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Predicting Corn Silage Harvest Dates

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One of the more difficult management decisions when producing corn silage is properly timing harvest. Corn silage that is too wet will yield less, result in silo seepage and produce a sour tasting silage resulting in lower intake by livestock. If corn silage is too dry then yield is often reduced, heat damage and mold more easily develops in the silo because fermentation is inadequate, and the silage has lower protein, digestibility and the vitamins A and E.

Traditionally, most farmers would begin chopping corn silage around September 15. Observations over the last 4 years indicate drydown rates between years vary dramatically. For example, between 1996 and 1999 in Manitowoc County, the date when corn silage moisture dropped to 65% was as early as September 6 and as late as October 3 (Figure 1). Farmers who chop their own corn silage and those who hire custom operators often have the dilemma of predicting when a field will be ready to chop. Below are a few suggestions for predicting when to begin harvest. Good communication with a custom operator is essential as harvest date draws near.

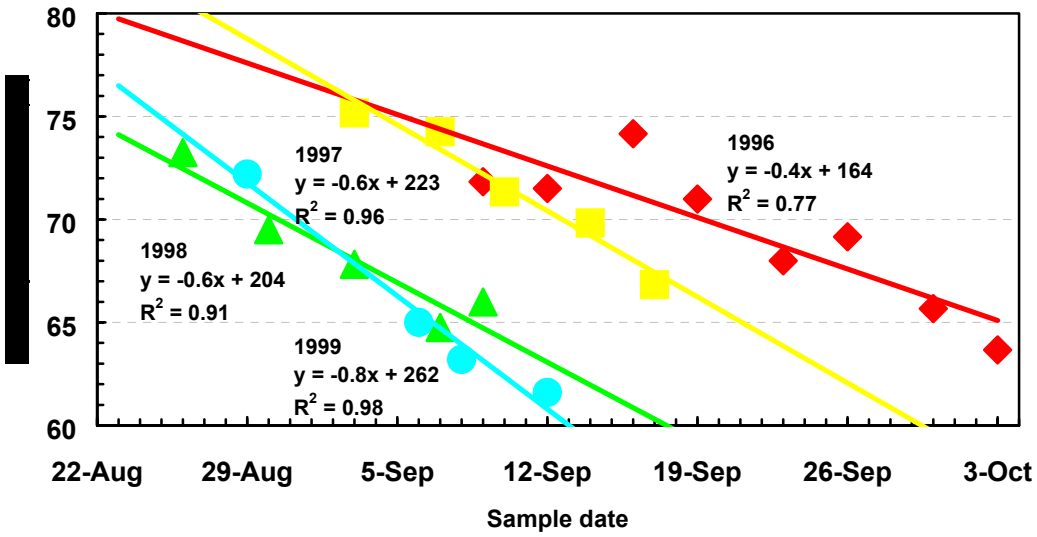

Figure 1. Rate of corn silage drydown in Manitowoc County between 1996 and 1999.

Environment significantly influences the rate of drydown and start date for silage harvest. Wet cool weather will slow drydown rate while hot, dry weather will speed drydown rate. Table 1 describes the rates of drydown observed in various Wisconsin counties since 1996. The silage production years of 1998 and 1999 were above normal for heat accumulation and were characterized as rapid drydown years for both grain and silage in numerous counties.

Table 1. Corn silage drydown rate (% moisture per day) for various counties in Wisconsin.

County	1996	1997	1998	1999
Chippewa	---	0.4	---	---
Dodge	---	---	0.7	---
Fond du Lac	---	---	---	1.0
Jefferson	---	0.6	0.7	1.0
Manitowoc	0.4	0.6	0.6	0.8
Shawano	---	---	---	0.6
Sheboygan	---	0.8	---	---
Wakesha	---	0.6	0.9	---
Washington	---	---	---	0.7

Pre-season
Greatest corn grain and silage yield potential is with full-season hybrids. Reaching physiological maturity (black layer) before a killing frost is not as critical for corn silage as it is for grain production. Select and plant hybrids that vary in maturity. This helps spread the risk associated with plant stress during pollination. It will also spread the grain and silage harvest windows. For fields intended to be chopped for corn silage, hybrid maturities can be 5-10 days longer season than what is typically grown for grain on the field.

Planting season
Plant full-season hybrids first. Note date and maturity of the hybrid planted. Some producers plant an "ultra" short-season hybrid (i.e. 75 d) early silage harvest, so that fermented feed can be continued in the dairy cow ration during early fall.

In-season
Note silking date. Silking date is the first indicator for predicting date of harvest for grain or silage uses. It can be used to predict which fields are developing ahead of schedule. Among corn hybrids the grain filling period is rather consistent regardless of maturity. Hybrids differ in maturity during the vegetative period of their development (planting to silking). Grain filling in Wisconsin usually lasts about 55-60 days after silking. The dent (R5) stage occurs 35-42 days after silking and black layer formation (R6) occurs 55-60 days after silking. Usually silage harvest begins shortly after half-milk line on the kernels. The half-milk line stage occurs about 13 days prior to black-layer (Wiersma et al., 1993). Thus, the predicted start date of silage harvest (half-milk line) occurs 42-47 days after silking.

Once the kernel milk line begins to move down the kernel following the dent stage (R5), the fields intended to be harvested for silage should be sampled for moisture. The "trigger" to start sampling for moisture depends upon the silage storage structure (Table 2). Once the moisture for the field is known use a dry-down rate of 0.5% moisture loss per day to predict when the field will be ready for the storage structure.

For example, a field of corn that will be stored in a concrete stave silo at 65% should be checked for moisture when kernel milk equals 60%. Let's say the forage moisture of this field was found to be 68%. This field should be harvested beginning [(68-65)/0.5 =] 6 days after sampling.

Table 2. Kernel milk stage "trigger" to begin sampling for various silage structures.

Silo structure	Recommended moisture content for ensiling	Kernel milk stage "trigger"
	%	%
Horizontal bunker	70 to 65	80
Bag	70 to 60	80
Upright concrete stave	65 to 60	60
Upright oxygen limiting	60 to 50	40

"trigger": kernel milk stage to begin checking silage moisture

Silage moisture decreases at an average rate of 0.5% per day during September

Harvest season
As a final check, the field should be sampled 1-2 days prior to harvest to determine if the silage moisture is proper for the storage structures described in Table 1. Follow recommended theoretical length of cut guidelines and make sure that good packing takes place to ensure adequate fermentation and storage.

Summary
The following in-season guidelines can be used to predict corn silage harvest date:

1. Note hybrid maturity and planting date of fields intended for silage.
2. Note silking date. Half milk of the kernels will typically occur about 42 to 47 days after silking.
3. Once kernel milk line begins to move, measure moisture of fields intended to be harvested for silage. Use 0.5% per day to predict date when field will be ready for the storage structure.
4. Final check prior to chopping.

Numerous management decisions need to be made for producing high yielding, high quality silage. All will be for naught, however, if the silage cannot be chopped, stored and ensiled at the proper moisture to allow for adequate fermentation and storage.

Literature Cited

Wiersma, D. W., P. Carter, K. A. Albrecht, and J. G. Coors. 1993. Kernel milkline stage and corn forage yield, quality, and dry matter content. J. Prod. Agric. 6:23-24, 94-99.