AGRONOMIC Spotlight
Technology Development by MONSANTO

Corn Drydown Rates - Northern Plains

Choosing the corn moisture content for harvest is often an economic decision that weighs excess harvest losses against the energy costs for drying corn. Other factors, such as stalk strength or the presence of ear rots, should also be considered when determining the target harvest date. Harvesting early may be a good practice since field losses can increase when harvest is delayed as well as when the crop dries down after maturity. Since energy costs are currently lower than in past years, growers may find it even more advantageous to harvest corn early this season.

Corn Maturity and Drydown

When corn reaches physiological maturity at black layer, it is around 30% moisture. There are many factors that can affect how quickly corn dries down in the field after reaching maturity. Warm, dry weather can speed up the drying rate, whereas wet and cool weather can slow it down. Additionally, late-planted and full-season corn products tend to dry more slowly.

Waiting to harvest until corn reaches 18% moisture may bring more harvest losses this year.

In general, it takes about 30 growing degree units (GDUs) per point of moisture to dry corn from black layer to 24% moisture content. Typical drying rates may range from 0.4% to 0.8% loss of moisture content per day. Rates of drydown vary depending on temperature and moisture levels. Research from the University of Minnesota indicates grain may lose moisture at a rate 0.8 points per day during the first half of September, and only 0.5 points per day for the last half of the month (Table 1). The rate of moisture content loss continues to decrease as temperatures cool and days get shorter. Studies from Purdue University show this relationship, where 0.5% moisture content is lost in a day when the mean GDU accumulation is 12 and 0.75% moisture content is lost in a day when the mean GDU accumulation is 22 (Table 2).

Knowing the grain moisture content at maturity can help predict grain moisture at different potential harvest dates (Table 3). A year with wet weather and delays in planting may result in slower field drying of corn. However, if enough growing degree units (GDUs) accumulate that may speed up the drying process. Other factors may also come into play if harvest is delayed. For example, corn could have developed a shallow root system because of the early season moisture. In addition, conditions may have been conducive for the development of stalk rots and stalk cannibalization in corn. These factors could lead to higher than normal harvest losses because of an increased risk for stalk lodging in corn this fall.

Germplasm Characteristics

Ear and husk characteristics of different corn germplasm can affect the rate of drydown. These characteristics have the largest effect when weather conditions are unfavorable for rapid grain drying.

- **Number and Thickness of Husk Leaves.** Fewer husk leaves and thinner leaves can lead to faster moisture loss.
- **Dieback of Husk Leaves.** Earlier dieback of husk leaves can lead to more rapid grain drying.
- **Husk Coverage of the Ear.** Husks that are open at the tip of the ear may provide for quicker grain moisture loss.
- **Tightness of Husk Leaves.** Looser fitting husks on the ear can lead to faster grain drying.

to pg. 2

from previous page

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- **Ear Angle.** Ears that droop from an upright position after maturity tend to lose moisture more quickly. Upright ears can capture additional moisture from rainfall.
- **Properties of Kernel Pericarp.** Thinner pericarps (outer layer covering a corn kernel) have been associated with faster drying rates in the field.

Harvest Loss

The optimum harvest moisture content for corn is approximately 23% to 25%. At this moisture level, kernels shell easily and stalks generally stand better, which can make harvesting more efficient. A normal level of harvest loss is about 1 to 2% with a timely and efficient harvest.

Delaying harvest until corn dries down to 17% to 19% moisture content can save on artificial drying costs. However, as corn dries down in the field there is greater potential for excess harvest losses from stalk lodging and ear drop. Most harvest losses are mechanical, caused by kernel shattering or corn never getting into the combine. Allowing corn to drydown in the field could lead to excess harvest losses, as much as 2 to 8% above the normal level with a timely and efficient harvest.

If stalk lodging or ear drop problems are observed, harvest timing will be more critical to maximize yield potential. Take the time to watch the crop condition in the field in an effort to balance field drydown with harvest losses.

Sources: J. Coulter. 2008. Maturity, Frost, and Harvest Moisture Considerations for Corn. Minnesota Crop eNews. Univ. of Minnesota Extension; R. Elmore and L. Abendroth. 2007. How Fast Can Corn Drydown? Iowa State Univ. Extension; D.R. Hicks. 2004. The Corn Crop—Frost and Maturity. Univ. of Minnesota; R.L. Nielsen 2008. Field Drydown of Mature Corn Grain. Purdue University. Corny News Network.

Table 1. Approximate field drying rates of corn.

Date	Grain moisture (%) loss per day
September 15-25	0.75-1.00
September 26-October 5	0.50-0.75
October 6-15	0.25-0.50
October 16-31	0.00-0.33
November 1 and later	little if any

(Source: Hicks 2004)

Table 2. Average rate of grain moisture content loss in relation to average daily heat accumulation.

Mean daily GDU accumulation during drydown	Grain Moisture (%) loss per day
12	0.5
17	0.6
22	0.75

Data compiled from Purdue University Agronomy Research Center.

Table 3. Predicted grain moisture at harvest for various maturity and harvest dates*.

Harvest Date	Date of Maturity		
	20-Sep	24-Sep	28-Sep
	Predicted grain moisture at harvest (%)		
5-Oct	20.9	24.4	27.1
10-Oct	19.0	22.5	25.3
15-Oct	17.1	20.6	23.4
20-Oct	16.3	19.8	22.6
25-Oct	15.5	19.0	21.7

*Using average drydown rates in Table 1 and assuming 31.5% grain moisture at maturity.

(Source: Coulter 2008)