



K-STATE
Research and Extension

Extension Agronomy

eUpdate

04/09/2018

These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy e-Update 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 Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Cold temperatures on April 7-8: Risk of freeze injury to Kansas wheat 3

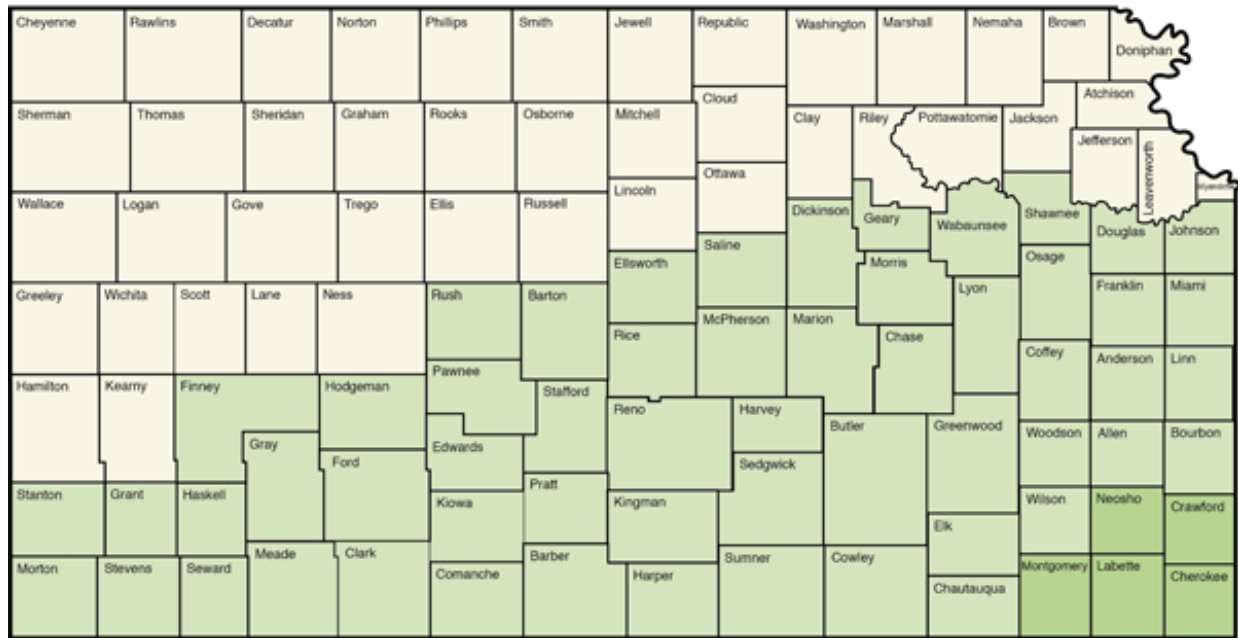
1. Cold temperatures on April 7-8: Risk of freeze injury to Kansas wheat

The cold temperatures this past weekend (April 7-8) have many wheat producers talking about the potential for freeze injury to the 2018 wheat crop. There are multiple factors that influence the risk of freeze injury in wheat. At any given location, factors such as growth stage of the crop, air temperature, minimum temperature, duration of these cold temperatures, as well as modifying variables such as soil temperature and snow cover all influence the risk of crop injury. The challenge is to integrate all these factors into a reasonable estimate of freeze injury.

Based on simple wheat growth models and observations from K-State Extension personnel, we know that the wheat growth stage around Kansas ranges from tillering in the northwest to second node in the southeast, with a few reports of early-sown fields approaching flag leaf emergence in the region (Figure 1). Most of the crop in central and western Kansas is either approaching or already at the jointing stages of growth. If the crop has not jointed yet, it generally withstands temperatures lower than 20 degrees F fairly well, especially if the growing point is still below ground. If the growing point is already above ground (first joint visible), wheat can sustain temperatures down to about 24 degrees F for a few hours. Minimum temperatures below 24 degrees F for extended periods of time increase the risk of crop injury. Information from the [K-State Mesonet](#) indicates that air temperatures dipped below this 24-degree F threshold for at least a few hours in most areas of the state. Many areas of the state experienced more than 10 hours with air temperatures below 24 degrees F. Some areas of northwest Kansas reported temperatures of 7 or 8 degrees F.

Estimated Wheat Growth Stage

April 8, 2018



Growth observation map based on reports from R. Lollato, E. De Wolf, D. Shoup, L. Haag, S. Duncan, A. Foster, S. Blocker, M. Chamas, J. Coltrair, J. Coover, A. Esser, J. Falk-Jones, W. Hughes, T. Huxa, A. Johnson, R. Ladd, C. Long, T. Maxwell, L. Russell, S. Wick, M. Young

Wheat Growth Stage

- | | | |
|--|--|--|
| <input type="checkbox"/> Tillering or strongly upright tillers | <input type="checkbox"/> Flag leaf emergence or boot | <input type="checkbox"/> Dough or physiologically mature |
| <input type="checkbox"/> Strongly upright tillers or jointing (first node) | <input type="checkbox"/> Boot or flowering | |
| <input type="checkbox"/> Jointing (first node) or jointing (second node) | <input type="checkbox"/> Flowering or watering ripe | |
| <input type="checkbox"/> Jointing (second node) or approaching flag leaf emergence | <input type="checkbox"/> Watering ripe or milk | |
| <input type="checkbox"/> Approaching flag leaf emergence or at flag leaf emergence | <input type="checkbox"/> Milk or dough | |

Figure 1. Estimated wheat growth stage as of April 9, 2018, for the state of Kansas. Growth stage is estimated for each county based on temperatures accumulated in the season and adjusted by observations of crop stage by K-State personnel. Local growth stage may vary with planting date and variety. Map created by Erick DeWolf, K-State Research and Extension.

Fortunately, soil temperature and snow cover can help buffer the effect of the cold air temperatures. In this case, it appears the soil temperature, measured at 2 inches below the soil surface, did not drop below 40 degrees in most areas. This measurement is highly relevant at these early growth stages because the growing point of the wheat is very near the soil surface. The presence of snow can also help insulate the plants against the cold air temperatures and help retain the warmth of the soil near the growing points. Soil temperatures can be viewed via the Kansas Mesonet here: mesonet.ksu.edu/agriculture/soiltemp.

Based on these factors, we estimate that most areas of Kansas are at a low-to-moderate risk for freeze injury from the cold temperatures on April 7-8 (Figure 2). The risk of injury was moderate in the southeast portion of the state where the crop was the most advanced and snow cover was minimal. The risk transitions from low/moderate to low in the remainder of the state, mostly due to either greater snow cover, or due to the crop being at earlier stages of development in which the growing point is at or near the soil surface. An area of low/moderate risk covering much of central Kansas

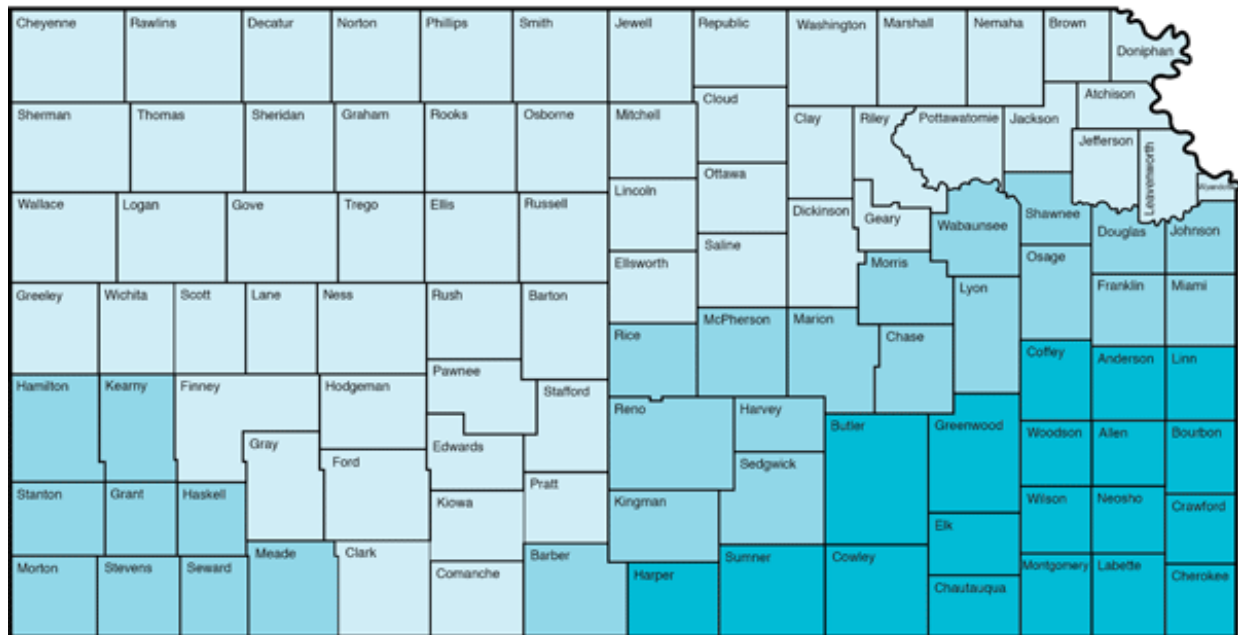
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drops to low risk in parts of south central and southwestern regions where snow was most likely to reduce the risk of injury.

Risk of Freeze Injury to Wheat April 7 - 8, 2018



Risk map based on observations of wheat growth stage, snow cover, min. temperature and duration of temperature below 24 degrees. Kansas State University: E. De Wolf, R. Lofatto, M. Knapp, and C. Redman.

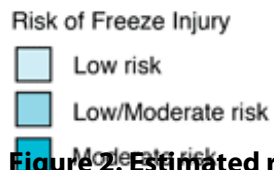


Figure 2. Estimated risk of freeze damage due to a combination of wheat growth stage sensitivity, lowest temperatures during April 7-8, 2018, number of hours below 24 degrees F during the same period, cumulative snowfall during the period, and soil temperatures at the 2-inch depth. Map created by Erick DeWolf, K-State Research and Extension.

Growers around the state should expect to see symptoms of freeze injury on foliage over the next 10-14 days. In most cases, this injury should not result in any long-term damage to the crop. However, growers with fields at advanced growth stages should be checking for symptoms of freeze injury to the growing point and stems.

For detailed information on evaluating wheat for freeze damage, see the eUpdate article from Issue 683 on April 4, 2018, ["Diagnosing freeze damage to wheat"](#).

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