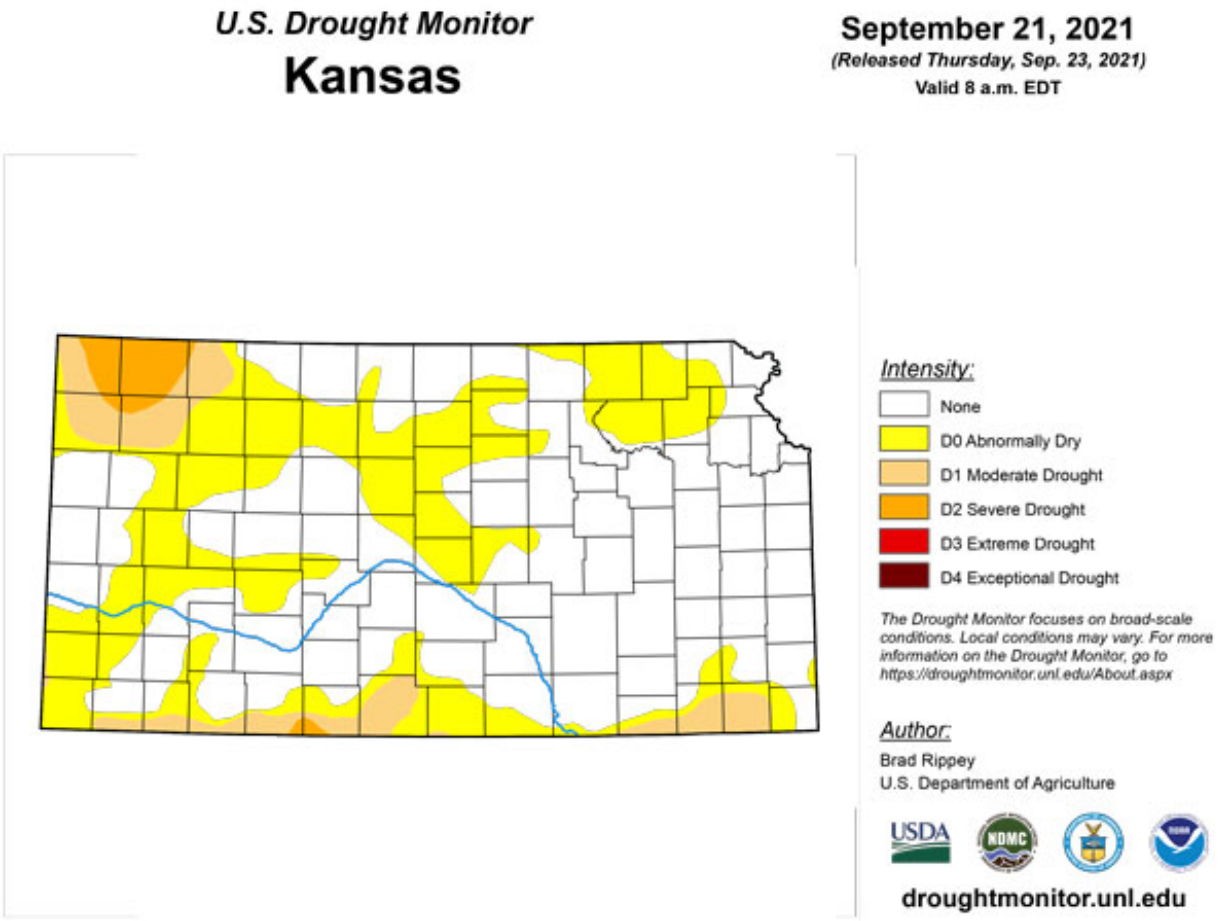

Figure 4. U.S. Drought Monitor Index map as of September 21, 2021. https://droughtmonitor.unl.edu/

General considerations

Stalk rot is a stress-related disease. Any stress on a crop can increase both the incidence and severity of stalk rot. Research has indicated that when the carbohydrates used to fill the grain become unavailable due to nutrient shortage, drought stress, leaf damage from insects, hail, disease or reduced sunlight, the plant uses nitrogen and carbohydrate reserves stored in the stalk to complete grain fill. When sugarcane aphid pressure is heavy, there will likely be an increase in the incidence of stalk rot and producers should be prepared to harvest as soon as the grain is ready.

The loss of nitrogen and carbohydrate reserves resulting from leaf damage weakens stalk tissues and results in increased stalk rot susceptibility. Early maturing hybrids are generally more susceptible than full-season hybrids.

Other than irrigation or rain, there is little that can be done to prevent stalk rot by late summer. No hybrid has complete immunity to the stalk rotting pathogens. When choosing a hybrid, a grower should select a hybrid that is not only a high yielder, but one that has good standability and "stay-green" characteristics. This will help assure that if stalk rot does occur, losses due to lodging will be minimal. A balanced nutrition program based on soil tests should be used. Overall fertility levels should be adjusted to fit the hybrid, plant population, soil type, environmental conditions and management program. An excess, as well as a shortage, of nitrogen can lead to increased stalk rot

problems.

Producers can check their sorghum for stalk rots by squeezing the lower stem with their thumb and fingers. If the stalks crush easily, they are probably infected with one of the stalk rot organisms and may lodge at any time. Check 100 plants across the field to determine the percent of affected plants. If the percentage of stalk-rot-infected plants is high, sorghum should be harvested as soon as possible, even if it hasn't dried down adequately in the field. If the stalks are firm, the plants will probably be able to stand just fine in the field for several more weeks if necessary.

Rotation with non-susceptible crops, such as small grains and alfalfa, will reduce the severity of stalk rot but will not eliminate it. A good insect control program is a must in limiting losses to stalk rot. In addition to the effect of leaf damage on stalk integrity, pathogens may enter stalks or roots through wounds created by insects. Hail damage will generally increase the amount of stalk rot damage.

For more information, see "Stalk Rots of Corn and Sorghum," K-State publication L-741, at:
http://www.plantpath.k-state.edu/extension/publications/L741.pdf

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3. Challenges with smooth bromegrass hayfields in eastern Kansas

Bromegrass is one of the most important cool-season grasses in the eastern half of Kansas. It grows best during months with cooler weather, primarily March through June and September through November, becoming semi-dormant during the hot, dry summer months. However, in the last few weeks, some farmers have been struggling with bromegrass fields which are not greening up as expected this time of the year.

Grub worms are the most common insect problem in smooth brome. Their larvae feed on the roots and rhizomes. However, in 2021 the problem has been fall armyworms. Small worms from these migratory pests feed on leaf material. Late haying or hot/dry weather may interact with armyworm infestations.

Some points to consider:

1. Smooth brome hay should be cut between early heading and full bloom (usually mid-May to June 1) to optimize quantity and quality. However, due to the weather during 2021 spring/summer, some of the fields were cut late (July or August), and this late-cutting was followed by drought. While some sparse rain occurred, it was not enough to match the plants' needs in most fields.

2. Worms, such as fall armyworms, have been a challenge in 2021. The caterpillar phase lasts from 14 to 21 days. However, in the last 2 or 3 days before pupating in the soil, caterpillars will eat ~90% of their total intake. For that reason, even when growers are scouting their fields eventually, the damage can be irreversible after two or three days without visiting a field. In some cases, it seems the field was "harvested" by the worms. In addition, some fields were sprayed two or three times in a row this year, leading to severe damage to the plants.

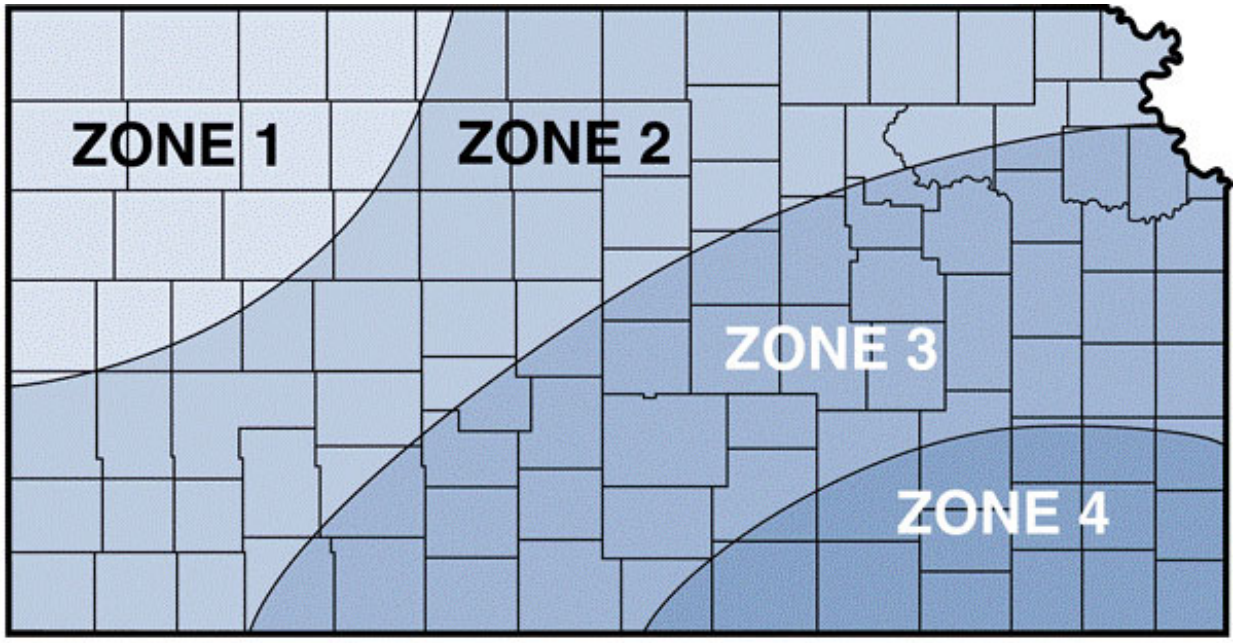
3. Smooth bromegrass requires annual fertilization for optimum production and to assure long-term productivity. Soil testing bromegrass pastures and meadows will provide an accurate picture of the nutrients available with particular attention paid to pH, phosphorus, and potassium. Keep in mind that every time a hayfield is cut, around 12 lb. of P_2O_5 and 40 lb. of K_2O is removed per ton of forage harvested.

In some fields, plants may have started to grow new leaves using their reserves after a late cut and the worm invasion was hard to control (or not controlled in time). Some of the fields also have low-nutrient availability, which makes the regrowth challenging and creating irreversible damage.

Figure 1. Bromegrass field struggling to regrow in Miami County, September 15, 2021. Photo by Bruno Pedreira, K-State Research and Extension.

Figure 2. Bromegrass field taken over by weeds in Miami County, September 15, 2021. Photo by Bruno Pedreira, K-State Research and Extension.

Smooth brome can be planted (or replanted) in late summer, early fall, winter, or early spring in different regions of Kansas (Figure 3). However, late fall and winter planting is not recommended on droughty claypan soils because smooth bromegrass will not survive if planting is followed by hot, dry weather conditions. While the establishment of cool-season grasses is most successful with late summer or early fall plantings, replanting in late fall especially with a dry forecast is a risky decision for farmers in eastern Kansas. Additionally,, seed and fertilizer prices are very high, leading to a less-favorable planting scenario.



Optimum Seeding Dates for Smooth Brome

	Zone 1	Zone 2	Zone 3	Zone 4
Fall	Aug 10–Sept 15	Aug 15–Sept 20	Aug 15–Sept 20	Aug 15–Oct 1
Winter	Nov 1–Mar 1	Nov 15–Feb 15	Dec 1–Feb 15	Not recommended
Spring	Mar 1–Apr 1	Feb 15–April	Feb 15–Apr 1	Not recommended

Figure 3. Optimum seeding dates for smooth brome in Kansas. Map from K-State Research and Extension.

At this point, we are reaching the end of the optimum planting date for smooth brome for the majority of the state (Figure 3). Given the current dry weather and the dry forecast, the best option may be to control weeds and wait to replant next year at the optimal time. If spring planting is considered, weed control and worm scouting are essential in the early stages to ensure adequate establishment. It is important to remember that smooth brome should never be cut before the early heading stage or below a stubble height of four inches as stand reduction or loss can occur, particularly during dry soil conditions.

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4. Fall armyworm infestations in early-planted wheat in central Kansas

There have been some heavy infestations of fall armyworms in early-planted wheat in Ellis County, with some plantings completely destroyed, and the larvae trying to finish up on the pigweeds. This is a very asynchronous, late generation of fall armyworm, with most larvae now almost mature, but some still quite small. Treatment will not be justified at this point. The best recommendation is to just wait until worms have finished feeding, recalling that larvae can "march" across to new fields after killing plants. If larvae are still active in adjacent fields, it will be best to wait until later in the planting window (up to 2nd week of October for Ellis County). The emerging moths should migrate south without laying any more eggs.

There have been many reports across the Midwest of large fall armyworm populations damaging crops, lawns and turf, so they are having a good year. There were some reports of true armyworms also. The color of these caterpillars is highly variable; the dark color depends on melanin deposition, which can increase at low temperatures, and the intensity of bright colors depends on plant pigments obtained in the diet. To help distinguish between these two worms, refer to the features identified in photos shown below.

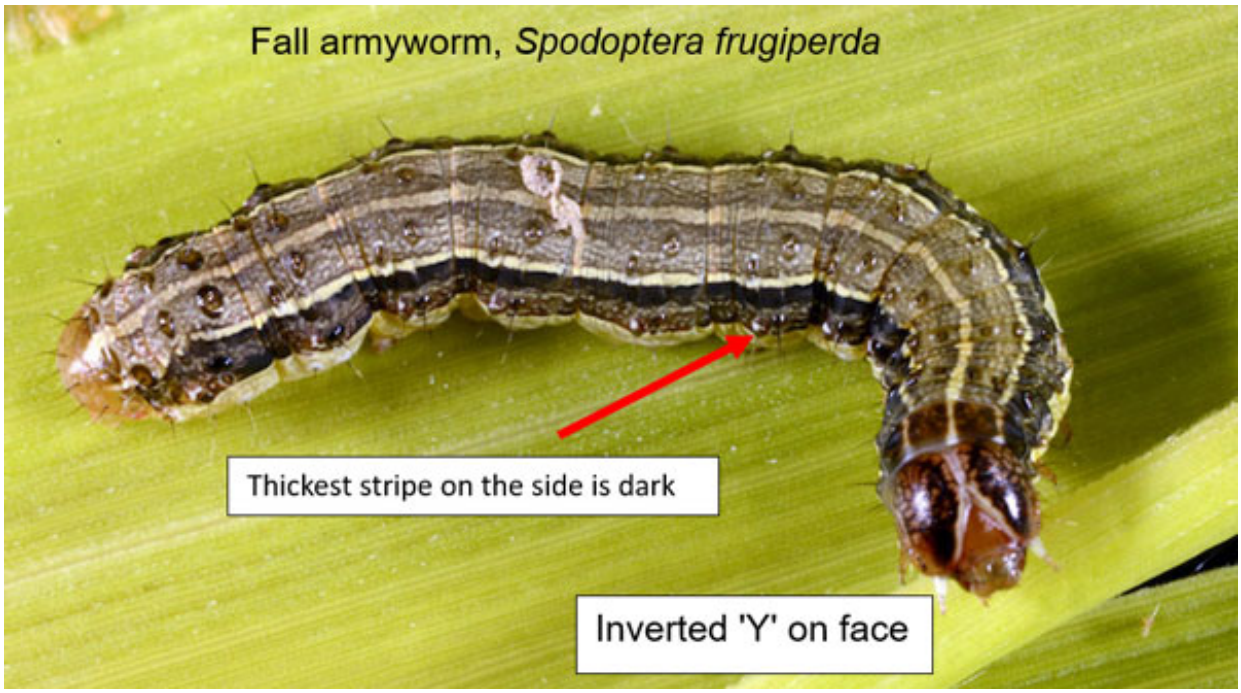

Figure 1. Fall armyworm showing key identifying features. Photo by J. Obermeyer.

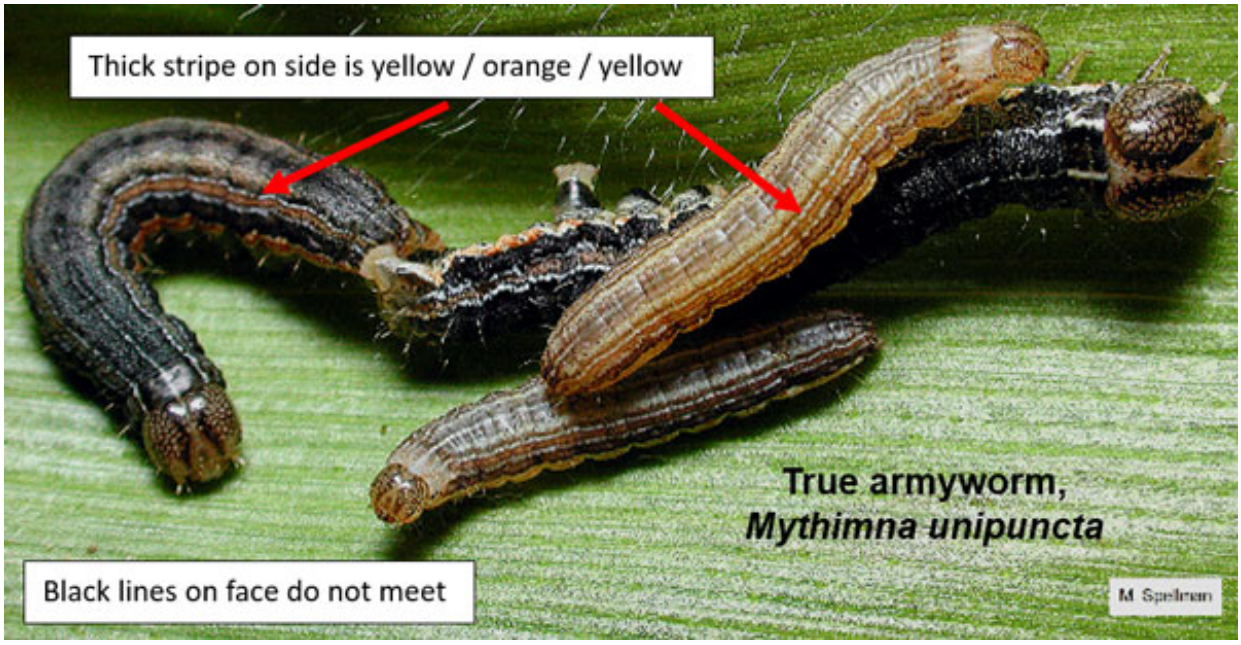

Figure 2. True armyworm with key identifying features. Photo by M. Spellman.

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5. Learn more about three winter wheat varieties developed in Kansas

Three new publications from K-State Research and Extension have been released that each highlight a winter wheat variety developed in Kansas by the Kansas Agricultural Experiment Station. These varieties, KS Dallas, KS Western Star, and KS Silverado, were released in 2019 and registered/certified seeds have been available since the fall of 2020.

Each publication discusses the origin and development of the variety, its resistance to pests, area of adaptation, milling/baking characteristics, and agronomic characteristics.

KS Dallas is a hard red winter wheat variety that performed very well under dryland conditions in western Kansas. It has a resistance gene that provides protection against the wheat streak mosaic virus up to about 70°F, which is about 5 degrees warmer than the temperature thresholds that other wheat varieties with the *Wsm2* resistance gene offer. Read more about KS Dallas at: https://bookstore.ksre.ksu.edu/pubs/L941.pdf

KS Western Star is a hard red winter wheat variety that had competitive yield under dryland production in western Kansas and its adaptability expands well into central Kansas. It offers good milling and baking attributes that producers can capitalize on. Read more about KS Western Star at: https://bookstore.ksre.ksu.edu/pubs/L943.pdf

KS Silverado is a hard white winter wheat variety that had very competitive yield in central KS. It also had competitive yield under irrigation in western Kansas. Read more about KS Silverado at: https://bookstore.ksre.ksu.edu/pubs/L942.pdf

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6. Kansas Bankers Association Conservation Awards - Nominations due Dec. 3

Nominate a deserving Kansas producer or landowner for the 2021 Kansas Bankers Association Conservation Awards Program. This year, the Kansas Bankers Association, K-State Research and Extension, and the Kansas Department of Wildlife and Parks have announced six award categories:

- **Energy Conservation**
- **Water Quality**
- **Water Conservation**
- **Soil Conservation**
- **Windbreaks**
- **Wildlife Habitat**

The purpose of this program is to stimulate a greater interest in the conservation of the agricultural and natural resources of Kansas by giving recognition to those farmers and landowners who have made outstanding progress in practicing conservation on their farms. In 2020, 197 Kansas producers and landowners were recognized through this program.

Nominations can be made by any person in the county. They should be sent to the County Extension Agricultural Agent or the Kansas Department of Wildlife, Parks, and Tourism District Biologist by December 3, 2021.

The K-State Extension agent for Agriculture and Natural Resources, or the Extension Coordinator, is designated Chairperson of the committee to select persons to receive awards.

For more information, see:
http://www.agronomy.k-state.edu/extension/kansasbankersaward/kansas-bankers-awards.html

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