Issue 872

K-STATE Research and Extension

Extension Agronomy

eUpdate

09/09/2021

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.

Subscribe to the eUpdate mailing list: https://listserv.ksu.edu/cgi-bin?SUBED1=EUPDATE&A=1

eUpdate Table of Contents | 09/09/2021 | Issue 872

1. Alfalfa management: Deciding on last cutting this fall

Alfalfa will quit growing after the first hard freeze (when temperatures reach below 26°F), which in Kansas occurs on average around October 15, but can be as early as October 1 or late as November 1. The decision should be weather-based at this time of the year because the timing of the last two cuttings impacts the winter survival and productivity of the stand in the following year.

The last cutting, prior to fall dormancy, should be made based on expected crown regrowth rather than one-tenth bloom because of the decreasing photoperiod. The last cutting should be made so there will be 8 to 12 inches of foliage, or 4 to 6 weeks of growth time, before the first killing frost. This should allow adequate time for replenishment of root reserves. Which means the second to final cutting should occur around September 1.

At this stage of the growing season, alfalfa plants need to store enough carbohydrates to survive the winter. If root reserves are not replenished adequately before the first killing freeze in the fall, the stand is more susceptible to winter damage than it would be normally. That could result in slower greenup and early growth next spring, and in some cases stand loss due to winter kill. The potential of the alfalfa crop to grow new foliar tissue in the spring is greater with greater root reserves in the fall, thus root reserves this fall are the main driver of next crop's yield and quality.

The final cutting should occur right after the first killing freeze, before too many of the leaves have dropped. Producers should be prepared to enter the fields as soon as soil moisture conditions allow. After a killing freeze, the remaining forage (if any) can be hayed safely. However, the producer should act quickly because the leaves will soon drop off.

Figure 1. Alfalfa stand with approximately 12 inches of top growth prior to winter dormancy. The last cut in this stand was performed early September, and this photo was taken late October. This stand will be hayed immediately following the first killing frost. Photo by Romulo Lollato, K-State Research and Extension.

Consider soil sampling alfalfa fields now

Late fall is also a great time of the year to soil sample alfalfa ground. This timing allows for an accurate assessment of available soil nutrients and provides enough time to make nutrient management decisions before the crop starts growing in the spring. Key soil tests include pH, phosphorus, and potassium, and to a lesser extent, sulfur and boron. In particular, potassium is highly related to winter survival so it's important to make sure to have optimum range of potassium in soil before entering the winter. When sampling for immobile nutrients, sampling depth should be six inches, while mobile nutrients (sulfur) should be sampled to 24 inches. Based on the soil test, a fertility program can be established to assure nutrient replenishment and maintain hayfield productivity.

John Holman, Cropping Systems Agronomist, Southwest Research-Extension Center
jholman@ksu.edu

Romulo Lollato, Wheat and Forages Specialist
lollato@ksu.edu

Bruno Pedreira, Southeast Area Agronomist – Parsons
pedreira@ksu.edu

2. Common causes of late-season stalk lodging in corn

Stalk lodging in corn occurs when the stalk weakens and breaks at some point below the ear (Figure 1). When this occurs, it results in harvest losses and slows down harvesting considerably. Grain moisture levels may also be unacceptably high in lodged corn.

Figure 1. Stalk rot in corn at Kansas River Valley Experiment Field, 2016. Photo by Eric Adee, K-State Research and Extension.

Two common causes of stalk lodging are stalk rot disease organisms or corn borer damage. Stalk rotting diseases in Kansas include charcoal rot, Fusarium, Gibberella, anthracnose, and Diplodia. Stalk rotting diseases are present in the soil or on old crop debris every year, but disease only develops when certain other factors predispose the plants to disease infection.

What are the most common causes of stalk lodging in corn throughout the state?

Carbohydrate depletion in the stalk during grain fill. High-yielding, "racehorse" hybrids tend to produce superior yields at the expense of late-season stalk integrity. These hybrids translocate a high percentage of carbohydrates from the stalks to the ears during grain fill. The latter is reflected with a substantial reduction in the stalk diameter from flowering until maturity (stem shrinking process). This weakens the lower stalk until eventually it will break over, possibly after becoming infected with a stalk rot disease. However, this does not mean producers should stay away from these hybrids. These hybrids have to be managed well. They should be harvested early, shortly after physiological maturity. This may mean harvesting the corn at about 20-25 percent grain moisture. Early harvest can result in discounts for high moisture, but it is better than leaving those hybrids in the field so long

that stalks break.

Hybrid differences in stalk strength or stalk rot susceptibility. Some hybrids have genetically stronger stalks than others do. This is often related to a hybrid's yield potential, as mentioned above, and how it allocates carbohydrates during grain fill. However, there are also genetic differences in stalk strength due to other reasons, including better resistance to stalk rot diseases. If a field of corn has stalk lodging problems, it could be due in part to hybrid selection.

Poor root growth and other stresses. Cold, waterlogged soils, severe drought, and soil compaction can all result in short, inadequate root systems and crowns that are damaged to the point that water and nutrients cannot effectively move through them. Under these conditions, the roots may not be able to extract enough water and nutrients from soil to support plant growth and carbohydrate production. When carbohydrate production is below-normal during any part of the growing season, the ears will continue to take what they need during grain fill, which can leave the stalks depleted even under average yield conditions. The developing ear always has priority for carbohydrates within the plant.

Poor leaf health. Any factor that results in poor leaf health will reduce carbohydrate production. When carbohydrate production from photosynthesis is inadequate due to loss of green leaf area in the leaves, the plant will mobilize reserves from the crown and lower stalk to complete grain fill (see carbohydrate depletion above).

Southern rust continues to arrive in Kansas earlier in the growing season, perhaps due to the overall warming trend in recent years (Figure 2). Late-planted corn is at a higher risk as it will be exposed to southern rust for a longer period of time than corn planted earlier in the spring. While there is direct yield loss due to less green tissue being available for photosynthesis, there are also secondary losses from increased levels of stalk rot.

Gray leaf spot is the other important foliar disease in Kansas that can affect stalk rot (Figure 3).

Figure 2. Southern leaf rust in corn. Photo by Doug Jardine, K-State Research and Extension.

Figure 3. Gray leaf spot on corn. Photo courtesy of Alison Robertson—© APS. Reproduced, by permission, from Wise, K., et al., eds. 2016. A Farmer's Guide to Corn Diseases. American Phytopathological Society, St. Paul, MN.

Many of the highest yielding hybrids lack good resistance to leaf diseases because the use of resistance genes can cause a "yield drag" in the hybrid. Therefore, when growing these hybrids, producers should be ready to apply a fungicide should leaf diseases develop. Bacterial leaf streak continues to spread in the state, however, its relationship to yield loss or increases in stalk rot are still unknown.

Stay green, another characteristic in hybrids, is highly correlated to stalk rot resistance and reduced lodging. The stay green effect associated with the use of strobilurin fungicides has also been

reported to reduce lodging. This same characteristic may also interfere with grain dry-down in the field.

High plant density. Plants become tall and thin when supra-optimal populations are used, which result in thin stalks with inadequate strength. In addition, plant-to-plant competition for light, nutrients, and water enhances the competition for carbohydrates between the stalk and ear within the plant, thus reducing the vigor of the cells in the stalk and predisposing them to invasion by stalk rot.

Nutrient imbalances and/or deficiencies. Nutrient imbalances and/or deficiencies predispose corn plants to stalk rot and stalk lodging. Both potassium and chloride deficiency have been shown to reduce stalk quality and strength, and stalk rot resistance. High nitrogen levels coupled with low potassium levels increase the amount of premature stalk death and create an ideal situation for stalk rot and lodging. Soil chloride levels should be maintained above 20 lbs per acre.

Figure 4. High plant density corn presenting late-season stalk lodging. Photo by Ignacio Ciampitti, K-State Research and Extension.

Corn rootworm and corn borers. Damage caused by the corn rootworm and the European corn

borer can predispose the corn plant to invasion by stalk rotting organisms, as well as lead to outright yield loss.

Mid-season hail damage. Similar to the damage caused by insects, the physical damage caused by mid-season hail can set up the plant for invasion by stalk rotting organisms. Stalk bruising and the resulting internal damage may also physically weaken corn stalks, making them more likely to lodge later in the season.

Rodrigo Borba Onofre, Postdoctoral Research & Extension Fellow
onofre@ksu.edu

Ignacio Ciampitti, Farming Systems
ciampitti@ksu.edu

Doug Jardine, Emeritus Plant Pathologist

3. Tips on scouting for Dectes stem borer in soybeans

The Dectes stem borer (*Dectes texanus* LeConte) is native to Kansas and can infest soybeans and sunflowers. The adult is a gray, long horned beetle that lays eggs in a soybean plant. The larvae hatch and tunnel into the soybean stem where the petiole of the leaf attaches, then proceed to tunnel down the stem. This tunneling usually goes through the pith to the base of the plant where the larva girdle the inside of the stem. This girdling weakens the stem, making the plant very susceptible to lodging, which may result in harvest losses. Scouting for the incidence of Dectes while the soybeans are still green can assist in helping avoid more loss of yield at harvest. Harvesting soybeans as early as possible can help reduce yield losses and is the best management tactic. The longer infested plants remain in the field, the longer they are exposed to wind that can break the girdled stem.

The first step in scouting for Dectes-infested plants is to look for a single trifoliate in a plant that is dead (Figure 1). It is much easier to find the dead trifoliates if the rest of the leaves are green and have not started to yellow with natural senescence. Breaking off the dead petiole will expose the hole tunneled into the stem. Splitting the stem at this node will show the browning of the pith caused by the Dectes larva as it tunnels (Figure 2). Continuing to split the stem down the plant will expose the larva that caused the damage (Figure 3). Fields with higher incidence of infested plants can be targeted for earlier harvest to help reduce yield losses due to these lodged plants.

Figure 1. Signs of dead trifoliates in soybeans infested with Dectes stem borers. Photo by Eric Adee, K-State Research and Extension.

Figure 2. Browning of the pith caused by Dectes stem borer in a soybean stem. Photo by Eric Adee, K-State Research and Extension.

Figure 3. Dectes stem borer larva in a soybean plant. Photo by Eric Adee, K-State Research and Extension.

For more information on the Dectes stem borer, please read the KSRE publication MF 2581, "Dectes Stem Borer: Kansas Crop Pests", at https://www.bookstore.ksre.ksu.edu/pubs/MF2581.pdf

Eric Adee, Agronomist-in-Charge, Kansas River Valley and East Central Experiment Fields
eadee@ksu.edu

Jeff Whitworth, Extension Entomologist
jwhitwor@ksu.edu

4. Planting wheat too early can lead to several problems

The general target date for planting wheat for optimum grain yields in Kansas is within a week of the best pest management planting date, or BPMP (formerly known as the "Hessian fly-free") date (Figure 1). If forage production is the primary goal, earlier planting (mid-September) can increase forage yield. However, if grain yield is the primary goal, then waiting until the BPMP date to start planting is the best approach (Figure 2). Planting in mid-September is ideal for dual-purpose wheat systems where forage yields need to be maximized while reducing the effects of early planting on reduced grain yields.

Optimum wheat planting dates in Kansas depend on location within the state. Suggested planting dates by zone are as follows:

Zone 1: September 10-30

Zone 2: September 15 – October 20

Zone 3: September 25 – October 20

Zone 4: October 5 – 25

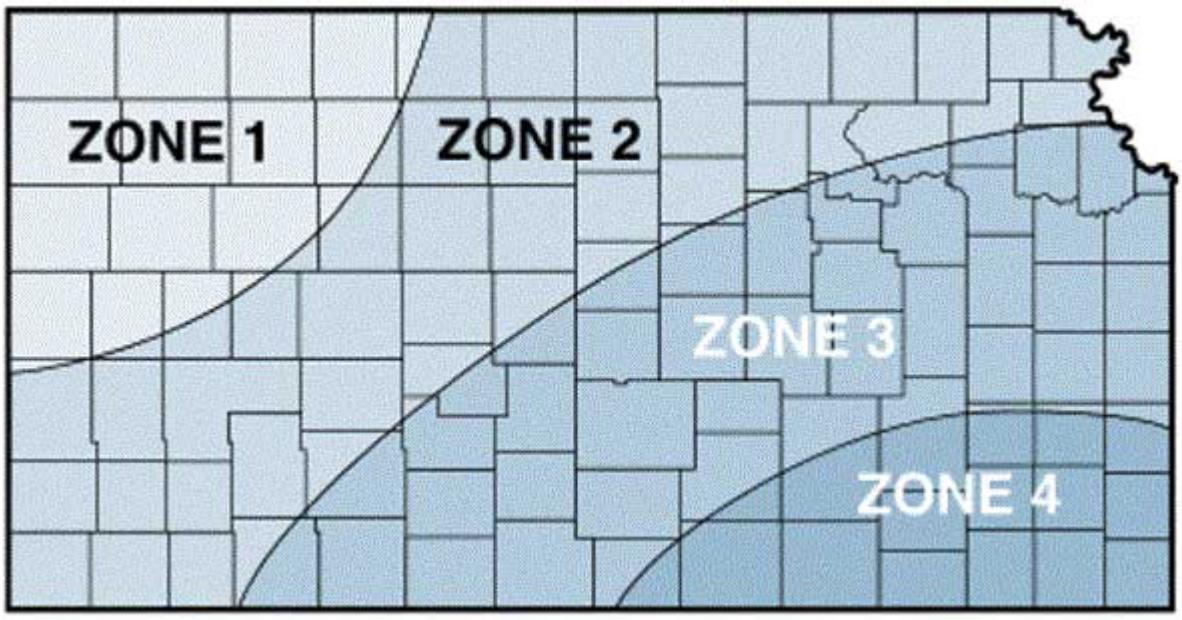

Figure 1. Optimum wheat planting dates by zone in Kansas.

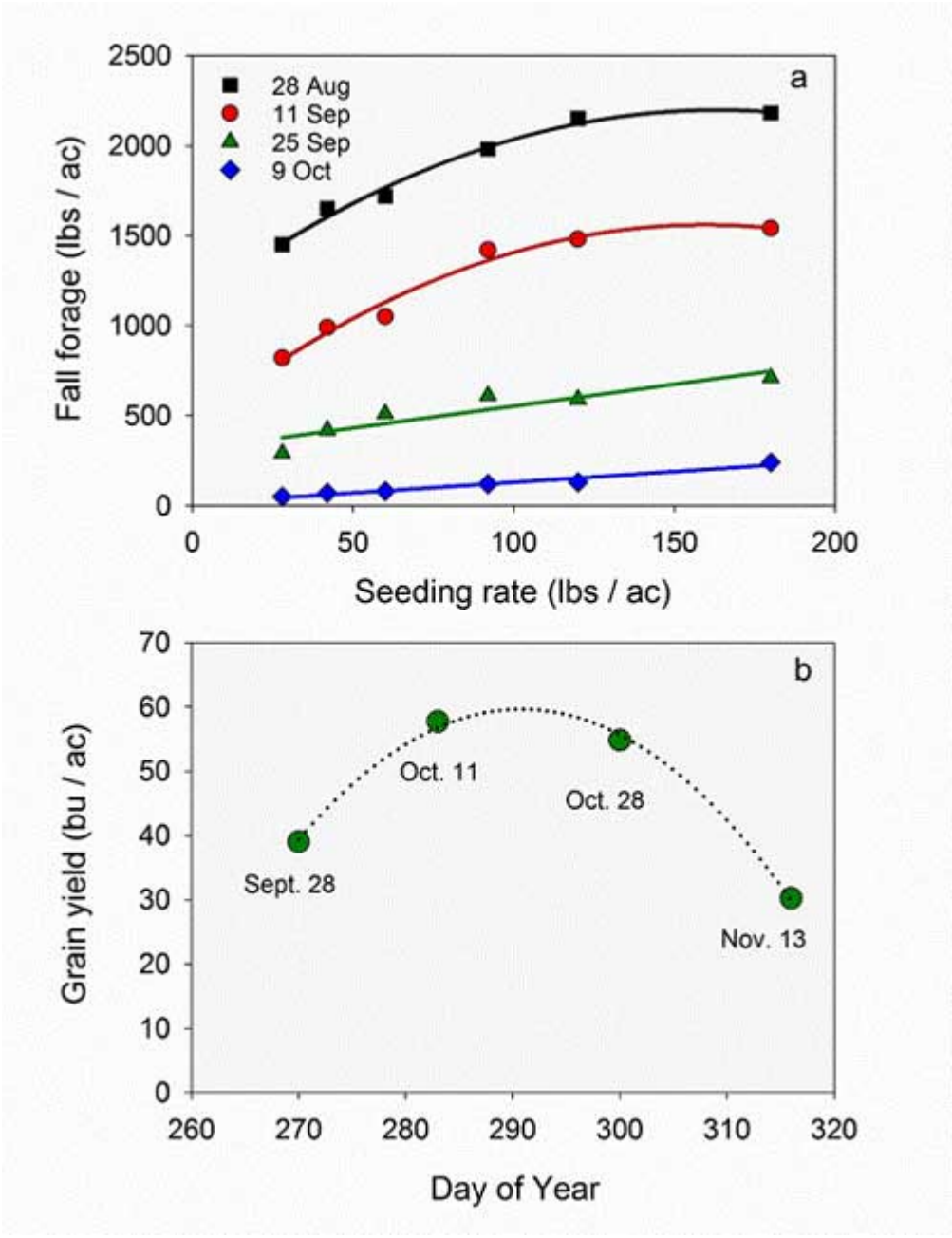

Figure 2. Effect of planting date and seeding rate on wheat fall forage yield in Lahoma, north-central Oklahoma (a) and effect of planting date on wheat grain yield near Hutchinson, south-central Kansas (b). Figure adapted from KSRE numbered publication MF3375.

While the effects of planting date on wheat yield shown in Figure 2 will hold true for most years, they will largely depend on environmental conditions and disease pressure during the growing season. In some years, earlier-planted wheat does best and some years the later-planted wheat does best, and these year-specific performances usually relate to the weather experienced in the fall and spring. For instance, early-planted fields in growing seasons with a warm fall might produce excessive biomass that will use an excessive amount of water during the fall. If the following spring is dry, soil water deficit during grain filling then can reduce grain yield. Conversely, a warm fall would favor tillering of a later-planted wheat crop, helping to compensate for this delay. The opposite is also true: in years with an early onset of cold temperatures during the fall, an earlier planted crop might perform better

than a later planted crop due to its ability to produce enough fall tillers to still maximize grain yield.

In dry years, seedling emergence and stand establishment can be uneven. These dry conditions can also lead to poor crown root development and fall tillering. If fields become too wet to plant by mid-October and stay that way through the remainder of the fall, then producers end up planting much later than the optimum planting date. Following an unusual year, producers will often start planting earlier than the recommended date if soil conditions are good, because the negative consequences of adverse conditions are fresh on their minds. However, planting early also increases the risk of other production problems including multiple diseases, insect pests, weed infestations and undesirable growth of the crop.

Potential risks of planting wheat early

Increased risk of **wheat streak mosaic and related diseases**. Wheat curl mites that spread these diseases survive the summer on volunteer wheat and certain other grasses. As those plants die off, the wheat curl mites leave in search of new plants to feed on. Early-planted wheat is likely to become infested, and thus become infected with wheat streak mosaic virus, high plains virus, and Triticum mosaic virus. The wheat curl mites are moved by wind and can be carried a mile or more before dying, so if wheat is planted early, make sure all volunteer wheat within a mile is completely dead at least two weeks before planting. For growers considering planting early, a good management consideration would be to select wheat varieties with resistance to the wheat streak mosaic virus and/or with tolerance to the wheat curl mite, especially in the western portions of the state.

Increased risk of **Hessian fly**. Over the summer, Hessian fly pupae live in the old crowns of wheat residue. After the first good soaking rain in late summer or early fall, these pupae (or "flaxseed") will hatch out as adult Hessian flies and start looking for live wheat plants to lay eggs on. They are most likely to find either volunteer wheat or early-planted wheat at that time. After the BPMP date, many of the adult Hessian fly in a given area will have laid their eggs, so there is generally less risk of Hessian fly infestation for wheat planted after that date. Hessian fly adult activity has been noted through November or even early December in Kansas. If planting early, consider varieties with improved tolerance to Hessian fly.

Armyworms and other lepidopteran larvae may also still pose a serious problem to early planted wheat. They may feed on the green wheat plants until the first cold front comes through (temperatures in the mid 20-degree F range for a couple hours). Insecticide seed treatments do not work well against lepidoptera larvae.

Increased risk of **barley yellow dwarf**. Many types of aphids can spread barley yellow dwarf. In Kansas, greenbugs and bird cherry-oat aphids are the primary vectors of this viral disease. These insects are more likely to infest wheat during warm weather early in the fall than during cooler weather. Planting wheat after the BPMD reduces the risk of problems with aphids and barley yellow dwarf. If planting early, consider varieties with improved tolerance to Barley Yellow Dwarf virus, especially in central and eastern Kansas or consider the use of seed treatments with imidacloprid (such as Gaucho XT or Rancona Crest).

Increased risk of **excessive fall growth and excessive fall tillering**. For optimum grain yields and winter survival, the goal is for wheat plants to go into winter with established crown roots and 3-5 tillers. Wheat that is planted early can grow much more than this, especially if moisture and nitrogen levels are good. If wheat gets too lush in the fall, it can use up too much soil moisture in

unproductive vegetative growth. These fields are often experience more drought stress in the spring if soil conditions remain dry.

Increased risk of **take-all, dryland foot rot, and common root rot**. Take-all is usually worse on early-planted wheat than on later-planted wheat. In addition, one of the ways to avoid dryland foot rot (*Fusarium graminearum* and other *Fusarium* species) is to avoid early seeding. This practice promotes large plants that more often become water stressed in the fall predisposing them to invasion by the fungi. Early planting of wheat also favors common root rot because this gives the root rot fungi more time to invade and colonize root and crown tissue in the fall. Seed treatments are an option to early season seedling diseases. More information: https://bookstore.ksre.ksu.edu/pubs/MF2955.pdf

Grassy weed infestations become more expensive to control. If cheatgrass, downy brome, Japanese brome, or annual rye come up before the wheat is planted, they can be controlled with glyphosate or tillage. If wheat is planted early and these grassy weeds come up after the wheat has emerged, producers will have to use an appropriate grass herbicide to control them.

Germination problems due to high soil temperatures. Early planted wheat is sown in hotter soils, which may become problematic because some wheat varieties are sensitive to high-temperature during germination. In fact, some varieties will not germinate when soil temperatures are greater than 85°F. If planting early, it is important to select varieties that do not have high-temperature germination sensitivity or sow sensitive varieties later in the fall, when soil temperatures have cooled down.

Emergence problems due to shortened coleoptile length. Hotter soils tend to decrease the coleoptile length of the germinating wheat. Therefore, deeply planted wheat may not have long-enough coleoptiles to break through the soil surface resulting in decreased emergence and poor stand establishment. When soil temperatures are hot, it is often better plant wheat at a shallower depth (3/4 to 1 inch deep) even if moisture is absent in the top layers of soil. Planting wheat deep (>2 inches) increases the risk of poor emergence and unacceptable stands.

Summary

Early sowing of wheat can lead to several problems, from increased chances of insect- or mite-transmitted viral diseases to decreased emergence due to high temperatures and its consequences on wheat germination of particular varieties and reduced coleoptile length. Ideally, growers should consider planting around the optimum window; but, if planting early due to moisture availability or a dual-purpose system, growers should consider selecting wheat varieties with tolerance to the major yield-reducing factors in their respective region. Growers should strongly consider a seed treatment with both fungicides and insecticides if planting wheat early in Kansas.

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

Erick DeWolf, Wheat Pathologist
dewolf1@ksu.edu

Romulo Lollato, Extension Wheat and Forages Specialist
lollato@ksu.edu

Jeff Whitworth, Extension Entomologist
jwhitwor@ksu.edu

5. Wheat planting - Consider seed treatments this year

As we move closer to wheat planting here in Kansas, fungicide seed treatments are strongly advised. In 2020 and 2021, we had higher than usual levels of common bunt (Figure 1) throughout the region. Common bunt can result in both yield and quality loss. Many producers received discounts on their wheat after the 2020 and 2021 harvests. Common bunt can result not only in losses for individual producers, but can also dramatically reduce the quality of grain destined for the market. Fungicide seed treatments are an important and highly effective tool for controlling common bunt and a host of other seed borne diseases.

Figure 1. When broken open, grain infected with common bunt is filled with black spores which can contaminate healthy grain. These spores stick to the surface of healthy wheat and, if used for seed, can infect plants when they germinate. Photo: Kelsey Andersen Onofre, K-State Research and Extension.

Some facts about common bunt

Common bunt is also referred to as "stinking smut" because of the foul, fishy odor produced by the fungus. The tough, black spores "stick" the surface of otherwise healthy seed and can infect plants after emergence (if seed treatments are not used). This disease then remains "silent" within plants (no symptoms) until grain fill, when the starch within grain is completely replaced with black spores (Figure 2). These spores can be released during harvest, contaminating the entire grain or seed lot.

Figure 2. Common bunt is only visible when seed is broken open after grain fill. Heads can look otherwise healthy. Photo: Kelsey Andersen Onofre, K-State Research and Extension.

Other seed-borne diseases to keep in mind for 2021

There are other reasons why fungicide seed treatments are particularly warranted for the 2022 season. We saw higher than usual amounts of Fusarium head blight in parts of the state that typically do not see this disease. Although Fusarium head blight is a result of fungal inoculum in residue during flowering, seed that was infected with the fungus that causes Fusarium head blight can cause a seedling blight and can reduce stand after planting. Therefore, seed lots that had some levels of "scabby" kernels from a Fusarium head blight infection should be prioritized for seed treatment to ensure good stand establishment. In addition, this year we saw higher than usual loose smut (Figure

3) which, although it doesn't cause quality loss, can reduce overall yield.

Figure 3. Classic symptoms of loose smut. Spores will no longer be present at harvest. Photo: Kelsey Andersen Onofre, K-State Research and Extension.

Tips for product selection

For more information about common seed treatment products and their effectiveness for the control of the diseases mentioned in this article please see *Seed Treatment Fungicides*

for Wheat Disease Management: https://bookstore.ksre.ksu.edu/pubs/mf2955.pdf. All products listed in this publication are labeled for the suppression or control of common bunt. This is due to the presence of a mode of action group 3 fungicide or "triazole" fungicide in each of these products

(tebuconazole, difenoconazole, prothioconazole, etc.). It is recommended that seed treatments with a minimum of one product within this mode of action of fungicides are selected. In addition to product selection, it is essential to have good seed coverage (Figure 4) for optimal control. Seed treatments failures can sometimes be traced back to inadequate coverage.

Figure 4. Wheat seed with very good seed treatment coverage. Photo: Bill Bockus.

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

6. Kansas Ag-Climate Update for August 2021

The Kansas Ag-Climate Update is a joint effort between our climate and extension specialists. Every month the update includes a brief summary of that month, agronomic impacts, relevant maps and graphs, 1-month temperature and precipitation outlooks, monthly extremes, and notable highlights.

August 2021: Warm and dry, with isolated heavy rain

August was drier than normal; it ranked as the 42nd driest August since 1895. Only the Northeast Division was above normal. As a percent of normal, the Northwest Division was the driest with 0.95 inches, 34 percent of normal. The Northeast was the wettest at 4.22 inches, 107 percent of normal. Dry weather stressed corn, sorghum, and soybeans, particularly the late-planted fields. Dry soil conditions, particularly in the west, are a concern as producers anticipate planting fall crops.

Warmer than average temperatures accelerated changes to the US Drought monitor (Figure 1). The statewide average for August was 1.7 degrees warmer than normal, ranking it as the 36th warmest August of record. There were 12 new daily record high maximum temperatures and 60 record warm minimum temperatures. There were no new record low maximums, but 17 record low minimums. Severe weather was more prevalent in August with the report of 1 tornado, 69 hail events, and 111 damaging wind events**.**

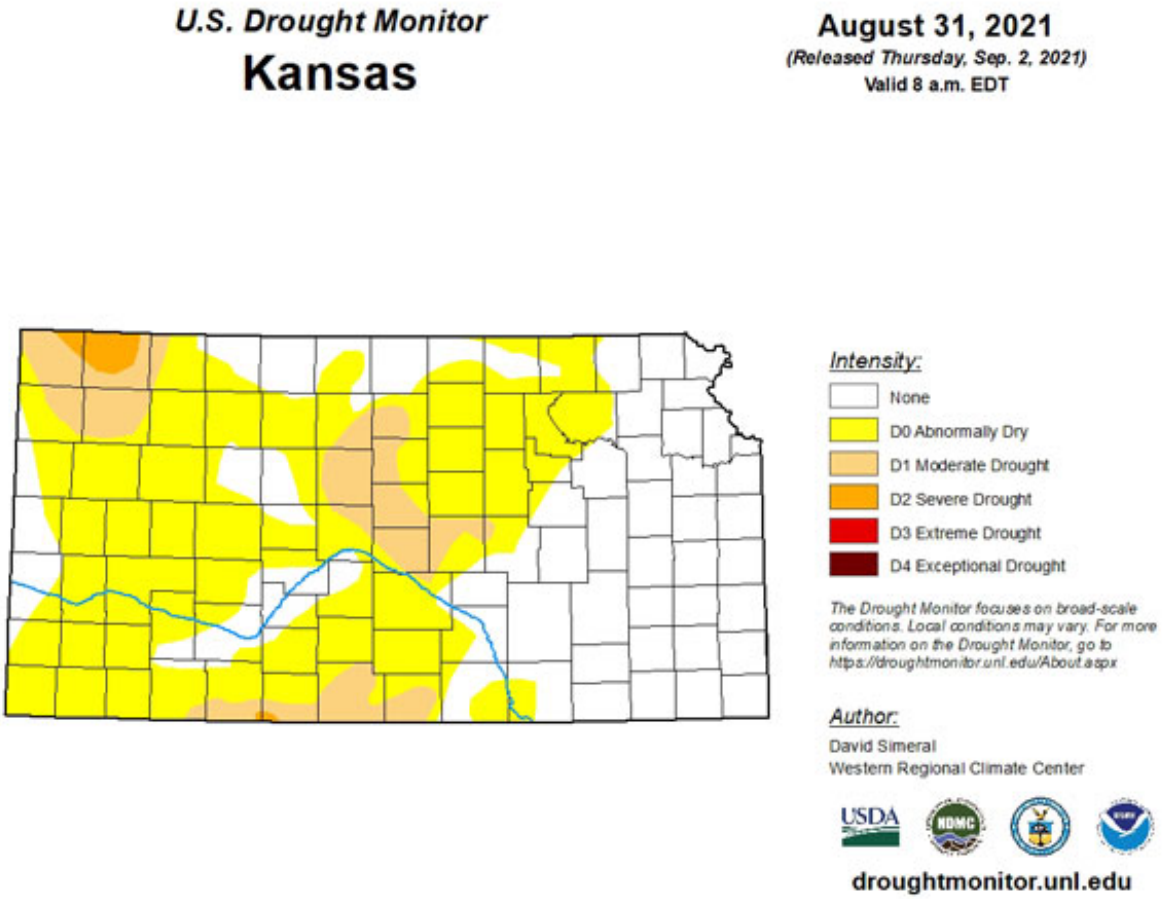

Figure 1. Drought monitor for Kansas as of August 31, 2021. Source: droughtmonitor.unl.edu

View the entire August Ag-Climate Update, including the accompanying maps and graphics (not shown in this short article), at http://climate.k-state.edu/ag/updates/