

WHEAT PRODUCTION NEWSLETTER

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First hollow stem... not yet

By Jeff Edwards, Brad Tipton, Rick Kochenower, and Curtis Bensch

The drought has slowed everything down, including development of first hollow stem. Remember that first hollow stem is the stage of wheat development to remove cattle from wheat pasture to optimize returns in the dual-purpose wheat/cattle production system.

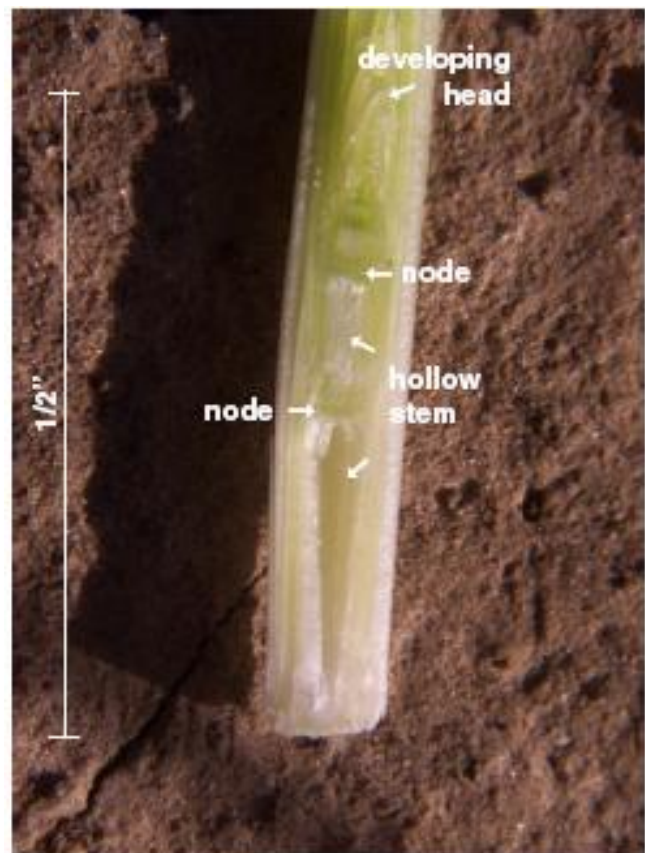
Growers should check for first hollow stem by digging up 8–10 plants in a nongrazed area of the field (usually just outside of the hotwire or fence). Split the stems open and look for hollow stem just below the growing point (see the picture to the right). When approximately 1/2 of an inch (or 1.5 cm) of hollow stem is present below the developing head, the plant is at the first hollow stem growth stage and cattle should be removed from wheat pasture.

We are monitoring varieties this year at Stillwater, El Reno, and Goodwell, OK. So far, we have not observed first hollow stem in any variety at any location. Similar to last year, we will communicate any progression of first hollow stem via the *Wheat Production Newsletter*, so check your email regularly.

In other news, significant greenbug activity has been reported in some areas of the state, and growers are faced with the tough decision of whether or not to spray a marginal crop. Dry conditions have kept diseases at bay, but dry

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First hollow stem stage of growth.

conditions have also kept wheat growth at a minimum. Many fields sown into lighter soils or that have been grazed heavily are going backwards in a hurry. In summary, we still have potential for a fair wheat crop, but the potential is less each day we don't get rain.

New information on first hollow stem

By Jeff Edwards

Let me start this article by making it clear that as a general rule, first hollow stem is still the optimal time to remove cattle from wheat pasture. New information gathered by an OSU research group led by Brian Fieser and Gerald Horn, however, indicates that there might be a little more flexibility than previously thought when removing cattle from wheat pasture.

Previous research (see article on next page) indicated a grain yield loss of 1.25 bu/ac/day for grazing past first hollow stem. This assumes that the yield loss response is linear. In other words, it assumes that the grain yield loss for the first day of grazing past first hollow stem is just as damaging as the tenth. New research, however, indicates that this is not necessarily the case. This research has shown that the first few days of grazing past first hollow stem are not as damaging as previously thought and that grazing 10 days past first hollow stem is much more damaging than previously thought.

One could compare this trend to interest accumulating on a loan. If grain yield losses for grazing past first hollow stem were linear in nature, it would be similar to non-compounding interest on a loan. That is, interest would be figured based on the original principal and the interest payment would not change for the life of the loan. Our new data, however, seem to indicate that the wheat grain yield response to grazing past first hollow stem is more similar to compounding interest (like a credit card). In this

scenario, the first few days of interest on the loan are manageable and may not be that big of a problem, but if left unchecked, the total amount can quickly snowball into an unmanageable sum.

It is also important to take into consideration that profitability of grazing past first hollow stem also depends on yield potential of the wheat. For example, a 10% yield loss associated with grazing a few days past first hollow stem has entirely different economic ramifications for a farmer with 30 bushel yield potential as compared to a farmer with 60 bushel yield potential.

The take-home message here is First Hollow Stem is still important, and, while you don't need to have a truck waiting at the gate in anticipation, it is important to remove cattle from wheat pasture as close to first hollow stem as possible. We will continue to fine-tune the system with further research at OSU and report findings on a regular basis.



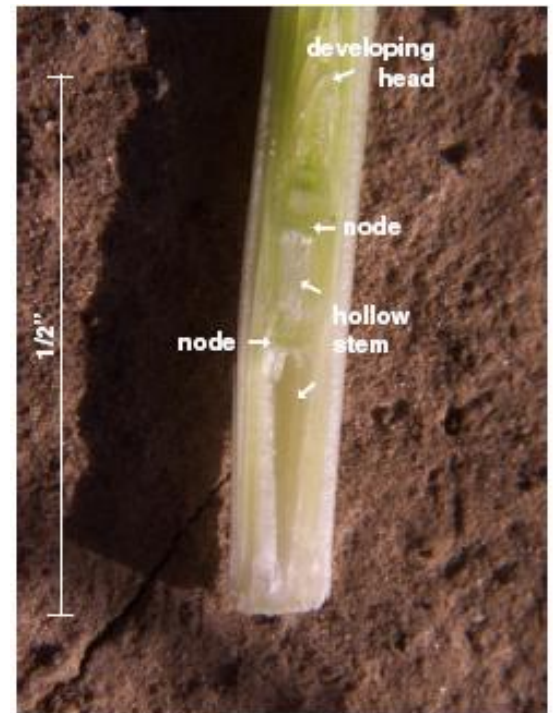
Once first hollow stem is reached, remove cattle from wheat pasture as soon as practically feasible.

First hollow stem explained

Taken from OSU publication L-309

Determining First Hollow Stem

First hollow stem (FHS) is the growth stage when hollow stem can first be identified above the root system and below the developing head. FHS occurs when the developing head is still below the soil surface. To check for FHS, dig up a few **ungrazed** wheat plants. Cut them off just above the root system. Starting where you cut off the wheat shoot, cut vertically, as near center as possible, toward the youngest leaves. Look for the very small growing point or developing head. Next, determine if any hollow stem is found between the growing point and where the root system was attached. If between 1/4 and 3/4" of hollow stem is present, the wheat plant is at FHS. The photograph is an example of FHS, enlarged considerably. It is important to check for FHS where cattle are not grazing, because grazing delays FHS, and grain yield losses occur before one can identify any hollow stem in wheat being grazed. Producers should begin looking for FHS with the first flush of growth in the late winter. Weather from January through FHS has the biggest influence on the date of FHS. First hollow stem has occurred as early as February 20 and as late as March 25 in twelve years of observation at the Marshall Wheat Pasture Research Unit. This tremendous difference emphasizes that calendar date is unreliable in determining when to terminate grazing.



First hollow stem stage of growth.

The Dilemma

Maximizing profits in dual-purpose wheat systems involves tradeoffs between grain and stocker production. One of the most critical decisions is grazing termination. More grazing days usually enhances stocker profitability, but maybe not the overall profitability. Biology of wheat growth imposes a rigid deadline for removing cattle without seriously reducing yield. Wheat growing conditions vary each year and the tendency to terminate grazing based on a fixed calendar date means that in some years profit is likely to be reduced.

Where is the Tiny Head?

What is happening in the growth of the wheat plant at first hollow stem (FHS)? If the wheat has not been grazed, the young head is developing and starting to be pushed up above the soil surface as the stem elongates. In wheat grazed all winter, elongation of the stem does not begin nearly as early as in the ungrazed wheat. We might interpret that there would be no problem allowing the cattle to continue grazing, because they certainly cannot graze off the tiny head if it is still below the soil surface.

Do Cattle Graze the Heads?

Historically, we thought that as long as the cattle were not grazing off the tiny wheat head, grazing did not reduce grain yield. However, in the last 15 years, we learned this was simply not true. It was

discovered that grazing past the FHS stage in ungrazed wheat reduced the wheat yield 1.25 bushels per acre per day, without grazing off any of the tiny heads. Apparently, grazing at this time **reduces the grain yield** because cattle are eating the leaves that produce photosynthate needed to grow the upper leaves of the wheat plant and help the head grow and fill.

Fewer, Smaller Heads

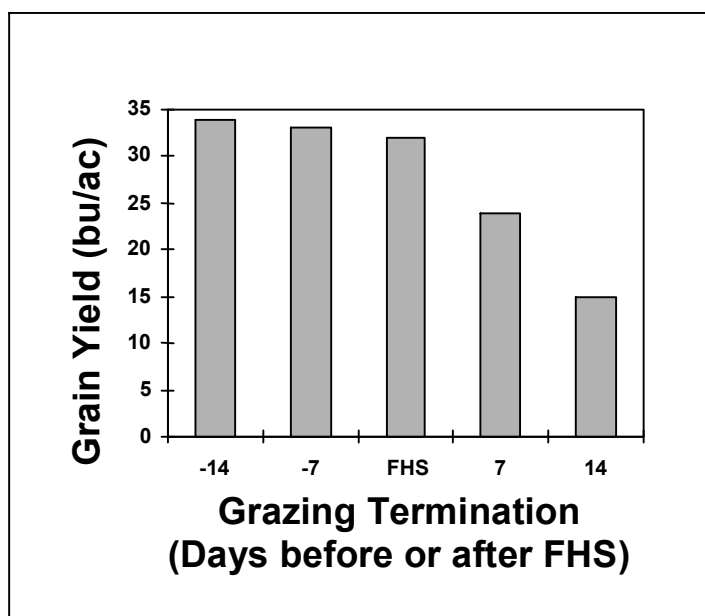
Two things are observed when we graze too long: 1) fewer heads per acre and 2) smaller and lighter heads than expected. As cattle continue grazing, the wheat plant is stressed and begins to abort some of the tillers that would produce grain. A little later, if there is not enough photosynthate, the plant begins aborting the lower spikelets (flowers where seed develops) 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.

Lower Grain Yield

Once FHS stage is reached in ungrazed wheat, continuously grazed fields will suffer dramatic grain yield reduction. The average decrease is 1.25 bushels per acre per day for the first two weeks after FHS (see graph).

Stocker Profitability

The impact of early grazing termination on stocker profits depends on many factors, including cattle size, rate of gain, stocking rate, wheat pasture value and cattle market trends. Stocker budgets for 1993-2002 indicate that terminating grazing two weeks early reduces profit by an average of \$11.53/acre based on typical assumptions including: 425-pound steers grazing 126 days; gaining 2 pounds/day; and normally marketed the first week of March.



Economic Summary

An arbitrary fixed date of grazing termination reduces returns over time. Early termination reduces beef returns and late termination reduces grain returns. *Maximizing profits from dual-purpose wheat means that a producer must monitor wheat for FHS and remove cattle promptly when FHS occurs.* If FHS occurs two weeks early only one year in five, total returns (gain + grain) over five years are increased by about \$45/acre, or \$9/acre/ year when grazing is terminated early to match FHS.

Conclusion

There is no way cattle can make enough money in two weeks at the end of the grazing season to recover losses from wheat incurred by grazing two weeks after first hollow stem!

Upcoming Events

April 4 & 5 – Southern Wheat Research and Education Consortium (SWREC) meeting in Stillwater. More information to come in future issues of the WPN.



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