



K-STATE
Research and Extension

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eUpdate

02/22/2017

These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, 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 Steve Watson, 785-532-7105 swatson@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Optimal time to remove cattle from wheat pastures: First hollow stem

Average temperatures across the entire state of Kansas have been as much as 10°F warmer than the long-term normal, inducing early spring greenup by the wheat crop (Fig. 1). As wheat begins growing more rapidly with the warm temperatures we've had in Kansas so far this winter, producers should start thinking about when to pull cattle off pasture to protect grain yields. After greenup and growth is underway and before the wheat has reached jointing, it is important to scout fields closely for signs of the "first hollow stem" (FHS) stage. This stage occurs as the wheat switches from the vegetative stage to the reproductive stage of growth.

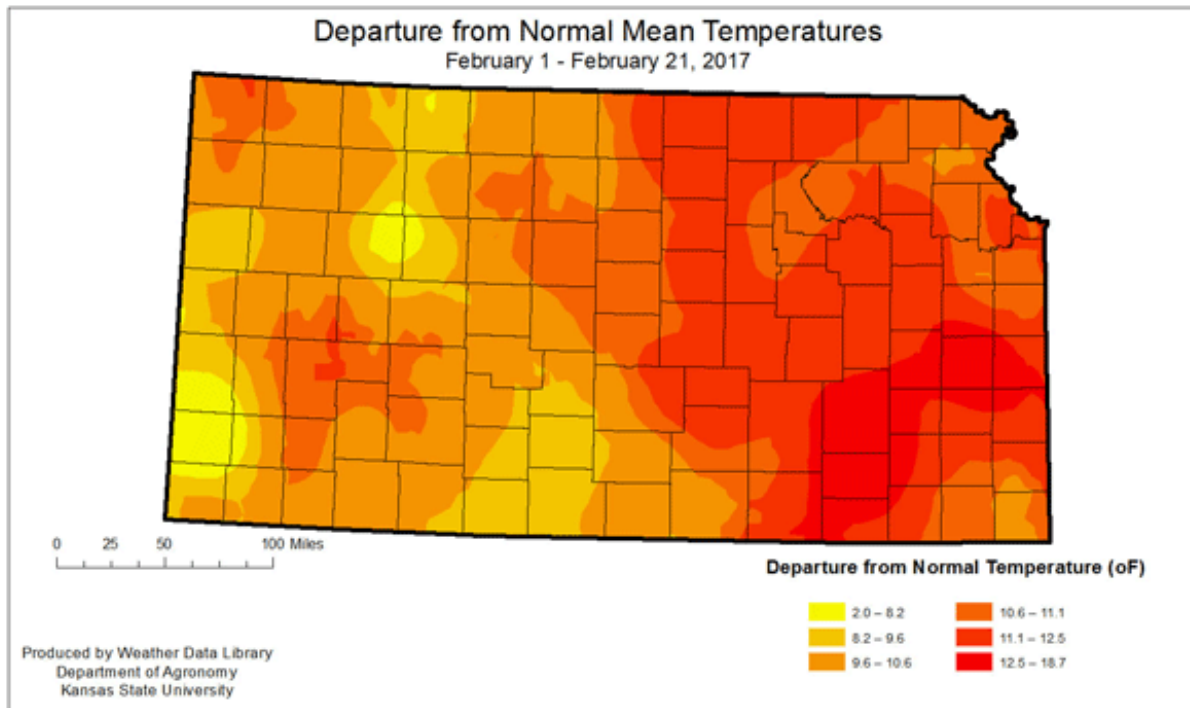


Figure 1. Departure from normal mean temperatures, Feb. 1-21, 2017. Source: Weather Data Library, K-State Research and Extension.

When the leaf sheaths become erect, the developing growing point, which is below the soil surface, will soon begin to form a tiny head. Although the head is quite small at this point, it has already established some important yield components. At this stage, the maximum potential number of spikelets is determined. Sufficient nitrogen (N) should already be available in the root zone at this growth stage in order to have the maximum effect on the potential number of seeds per head.

Once the embryo head has developed, the first internode will begin to elongate pushing the head up

through the leaf sheaths. This first internode will be hollow. This will be visible before you can actually feel the first node (joint, located just above the first internode). Prior to this stage the nodes are all formed but tightly packed together and hard to see.

FHS is the point at which a 1.5 cm (about half-inch) length of hollow stem can first be identified above the root system and below the developing head (Figure 2). This length is roughly equivalent to the diameter of a dime, which makes its identification in the field easier. FHS occurs when the developing head is still below the soil surface, which means that producers have to dig plants out of the ground to do the examination.

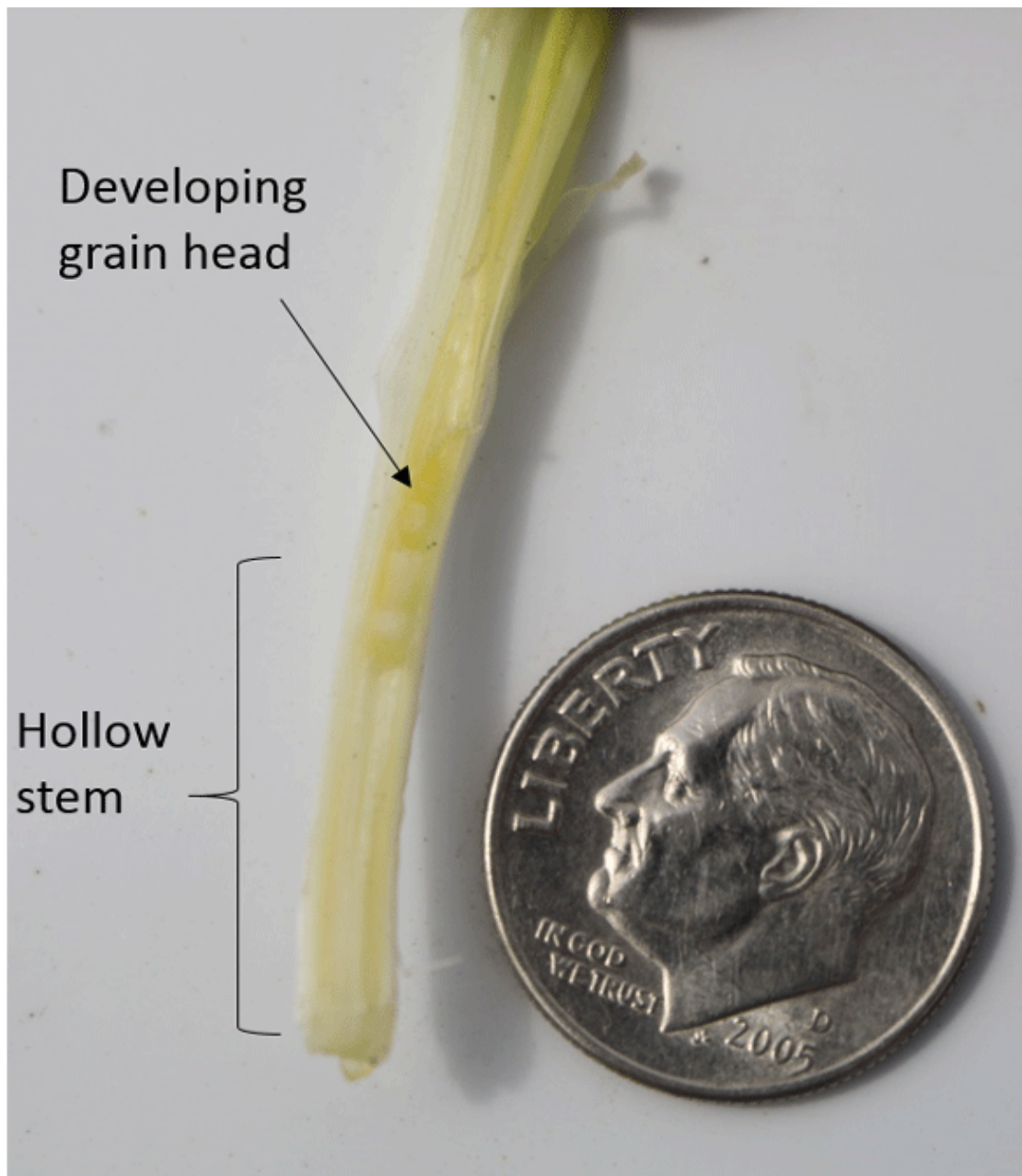


Figure 2. Wheat plant reaching the first hollow stem stage of growth, characterized by approximately 1.5 cm (or roughly the diameter of a dime) of hollow stem underneath the developing grain head. Photo by Romulo Lollato, K-State Research and Extension.

To look for FHS, start by digging up some plants from fields that have not been grazed, such as field corners or just outside the electric fence. Date of FHS is variety- and field-specific, so it is important to sample each individual field. Select the largest tillers to examine, and slice the stem open from the crown area up. Look for the developing head, which will be very small. Next, see if you can find any hollow stem between the developing head and the crown area. If there is any separation between the growing point and crown, the hollow stem is elongating. If that separation is 1.5 cm, the wheat plant is at FHS. FHS occurs between a few days to a week or more prior to jointing, depending on temperatures.

If the wheat has reached FHS, cattle should be removed to prevent grain yield loss. Yield losses from grazing after FHS can range from 1 to 5% per day, depending on grazing intensity and the weather following cattle removal. If cattle removal is followed by cool, moist weather, yield losses will often average about 1% per day grazed after FHS; if weather is hot, dry, and harsh, yield losses of 5% per day or more can be expected. In fact, as much as 1.25 bushels per day yield decrease can occur according to OSU data. It is easy for producers to be late by a few days in removing livestock as they wait for obvious nodes and hollow stems to appear, and even the first few days can be significant.

Two things are observed when wheat is grazed too long: 1) fewer heads per acre because the primary tiller has been removed and 2) smaller and lighter heads than expected because leaf area has been removed. As cattle continue grazing, the wheat plant is stressed and begins to lose some of the tillers that would produce grain. A little later, if there is not enough photosynthate, the plant begins aborting the lower spikelets (flowers where seed develops) or some of the florets on each head. Finally, if there is not enough photosynthate during grain filling, the seed size will be reduced and if the stress is severe enough, some seed will abort.

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2. First hollow stem update: Feb. 22, 2017

Cattle should be removed from wheat pastures when the crop reaches first hollow stem (FHS).

Grazing past this stage can severely affect wheat yields (for a full explanation, please refer to eUpdate article "Optimal time to remove cattle from wheat pastures: First hollow stem" in the Feb. 22, 2017 issue).

First hollow stem update

In order to screen for FHS during this important time in the growing season, the K-State Extension Wheat and Forages crew measures FHS on a weekly basis in 20 different commonly grown wheat varieties in Kansas. The varieties are in a September-sown replicated trial at the South Central Experiment Field near Hutchinson, in cooperation with Gary Cramer, Agronomist-in-Charge of the Field.

Ten stems are split open per variety per replication (Figure 1), for a total of 40 stems monitored per variety. The average length of hollow stem is reported for each varieties in Table 1. As of Feb.17, none of the varieties had yet reached first hollow stem but all varieties had started to elongate the stem.



Figure 1. Ten main wheat stems were split open per replication per variety to estimate first hollow stem for this report, for a total of 40 stems split per variety. Photo by Romulo Lollato, K-State Research and Extension.

Table 1. Length of hollow stem measured Feb. 17, 2017 of 20 wheat varieties sown mid-

September 2016 at the South Central Experiment Field near Hutchinson. The critical FHS length is 1.5 cm (about a half-inch or the diameter of a dime).

Variety	Hollow stem length (cm)*
1863	0.02
Bentley	0.03
Doublestop	0.02
Everest	0.04
Gallagher	0.05
Iba	0.03
KanMark	0.04
KS061193K-2	0.03
KS080448C*102	0.01
Larry	0.03
OK11D25056	0.02
OK12716	0.03
OK12DP22002-042	0.03
Ruby Lee	0.02
Stardust	0.02
SY Flint	0.03
SY Grit	0.02
SY Llano	0.01
Tatanka	0.03
Zenda	0.04
* Critical hollow stem length to remove cattle is 1.5 cm, or roughly the diameter of a dime.	

While none of the varieties had yet reached first hollow stem as of February 17, this stage is generally achieved within a few days from when the stem starts to elongate, provided sufficient moisture and warm temperatures. Thus, producers should keep a closely monitor first hollow stem in their wheat pastures at this time. In fact, some commercial fields in the region were already at first hollow stem and reaching jointing by February 20 (Figure 2). Our team is performing first hollow stem measurements on February 22 again, and will report these measurements on the February 24 issue of the Agronomy eUpdate.



Figure 2. Commercial wheat field on Feb. 20, 2017 in Rice County planted Sept. 27-30, 2016 showing first hollow stem. Photo by Skylar January, Rice County wheat producer, courtesy of K-State Research and Extension.

The intention of this report is to provide producers a weekly update on the progress of first hollow stem development in different wheat varieties. Producers should use this information as a guide, but it is extremely important to monitor FHS from an ungrazed portion of each individual wheat pasture to take the decision of removing cattle from wheat pastures.

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