



K-STATE
Research and Extension

Extension Agronomy

eUpdate

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

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1. Potential wheat injury due to the upcoming cold temperatures.....	3
2. Field equipment maintenance: Winterizing sprayers.....	7
3. Value of forage insurance during drought.....	9
4. Save the date for the 2023 Kansas Corn Schools.....	12
5. K-State/KARA Crop Production Update: Dec. 7-8 in Manhattan.....	14

1. Potential wheat injury due to the upcoming cold temperatures

The sudden sharp drop in temperatures across Kansas this week will cause the wheat crop to go into dormancy. Whether it will injure the wheat to any degree depends on several factors which are described in more detail in this article.

Topsoil moisture

The moisture level in the topsoil will be important because dry soils will get colder easier than wet soils. Soil moisture has been generally low across most of the state during the fall, especially in western Kansas (Figure 1). Meanwhile, the central portion of the state has received varying levels of precipitation in the last week, which can help buffer negative effects of cold air temperatures.

In parts of the state where the soil has been dry enough to preclude wheat emergence, no damage should be expected. The cold temperatures will be more likely to cause injury to wheat if the plants were emerged and showing drought stress symptoms.

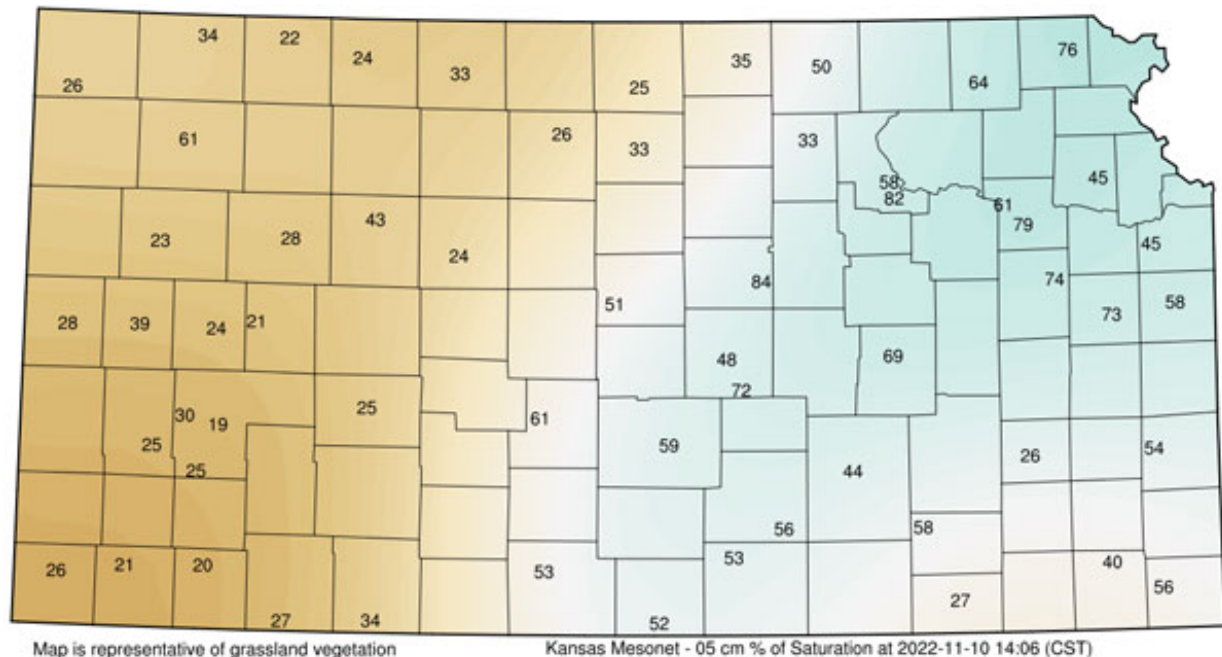


Figure 1. Soil moisture status (% saturation) at 5 cm (2 inch) depth for Kansas as of November 10, 2022.

Cold hardiness of the crop

Another important factor in wheat's response to the cold is whether the wheat had time to become properly cold hardened. Although there were some heat waves in October and early November, the temperatures were overall low enough to have allowed the wheat to develop cold hardiness.

The extent of the unusually large and rapid drop in temperatures from well above normal to well below normal is a concern. If the wheat did not develop sufficient cold hardiness, it would be more

susceptible to injury from the upcoming cold snap. We likely won't know for sure until next spring as the wheat comes out of dormancy.

The first thing we'll be seeing is a lot of burndown of the wheat from these cold temperatures. If the wheat was bigger than normal – which was likely not the case this year due to the dry and mild temperature conditions – the plants may look “rough” with a lot of brown dead-looking foliage on the soil surface (Figure 2). That doesn't mean the plants are dead, however.

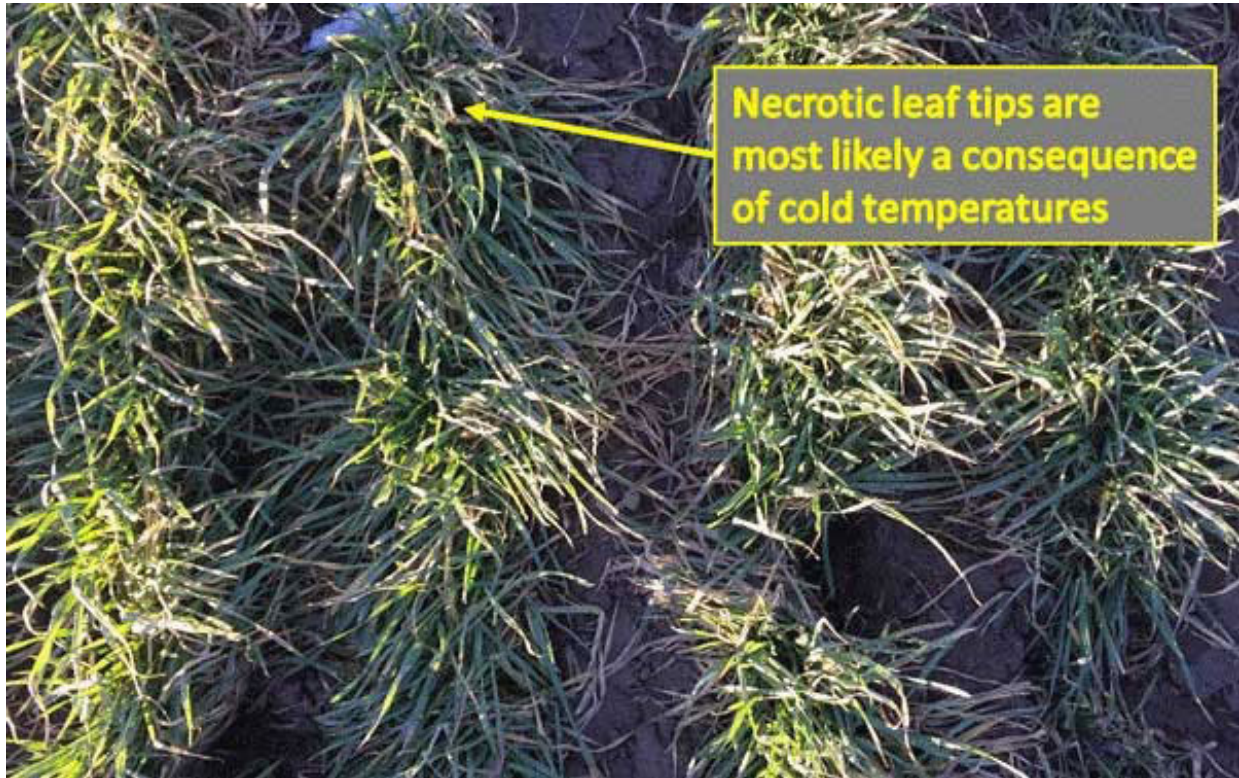


Figure 2. Wheat plants starting to show straw-colored or pale leaf tips as a consequence of cold temperatures near Healy. Brown, dried leaves do not necessarily indicate winter injury. The only way to assess the plant's condition following winter is to examine the crown for winterkill. Photo by Romulo Lollato, K-State Research and Extension.

Root system development

Two other factors to consider when assessing the likelihood of cold damage to winter wheat are fall root system development and soil temperatures at the crown level. Good top growth of wheat doesn't necessarily indicate good root development. Poor root development is a concern where conditions have been dry. Where wheat plants have a good crown root system and two or more tillers, they will tolerate the cold better. If plants are poorly developed going into winter, with very few secondary roots and no tillers, they will be more susceptible to winterkill or desiccation, especially when soils remain dry. Poor development of secondary roots may not be readily apparent unless the plants are pulled up and examined (Figure 3). If secondary roots are poorly developed, it may be due to dry soils, poor seed-to-soil contact, very low pH, insect damage, or other causes.



Figure 3. Differences in wheat development prior to winter dormancy. Both examples shown above should be able to make it through the winter, although the more developed root system in the photo to the right will be able to provide water and nutrients with less limitations to the plant during the winter. Photos by Romulo Lollato, K-State Research and Extension.

Soil temperatures at the crown level and crown insulation

Soil temperatures at crown level – another important determinant of wheat survival to cold temperatures – depend on snow cover, moisture levels in the soil, and seedbed conditions. Winterkill is possible if soil temperatures at the crown level (about one-inch-deep if the wheat was planted at the correct depth) fall into the single digits. If there is at least an inch of snow on the ground, the wheat will be insulated and protected, and soil temperatures will usually remain above the critical level. In addition, if the soil has good moisture, it is possible that soil temperatures at the crown level will not reach the critical level even in the absence of snow cover. However, if the soil is dry – as it is this year in a large portion of western Kansas – and there is no snow cover, there may be the potential for winterkill, especially on exposed slopes or terrace tops, depending on the condition of the plants. Dry soils and loose seedbeds warm up and cool down much faster than moist or firm soils, contributing to winter injury.

If wheat is planted at the correct depth, about 1.5 to 2 inches deep, and is in good contact with the soil, the crown should be about one inch below the soil surface and well protected from the effects of cold temperatures. If the wheat seed was planted too shallow, then the crown will have developed

too close to the soil surface and will be more susceptible to winterkill. Also, if the seed was planted into loose soil or into heavy surface residue, the crown could be more exposed and susceptible to cold temperatures and desiccation.

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2. Field equipment maintenance: Winterizing sprayers

Temperatures across the state are expected to drop much below normal this weekend, so now is the time to get your field sprayers winterized. As you put the sprayer in storage for the winter, this is also a good time to clean and inspect the exterior, tanks, hoses, and other components – including your tendering equipment. This article summarizes some of the key steps to winterizing sprayers. Be sure to check your owner’s manual for detailed instructions for your particular sprayer so you don’t void any manufacturer’s warranty.

1. Clean the sprayer to remove herbicide residues, if not already done.
2. Check and service the pump.
3. Remove filters, nozzles, check valves, and screens from your sprayer and wash them by hand. You can store metal filters and screens in vegetable oil to prevent rusting.
4. Remove pressure gauges and store them at room temperature.
5. Remove as much water as possible. Consider using an air hose to blow out moisture.
6. Add RV antifreeze with a corrosion preventer. Solutions designed to winterize sprayers are also available. Liquid fertilizer is another option, but can cause corrosion.
7. Circulate the antifreeze through the entire system, including the boom (if applicable). For boom sprayers, turn on one section at a time until you see the antifreeze come out the nozzle openings, then cap the opening.
8. Refer to your owner’s manual for other components, such as flow meters, rate controllers, and electronics.



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3. Value of forage insurance during drought

As of November 1, 2022, over two-thirds of all Kansas counties was reported as experiencing extreme or exceptional drought conditions (Figure 1). Cattle producers can take many actions to mitigate the impact of drought, including purchasing forage insurance, or Pasture, Rainfall, Forage (PRF) insurance. The deadline to purchase PRF for 2023 is December 1, 2022, but the premium would not be billed until September 23, 2023.

In this article, we discuss what the PRF is and report PRF payouts to-date by drought status for all 105 Kansas counties. In 2022, nearly 2.9 million acres were enrolled in PRF in Kansas; USDA reported 15.6 million acres of pastureland in Kansas in 2017. PRF premiums for 2022 totaled about \$14 million and PRF has already paid out nearly \$25 million in indemnities.

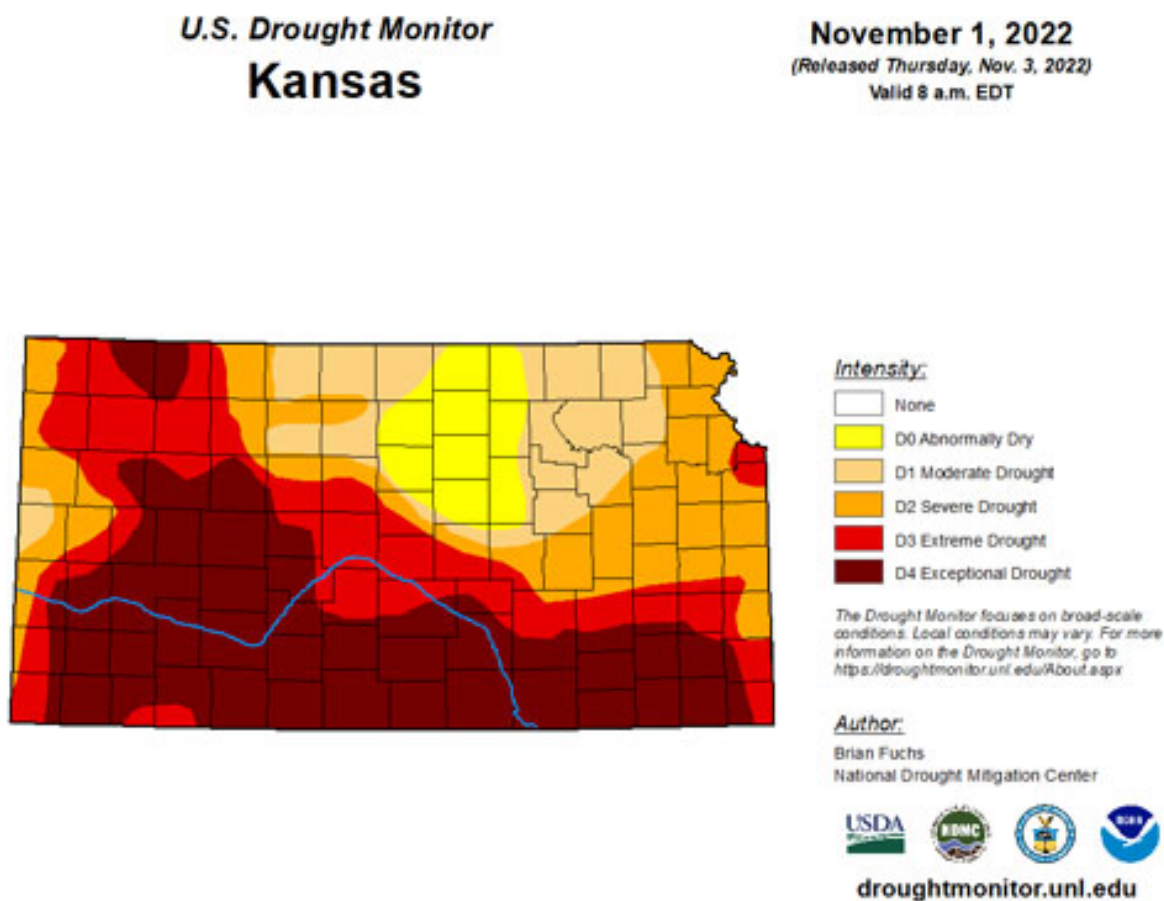


Figure 1. U.S. Drought Monitor for Kansas as of November 1, 2022.

What is PRF?

PRF insurance makes payments to producers with land used for hay production or grazing when precipitation levels within a producer-selected 2-month window (“interval”) are lower than the historic average. Precipitation is measured for a “grid”, which is smaller than a county; Riley County contains all or parts of 6 grids. Producers purchasing PRF make two major decisions. The first is the

months during the year when they want to have PRF coverage. Specifically, producers must select at least 2 2-month intervals during the calendar year; the maximum number of intervals is 6. For example, a producer could select April/May and June/July intervals. A producer could select 6 intervals, effectively covering all intervals/months in the year. Second, producers must select a coverage level from 70-90%. A 70% coverage level pays out when precipitation is 70% less than the historic average, while a 90% coverage level pays out when precipitation is 90% less than the historic average.

Producers must pay a premium to enroll in PRF, but the Federal government covers up to 59% of the premium cost. Over time, *on average* PRF has paid out more indemnities than premiums. See the links at the end of this article or contact a local livestock insurance agent for more information on the risks and benefits of using PRF.

Has PRF paid out in 2022?

PRF pays out based on precipitation instead of drought status, so it is worth asking whether payouts (indemnities) were higher in counties experiencing drought. This is not a perfect comparison, as several choices producers make about their PRF coverage can influence payouts. For example, payouts are typically higher for higher coverage levels. Further, drought status may reflect cumulative precipitation and temperature as opposed to precipitation at a particular point in time. However, this comparison does provide a general idea of the degree to which PRF can make payouts during a drought. In the table below, we estimate average PRF net indemnities per acre for all 105 Kansas counties by drought status, as measured by the UNL Drought Monitor. Net indemnities are calculated as total indemnities minus total producer-paid premium. *2022 is not complete yet, indemnities are likely to increase substantially by the end of 2022.*

The relative level of indemnities as of late October is strongly related to drought status in Kansas. Counties moderate drought on average paid more in premiums than indemnities. However, counties with severe to exceptional drought have positive net indemnities that are increasing in drought status. For counties with exceptional drought, average net indemnities are currently higher than \$5 per **acre**. Experience is not uniform across all counties by drought status, but these statistics do quantify how PRF payouts tend to increase as droughts become more severe.

Table 1. Drought Status and average 2022 PRF Indemnities for Kansas counties through Nov. 9, 2022.

Drought Monitor Category	DSCI*	2022 PRF average net indemnities per enrolled acre	# of counties	Acres enrolled in PRF
Moderate drought	101-200	-0.10	14	214,000
Severe drought	201-300	\$0.76	23	665,000
Extreme drought	301-400	\$4.40	18	403,000
Exceptional drought	401-500	\$5.12	50	1,593,000

*Drought Severity and Coverage Index

Note: Data sources are USDA Risk Management Agency and <https://droughtmonitor.unl.edu/>. More

information on the Drought Severity and Coverage Index (DSCI) is available at <https://droughtmonitor.unl.edu/About/AbouttheData/DSCI.aspx>. Net indemnities are calculated as total indemnities to date minus the total premium. Data was collected on November 9, 2022. The lowest DSCI for a Kansas county on Nov. 9, 2022 was 100, in 2 counties. Acres enrolled are rounded to the nearest 1,000. Indemnities are only partial and are likely to increase substantially by the end 2022.

For more information:

<https://enewsletters.k-state.edu/beeftips/2021/11/01/ten-things-to-know-about-pasture-rangeland-and-forage-insurance/>

<https://www.rma.usda.gov/en/Fact-Sheets/National-Fact-Sheets/Pasture-Rangeland-Forage-Pilot-Insurance-Program>

<https://prodwebnlb.rma.usda.gov/apps/prf>

<https://www.rma.usda.gov/en/Information-Tools/Agent-Locator>

Editor's note: This article originally appeared in the "Beef Tips" newsletter on November 1, 2022. You can subscribe to this newsletter at <https://enewsletters.k-state.edu/beeftips/>.

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4. Save the date for the 2023 Kansas Corn Schools

The Department of Agronomy and K-State Research and Extension, in partnership with Kansas Corn, are planning to host several Corn Schools in 2023. Please save the date for the location nearest you. Details on speakers and topics will be coming soon.

January 12 – Oakley

Buffalo Bill Center
3083 US-83
Oakley, KS 67748

January 13 - Salina

Great Plains Manufacturing Conference Center
1569 E North St.
Salina, KS 67401

January 19 – Mayetta

Prairie Band Casino
12305 150th Rd.
Mayetta, KS 66509

January 20 – Parsons

KSU Southeast Research and Extension Center
25092 Ness Rd
Parsons, KS 67357



Stay tuned to future eUpdates for more information!

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Josh Roe, VP of Market Development and Policy, Kansas Corn

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5. K-State/KARA Crop Production Update: Dec. 7-8 in Manhattan

The 2022 Crop Production Update, hosted by the Kansas Agribusiness Retailers Association (KARA) and in cooperation with K-State Research and Extension, will be offered in-person this year with a virtual option. The two-day event will take place on December 7 and 8 at the Bluemont Hotel in Manhattan, KS. This course will provide a total of 12 CCA CEUS (tentatively, 4 soil water credits, 3 nutrient management credits, 3 crop production credits, 1 pest management credit, and 1 professional development credit), in addition to one 1A hour and one core hour.

This training provides the latest research and technological advances in fertilizer and chemical recommendations, soil fertility, soil water and soil conservation, and much more. The agendas for each day are still being finalized. Confirmed topics include:

- Impacts of the Russia-Ukraine conflict on grain production and market
- Carbon credits: What do we know?
- New nitrogen recommendations for corn
- Economics of fertility management
- Corn and soybean production update
- Wheat and alfalfa production update
- Soil mineralogy review and applications
- Wind erosion mitigation and the causes and impacts of the Dust Bowl
- Disease management in wheat
- Phosphorus runoff in agroecosystems

Don't delay - get registered today! Registration information and cost options can be found here: <https://www.ksagretailers.org/events-training/crop-production-update/>

Stay tuned to the eUpdate and the conference website for complete agendas to be released soon.

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