Harvesting and Pricing Variable Maturity Corn Silage in 2022

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Most corn silage is going to be of extra variable yield and quality this year, which will make harvest management and pricing the standing crop more difficult.

2022 has been a challenging year to grow corn in the North Country; generally, it's been too wet in the west and too dry in the east. Extremely wet weather for the western part of the region delayed or prevented field fitting and corn planting in May and June. Saturated soil conditions continued into June and early July, further delaying late corn planting, limiting young plant development and drowning portions of fields. Despite this poor start, some corn fields look remarkably good, almost normal. But many of these western fields are well behind and may be sporting some version of the 'rollercoaster' look – with bare spots, acres of plants at variable heights and maturities and even some replanted areas. Some fields, or parts of fields, will probably not reach full maturity while the best parts may. In those 'rollercoaster' fields, some corn plants will have normal ears; some plants may have unusually small ears or poor grain fill, or even no ears at all, at harvest time.

Many fields on the eastern side of the North Country have been very dry this year, receiving well under normal precipitation. Droughty weather early in the season, before silking, reduces overall corn plant size, number of kernel rows on the ear and silage yield but improves fiber digestibility. Drought stress just before silking or at pollination may reduce the number of kernels per row, resulting in partially empty ears and reduced grain yields. Droughty weather after silking reduces ear development and grain fill, grain yield, overall silage energy content and digestibility. Wet weeks during grain maturation and whole plant dry down usually slow the maturation process.

Several key points about managing the 2022 corn silage harvest, including how to value standing corn, are discussed here.

Silking dates are a key management tool and should be recorded for all fields, every year, to help estimate subsequent harvest timing. Dr. Bill Cox at Cornell determined that corn requires 750 to 800 $GDD_{86/50}$ from silking, to reach 32% moisture, nearly harvesting stage. Monitoring $GDD_{86/50}$ accumulations from silking date will help prioritize and order fields for chopping. Variable development and maturity this year will present some additional challenge, and importance, for this tool. It's difficult to evaluate maturity of a variable field but give it a good effort. Scout thoroughly to gauge the dominant maturity level in the field. Note areas of significant departure from that dominant condition in case portions may be left, combined with other fields, ensiled separately, etc.

Table 1 below lists approximate calendar dates when 750 to 800 $GDD_{86/50}$ typically accumulate, after 4 different silking dates, for 11 different North Country locations. For example, if a field

near Westport has a silking date of about July 27, then it would be expected to reach 32% DM between Aug 31 and Sept 2 in a normal year. Maturity dates that fall in the normal range of first frost dates are shown in blue. In many of these locations, fields silking after August 3 or so may not reach silage maturity before the first frost. If fall weather turns cooler than normal, many more fields may not reach silage DM.

Table 1. Approximate date range to reach 32% DM corn silage for 11 North Country locations given silking dates of July 20, 27, August 3 or 10th. Date ranges when 750 to 800 $GDD_{86/50}$ typically accumulate are listed for each location. Maturity dates in or after the range of normal first frost date (32 °F) are listed in blue.

	Silking Date							
	July 20		July 27		August 3		August 10	
Location	**+750**	**+800**	**+750**	**+800**	**+750**	**+800**	**+750**	**+800**
Westport	Aug 23	Aug 25	Aug 31	Sept 2	Sept 8	Sept 12	Sept 23	Sept 27
Peru	Aug 24	Aug 26	Sept 2	Sept 4	Sept 11	Sept 15	Sept 25	Sept 29
Churubusco	Aug 29	Sept 1	Sept 10	Sept 14	Sept 23	Sept 28	Oct 13	Oct 30
Moira	Aug 25	Aug 28	Sept 4	Sept 7	Sept 14	Sept 19	Sept 27	Oct 4
Madrid	Aug 26	Aug 29	Sept 5	Sept 8	Sept 15	Sept 19	Sept 28	Oct 5
Edwards	Aug 28	Aug 30	Sept 6	Sept 10	Sept 16	Sept 21	Oct 1	Oct 8
Hammond	Aug 25	Aug 28	Sept 3	Sept 6	Sept 13	Sept 17	Sept 26	Oct 2
Philadelphia	Aug 25	Aug 28	Sept 3	Sept 6	Sept 13	Sept 17	Sept 26	Oct 2
Denmark	Aug 27	Aug 29	Sept 5	Sept 9	Sept 16	Sept 20	Oct 1	Oct 9
Ellisburg	Aug 25	Aug 28	Sept 3	Sept 6	Sept 13	Sept 17	Sept 27	Oct 3
Talcottville	Aug 31	Sept 3	Sept 10	Sept 15	Sept 22	Sept 27	Oct 13	Oct 28

Now, accurately estimating yield and quality of this year's variable crop will require more intensive sampling than normal. Our fields don't look like they normally do, so visual estimates may be extra inaccurate. Dr. Larry Chase, retired from Cornell University, emphasized some key points to keep in mind during corn silage harvest in this sort of wet, variable and immature corn year. It's worth repeating his main points here.

Estimating corn silage yield is extra challenging when fields are immature and/or variable. Count, weigh and sample corn plants in 1/1000th of an acre. For fields planted on a normal 30" spacing, a 17'5" row length provides this sample. Twenty-inch rows require a 26'2" sample and 15" row spacing requires 34'10" sample. A highly variable field will require more of these samples than a consistent field, to get a good estimate. If 3-5 samples are adequate in a typical year, use 6-10 samples in a variable or odd field this year. Average across samples within a field.

Estimating value for corn silage when it is so variable - is tough. The sale price of variable maturity or immature corn silage will depend on yield, dry matter content and nutrient composition. Dr. Bill Weiss at Ohio State indicates that immature corn silage is worth about 85% of the economic value of normal corn silage – *if it is the same dry matter content*. Mike Hunter calculated pricing over several years and concluded that our standing 35% DM corn silage price per ton is, on average, 8.34 times the per bushel corn grain price. This fall, the market corn grain

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price is about $6.50 per bushel, so standing corn silage should be worth about $54 per ton, 35% DM. Add to that the costs of chopping, trucking, inoculation, ensiling and 10% shrink and the cost of stored corn silage might be about $71 per ton, 35% DM.

If the value of "normal' standing corn silage = $54/ton (@ 35% DM)
Then the value of immature corn silage = $54 * 0.85 = $46 (@ 35% DM)
If the actual dry matter of the standing immature corn silage is only 27%, then the adjusted price = 27/35 *$46 = $35.50/ton.

How many tons per acre are standing in your field? When using any of these calculations to value standing corn silage, consider that estimating yield of the standing crop may be the most uncertain component in your calculations – especially this year. Therefore, it may be best to measure yield, with a calibrated yield monitor or by counting and weighing trucks or wagons rather than estimate yield, even with intense sampling described here. Yields are lower for drought-stressed, wet-stressed, late-planted immature fields, therefore harvesting costs, on a per ton basis, are increased.

Nutritional value of an immature and/or variable crop will present another challenge. In addition to variable moisture content, nutrient composition of the corn silage will also vary with maturity and with weather patterns, so periodically collect samples of the chopped forage during harvest to provide information on the nutrient content of the silage for use in ration balancing. Proper moisture content for good fermentation is always key. Less mature corn is likely to be higher in crude protein, higher in fiber, higher in sugar and lower in starch than normal corn silage. Because the fiber in immature corn is more digestible, the energy value of immature silage may be 85-95% of normal, despite the significantly lower starch content. Drought-stressed corn will ferment fine if the DM is right, but DM may vary across a field. Drought-stressed corn may also be high in nitrates, so ferment well and test for nitrates prior to feeding. A wet chemistry nutritional analysis may be more accurate than NIR analysis of immature corn since NIR calibrations for corn silage are based on mature silage composition.

If possible, store different maturities of silage separately, so you can feed them accurately, and work with your nutritionist to determine the best use for your variable maturity or immature corn silage.

Additional resources:

1. Using the Number of Growing Degree Days from the Tassel/Silking Date to Predict Corn Silage Harvest Date. Cox, W. 2006. What's Cropping Up 16(4):1. http://climatesmartfarming.org/wp-content/uploads/2017/01/GDD-for-silking-to-silage-Cox-Cornell-2006.pdf
2. Pricing Drought-Stressed and Immature Corn for Silage. Weiss B. et al. Ohio State Buckeye Dairy News 13(4) https://dairy.osu.edu/newsletter/buckeye-dairy-news/volume-13-issue-4/pricing-drought-stressed-and-immature-corn-silage
3. Working with Immature Corn Silage. August 2013. Dr. L. E. Chase, Cornell University. https://nydairyadmin.cce.cornell.edu/pdf/newsletter/pdf48_pdf.pdf

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4. Pricing Standing Corn Spreadsheet. Beck et al. Penn State Cooperative Extension. https://nydairyadmin.cce.cornell.edu/uploads/doc_379.xls

For more information about field crop and soil management, contact your local Cornell Cooperative Extension office or your CCE Regional Field Crops and Soils Specialists, Mike Hunter and Kitty O'Neil.

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