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## Field Update – Forecasted Frost, Soybean Harvest

Welcome to fall in the North! Temperatures have changed from a high of 80°F+ last week to high-60°F this week and a chance of frost. The main concern is whether or not we will have a “killing frost” this week and the impact on the crop. This is primarily dependent upon 3 factors: stage of crop, low temp. reached, and duration of low temp. period. A freeze event, with temperatures below 32°F for several hours are needed to penetrate the canopy to kill leaves and stop development. If temps fall below 32°F but only for a short period of time, then the impact may not be severe. Damage can occur at overnight temps between 32-40°F, but the extent of damage can vary considerably and should not completely stop development. What to look for after a frost? Affected tissue will be evident in 1-2 days as a water-soaked appearance. Leaves around the ear may be unaffected and remain photosynthetically active- meaning development can continue. The impact on yield depends on the stage of the crop. Corn that has reached ¾ milk line has determined ~95% of it's yield. A killing frost can impact the remaining 5%. A majority of soybean fields have reached full maturity and the frost should not impact yield.

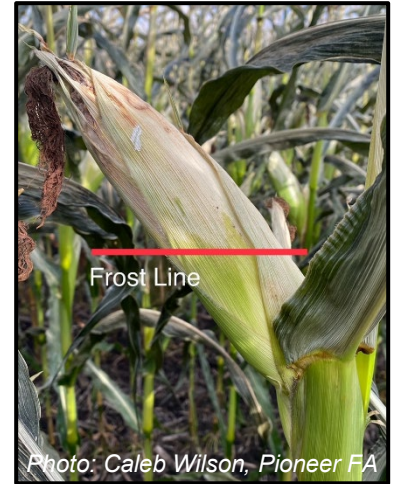


Photo: Caleb Wilson, Pioneer FA

Looking beyond the overnight temperatures, we still have an decent opportunity to accumulate GDUs with high temperatures in the upper 60's – lower 70's. Currently, central MN has accumulated a total of ~2580 GDUS on average since May 1<sup>st</sup>, which is 254 ahead of normal. The region is projected to add another 58 GDUs over the next 7 days. The forecast remains favorable over the next 10 days to allow for soybean harvest to kick off. The first fields were harvested last week and more should be ready by the end of this week/early next week. While walking corn fields, start to monitor stalk integrity as the plants reach black layer. Anthracnose stalk rot and top dieback have been evident in pockets throughout the region, which can impact standability. Fields with compromised stalks should be prioritized for harvest.

Location	GDUs Since May 1st	GDUs From Normal- 5/1	Projected GDUs- 7 Day
Albany, MN	2602	+265	57
Wadena, MN	2268	+208	54
Little Falls, MN	2543	+312	54
Waverly, MN	2775	+230	57
Belgrade, MN	2663	+285	60
Cambridge, MN	2632	+194	56
<b>Average</b>	<b>2581</b>	<b>+254</b>	<b>56</b>

\*Data collected from Pioneer.com GDU Calculator 5/1 - 9/26

## Green Soybean Plants? Bud Blight may be the Cause

While walking soybean fields, a completely green plant may stand out within the mature colored plants around it. What could be the cause of this? The probable cause this season is from a virus that results in “bud blight.” The following describes the symptoms to identify bud blight:

- Random plants may exhibit stunting or remain completely green.
- Maturity may be delayed and plants may remain green until frost.
- Pods do not develop normally and appear in clusters.
- The terminal bud of plants can be bent over to form a characteristic hook.

The cause of bud blight is the result of a virus infection, often pinpointed as tobacco ringspot virus (TRSV). The virus can be transmitted through a variety of vectors including: aphids, grasshoppers, and thrips. In central MN, aphids and grasshoppers were commonly found in fields this season. The symptoms of bud blight are different than that of “green stem syndrome” in soybean, which results in normal pod development while the stem remains green at harvest maturity.



Photo: Clyde Tiffany, Pioneer FA

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The yield impact from bud blight is typically negligible because only 1 out of thousands of plants are affected. Future management includes using clean, disease free seed and insect management to prevent virus transmission.

## Impending Corn Harvest – Retaining Yield

Minimizing losses at soybean harvest was a topic of conversation last week. This week, we turn our attention to minimizing losses at corn harvest since fields intended for high moisture will be ready shortly. The first topic to address is moisture loss and drydown rates. Once black layer has been achieved, moisture loss is entirely due to evaporative loss through the pericarp (outer portion of kernel). So, at what rate will drydown occur?

- Drydown can be dependent upon environment (air temperature, air movement, and relative humidity) and hybrid characteristics (ear orientation, plant density, husk tightness and length, and kernel hardness).
- As grain decreases from 30% to 20% moisture, more GDUs are needed for each point of moisture loss.
  - Grain moisture at black layer is typically ~32-35%.
  - 15-20 GDUs per point to drydown from 30-25% moisture.
  - 20-25 GDUs per point to drydown from 25-22% moisture.
  - 25-30 GDUs per point to drydown from 22-20% moisture.

Harvest Season Stage	Points of Moisture per Day
Sept. 15 – Sept. 25	¾ to 1
Sept. 26 – Oct. 5	½ to ¾
Oct. 6 – Oct. 15	¼ to ½
Oct. 16 – Oct. 31	0 to ¼
Nov. 1 and later	~0

*Hicks, D.R. 2004. The Corn Crop- Frost and Maturity. Univ. of MN.*

Once the desired harvest moisture is reached, the next step is to determine yield loss pre & post-harvest. This can help dial in equipment and capture yield in the field. Below are the steps to measure and determine these losses.

- **Pre-harvest-** Measure an area equivalent to 1/100<sup>th</sup> acre in standing corn and count all the ears on the ground in that area. On 30" rows that would equate to measuring an area 8 rows wide and 21.8 ft long. Each ear on the ground = ~1 bu/ac yield loss.
- **Machine Losses-**
  - Header Loss- This can be one of the largest areas of harvest loss through either whole ears or kernels. Stop the combine and back up 20 ft. Inspect an area already passed over by the corn head, but not the back of the combine. Measure a 10-sq. ft. area and count the number of kernels. For every 20 kernels found in that area = ~1 bu/ac yield loss.
  - Threshing & Separating Loss- Threshing losses are represented by kernels still attached to cob fragments, while separating losses are unattached kernels. Measure a 10-sq. ft. area behind the combine and repeat the process.
- Combine the total losses between pre-harvest and machine losses to determine total loss.

### Yield loss math

**Kernels:** 20 kernels lost per 10 sq. ft. = ~ 87,000 kernels/acre. One bushel of corn is assumed to contain about 90,000 average-sized kernels.

*Corn yield loss via kernel counts. Butzen, S. 2018. Crop Insights Vol. 28 No. 8.*

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