

# Agronomy Weekly Update

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**Nick Schimek**  
Pioneer Field  
Agronomist



**PIONEER**



**CORTEVA**  
BRAND VALUES



## Field Update- Fall Frost Date and Harvest Progress

A relatively “cool” start to the week is projected to continue over the 7-10 day forecast. Daily highs are expected to reach into the mid-upper 60’s with overnight lows in the low 40’s (and maybe even high 30’s). Cool overnight temperatures always sparks the question, when will the first killing frost occur? The long-term median date of the first 28°F freeze occurs between September 21<sup>st</sup> and October 10<sup>th</sup> across central and northern MN. This doesn’t mean that the trend will continue this season; however, the window is closing quickly for those fields that still need to reach physiological maturity. Central MN has accumulated 2675 GDUs on average from April 26<sup>th</sup>, which is ~430 ahead of normal. In terms of calendar days, this means we are ~2 - 2.5 weeks ahead of normal.

Location	GDUs Since April 26th	GDUs From Normal- 4/26	Projected GDUs- 7 Day
Wadena, MN	2425	+466	51
Little Falls, MN	2662	+523	53
Albany, MN	2717	+464	56
Buffalo, MN	2790	+342	58
Glenwood, MN	2792	+465	61
Cambridge, MN	2662	+328	58
<b>Average</b>	<b>2675</b>	<b>+431</b>	<b>56</b>

\*Data collected from Pioneer.com GDU Calculator 4/26 - 9/19

Daily temperatures with a high of 65°F compared to 85°F and lows at or below 50°F, results in a difference of 10 GDUs accumulated per day. This can make a big difference at this point in the growing season because it will greatly influence the rate of drydown. Silage harvest is nearly completed and our focus will quickly turn to corn grain and soybean harvest, which started in pockets of the region last week. Reports of corn moistures ranging anywhere from 19-25% in early maturing hybrids or fields that prematurely died due to drought conditions. I would suggest to start monitoring moisture levels in both corn and soybean because the grain may be at lower moistures than anticipated. Primarily focus on stressed fields that prematurely died compared to fields that matured normally and still holding green foliage in the upper canopy. Stalk integrity continues to be a primary concern while walking fields last week due to an increase in stalk rots that compromise the structure of the stalk. Read below for further details on monitoring late-season stalks and minimizing losses during corn harvest.

## Stalk Integrity- Prioritizing Harvest

Extended drought conditions during the growing season throughout central and northern MN have created stresses on the corn crop that are causing standability concerns as harvest approaches. Why does this occur?

- Carbohydrate demand is high in the developing ear. Environmental stresses (drought, insect/disease pressure, hail) decreases the amount of carbohydrates that can be produced via photosynthesis. Therefore, the plant robs reserves in the leaves, roots, stalk, and shank to support ear development.

Ultimately, the corn plant’s structural integrity can be comprised, as well as its ability to fight off stalk and root rots such as fusarium, gibberella, or anthracnose. If you are observing stressed fields as the corn crop approaches physiological maturity, then start monitoring plants to help diagnose and prioritize high risk fields for early harvest.

This can be done via the “pinch/push” test. What does this look like?

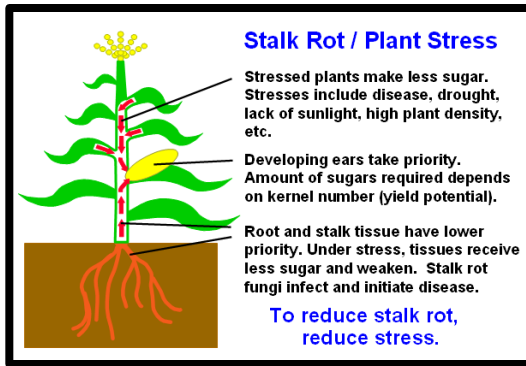
- Pinch- Attempt to pinch together the lower 1-3 internodes of the plant.
- Push- Physically push the plant at the ear across the row.
- Conduct the test on 20 consecutive plants in several areas of the field.
- Plants that “fail” the test will have stalks that pinch together or buckle when pushed.
- Fields with >10-15% plants that fail should be prioritized for early harvest.

Another way to analyze stalk integrity is to split a stalk in half and inspect the inner tissue. If the inner tissue is pulling away at the bottom 1-3 nodes (leaving the vascular bundles visible) or if you notice any discoloration due to stalk rots, then late-season standability may be a concern.

### Nick Schimek’s Contact Information

Phone: (507) 525-6297 Email: [nicholas.schimek@pioneer.com](mailto:nicholas.schimek@pioneer.com)

Twitter: @Nick\_Schimek and @Pioneer



Butzen, S. Pioneer Agronomy Sciences Crop Insights  
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## Corn Moisture & Harvest- Minimizing Losses

I know late September seems early for corn harvest, but weather conditions throughout the growing season have pushed the crop 2+ weeks ahead of normal. With corn harvest approaching, the first question 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 tune 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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