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Adjusting Corn Silage Contracts for the 2019 Season

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The Kernels

- Due to late-planting in 2019, corn grain yields will be variable prompting the question "What is corn silage worth this year?"
- A fair price must be negotiated from the seller's (minimum to accept) and buyer's (maximum to pay) perspectives.
- UW extension personnel have developed a spreadsheet and a mobile phone app to make this process easier.
- A different starch content approach is described to arrive at a fair price in challenging years.

Grain producers and dairyman annually debate the question, "What is corn silage worth this year?" This question will be even more important in 2019 because grain yields will be all over the board due to late planting. With variability in corn maturity and quality comes variability in price. Most farmers want a pricing method that's simple yet justifiable.

Most grower-dairyman silage contracts are based upon prices determined at some point during the growing season using CBOT and CME grain markets. A fair price must be negotiated from the seller's (minimum to accept) and buyer's (maximum to pay) perspectives. Buyers and sellers need to consider local market conditions that will influence the final negotiated price.

In most years there are about 8 bushels of corn grain in a ton of corn silage. However, significant variation in this number is caused by the production season, forage moisture, and the actual grain-to-stover ratio.

Often, the recommendation is to multiply the price of grain corn times 7.5, 8 or 8.5 to get the comparative price per ton for wet silage. It usually is a good estimate because the cost of grain harvest (a savings) is near equally offset by the value of additional nutrients and organic matter removed in the silage crop (a cost).

Seller's perspective

When pricing corn for silage, it's best to first approach the transaction from the seller's perspective. The seller (grain producer) has opportunities with marketing grain and opportunities with marketing stover (i.e. bedding, fertilizer value, decreasing soil erosion, etc.). Generally, the seller is not going to price the crop for less than what could be made if it was harvested and sold for dry grain. An exception is when the crop won't reach maturity for dry grain harvest.

The seller starts with the value of the standing corn minus grain harvest costs. The price is adjusted for the value of phosphorous and potassium harvested in the stover. To derive the fair market price for corn silage, calculate the potential gross income from grain (price x yield); subtract grain harvesting costs including combining, trucking, drying, storage, and harvest loss; then add back the fertilizer value of the stover being removed. The result from these calculations is then divided by the estimated corn silage yield to give an equivalent price per ton that equals the net grain return.

Buyer's perspective

The buyer (dairyman) starts with the price of standing corn and adjusts for quality and harvesting costs. The buyer usually assumes harvesting costs when corn is standing and adjusts the value of corn silage based on what it would cost to purchase corn and straw to replace the nutritional value of corn silage. Forage quality adjustments can be derived through opportunities with marketing milk. Some corn, like brown midrib hybrids (bmr), have more stover value than non-bmr hybrids.

These calculations are often more work than many people want to deal with. UW-Extension has developed a spreadsheet to make this process easier. The spreadsheet can be downloaded at: http://corn.agronomy.wisc.edu/Season/DSS/UWEXC ornSilagePricingDecisionAid_v2018Jun07.xls. The UW-Extension has also made available a similar mobile phone app (search for “corn silage pricing”).

Grain price drives the process

Keep in mind that the seller's equivalent net return for grain price is essentially a floor, or minimum price. From the buyer’s perspective, there may be reason to pay more or the need to look for cheaper alternative feeds.

Corn grain price drives silage price. Both buyer and seller need to first agree on how the base grain price will be determined. Some options include local price on a given date, average of local price on several dates, or using a futures market price. Once a base price is determined, some adjustments may still need to be made.

Finally, sell by the ton; estimating silage yield and selling by the acre will almost always result in someone getting the short end of the cornstalk.

Factors affecting the grain equivalent calculation

Harvest timing can affect grain yield in the forage. Kernel milkline is a good indicator of development and remaining potential grain yield. For example, grain yield can still increase 5 to 12% when the kernel is at 50% kernel milk. No further grain yield increases occur after “black layer” formation at the kernel tip. Make price adjustments for immature corn. The easiest way to do this is to take a percentage of the normal price (for example: use 70 to 80 percent of a normal corn price based on lower silage quality).

Moisture content in forage and grain has a major influence on this relationship and needs to be considered to accurately determine fair forage prices. If the base price is set for 65 percent moisture corn silage, an adjustment must be calculated if the silage is harvested wetter or drier than 65 percent.

Environment can significantly affect the amount of grain in corn forage. Drought can reduce plant stature and affect pollination reducing both grain and forage yield. Sometimes early drought can reduce plant stature, but normal precipitation might relieve stress, and high grain yields occur. Depending upon year, grain equivalents have ranged from 6.4 to 9.4 at a 150 bu/A yield level. Some locations produced consistently higher grain equivalents than others.

Hybrid types evaluated have included bmr, leafy, bioengineered, and conventional hybrids. The range among hybrids for grain equivalents was 6 bu/T (min. hybrid= 4.5 bu/T, max. hybrid= 10.5 bu/T). Brown mid-rib hybrids had significantly lower grain equivalents than conventional or bioengineered hybrids.

A different approach – Using starch content

In order to accurately use grain equivalents in contract negotiations, measurements need to be taken “after the fact” (after silage harvest). Few growers are willing to leave “check strips” in the field. Weather, wildlife and hybrid standability and ear droppage can influence post-silage harvest grain yield measurements.

To deal with variability, corn forage starch content at harvest and be back calculated to determine grain equivalents on a field-by-field or load-by-load basis (Starch method in Table 1). This would allow for a much more accurate estimation of corn grain produced in a field regardless of circumstance and a fairer method for payment.

Assuming that starch is 70% of the grain, we can back calculate grain equivalents using starch content and forage yield (Starch method in Table 1). This method consistently underestimated true grain yield equivalents. The difference (or bias) between these two methods was affected by the grain yield level. However, by using a forage yield measurement, a more accurate contract could be arrived at between grain producers and dairymen.

Table 1. Corn grain equivalents (15.5% moisture) per ton of silage (65% moisture).

Grain Yield	Forage Yield	Starch content	Grain equivalents (1972)	Grain equivalents (Revised 2016)	Grain equivalents (Starch method)	difference
Bu/A	T DM/A	%	Bu/T	Bu/T	Bu/T	Bu/T
Less than 90	3.8	20.9	5.0	5.1	4.4	0.7
90-110	5.4	27.3	5.5	6.6	5.8	0.8
110-130	6.0	29.0	6.0	7.1	6.1	1.0
130-150	6.7	30.4	6.5	7.5	6.4	1.1
150-170	7.3	31.4	7.0	7.8	6.6	1.2
170-190	7.9	32.2	7.0	8.1	6.8	1.3
190-210	8.6	32.6	7.0	8.3	6.9	1.4
210-230	9.3	32.6	7.0	8.5	6.9	1.6
230-250	9.9	32.4	7.0	8.6	6.8	1.8