

## Guidelines for Pricing Corn Silage and Earlage from Immature Corn

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The weather challenges leading to late planting season last spring (2013) have raised a concern about some fields of corn reaching maturity in some locations in Michigan this fall. It may not be practical to harvest the late maturing corn as grain corn. Alternatives may exist including harvesting as silage or earlage even if this harvest method is at a reduced price rather than taking the risk of a killing frost before the crop matures. If the crop is insured under one of the USDA/RMA facilitated COMBO insurance plans (Yield, Revenue Protection or Revenue Protection with Harvest Price Protection), check with your insurance crop agent about the options available.

This article describes the nutrient values of corn using different harvest, storage, and processing methods and suggests benchmark pricing methods which might be used to initiate negotiate discussions between cash crop producers who have later maturing corn for sale and livestock producers who can use the corn for feed and have the harvest and storage capacity to handle the corn as corn silage or earlage.

The nutrient content of corn for beef cattle for different harvest, storage, and processing models is described in Table 1. Corn silage harvested before black-layer formation (immature corn silage) has a feed energy value similar to normal silage but will likely have less tonnage per acre. Harvesting the ear is another option. Several terms have been used to define harvest of the ear. Corn and cob meal results from harvest of only the ear and has very little contamination from the husks, leaves and tassel. Earlage generally contains the ear and husks with small amounts of leaf and tassel material. Snapped ear corn is harvested by placing a snapper head on a silage chopper which harvests the ear, husks and a significant amount of leaves and tassel. As leaf and tassel material in the corn and cob meal increases, the energy value decreases.

**Table 1. Nutrient content of corn using different harvest, storage, and processing methods.**

Corn type	Dry matter	TDN, %	NE <sub>m</sub> , Mcal/lb	NE <sub>g</sub> , Mcal/lb	CP, %	Escape protein, % of CP
Dry Rolled Corn	86	90	1.02	0.70	9.8	60
Ear Corn	87	83	0.92	0.62	9.0	60
Steam Flaked Corn High	82	94	1.06	0.73	10.0	45
Moisture Corn High	75	90	1.02	0.70	10.0	40
Moisture Ear Corn	75	83	0.92	0.62	8.7	40
High Moisture Snapped Corn	74	81	0.90	0.59	8.8	40
Corn silage, few ears	29	62	0.63	0.36	8.4	25
Corn silage well-eared	33	70	0.77	0.49	8.7	30

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*Table adapted from NRC (2000) and Stock, R., R. Grant, and T. Klopfenstein (1995) Average composition of feeds used in Nebraska. G91-1048-A. University of Nebraska.*

## **Corn Silage**

A starting point for pricing corn in the field as corn silage is to agree on a price and terms. There are many schemes for pricing corn silage but a common one for, pricing corn at the feedbunk, is the local price of No. 2 corn x 10. This price is typically contingent on moisture / dry matter content and other terms. There are many “approaches” for pricing corn silage but that is an article for another day.

Typically, silage from late planted corn will be priced standing in the field. Thus, we need to start at the feedbunk and work backwards to the field. Thus, the participants have the challenge of estimating the costs incurred from harvesting through storage including shrink to arrive at a price at the feedbunk. Also, more often than not the cash crop and livestock producers are trying to arrive at a price/acre (yield x price/ton).

A common starting point for estimating costs is custom rates being charged for the tasks that have to be completed. Several states have either conducted surveys and/or completed estimates of these costs. For Michigan, we start with a download of [Custom Machine and Work Rate Estimates](#) for Michigan a common starting point for estimating costs is custom rates being charged for the tasks that have to be completed. This report contains estimates for silo and bunker filling tasks including tasks separated out from harvest through filling and packing to complete operations. Additional resources can be found on the [FIRM web page](#). We also have to adjust storage costs including shrink / storage losses which will depend on method. A storage loss in the 16% range for a bunker is a starting point.

**Example:** Assumptions for the example:

- Local corn price that matches corn silage (plant) delivery date): \$4.50
- Corn silage at 32% dry matter / 68% moisture
- Shrink in silo: 17%
- Cost of storage (Structure: depreciation and interest): \$4.25/ton
- Cost of harvesting, hauling, filling, and packing: \$8.69/ton
- Corn silage (plant) yield / acre @ 32% moisture delivered: 12 ton

Calculations:

- Calculate price delivered to feedbunk:  $10 \times \$4.50 = \$45.00/\text{ton}$
- Calculate cost of harvesting, hauling, filling, and packing + storage/ ton:  $= \$8.15 + \$4.25 = \$12.40/\text{ton}$
- Calculate net tons delivered/ton in field  $= 1.0 - \text{shrink} = 1 - 0.17 = 0.83 \text{ ton net} / \text{ton in field}$
- Calculate net value/ton in the field: net tons delivered to feedbunk x price – cost of delivery  $= 0.83 \times \$45/\text{t} - \$12.40/\text{t} = \$24.95/\text{ton in the field} (\$0.077/\text{lb dry matter})$
- Value/acre  $= 12 \text{ ton/acre} \times \$24.95/\text{ton} = \$299.40 / \text{acre}$

The example assumed the nutrient values were equivalent for normal silage and the immature silage. Typically, the price used in the calculation would be adjusted by an estimate of the relative energy values. For example, a 95% ratio would have implied a value of \$24.95/ton based upon reducing the value of silage from \$45.00 to \$42.75/ton. As you can see, the guidelines provide a starting point for discussions with the ultimate price likely depending upon the specific parameters and the needs and opportunities of both parties.

A challenge will be establishing the tons/acre. A common measure is typically based upon loads if there is a way to measure loads and approximate moisture content.

### **Earlage**

Earlage is more difficult to price because of the variable amount of leaves and tassels in the various forms and there is not an established industry standard for pricing relative to US No. 2 corn. Earlage is ensiled corn grain, cobs and, in some cases, husks and a portion of the stalk (depends on the harvest method). Earlage is higher in energy than corn silage, but it has lower energy than dry or high-moisture corn grain.

Depending on the material being ensiled and the harvest equipment, you also may hear the following terms: (1) snaplage: This term describes ensiled corn grain, cobs and husks typically harvested with a forage harvester equipped with a corn snapper header so that only the ear and a portion of the ear shank is removed, chopped and ensiled or (2) high-moisture Ear Corn or Corn and Cob Meal: This refers to corn grain and cob material that is harvested with a combine set to return the grain and a portion of the ground cob to the hopper. See Lardy, G. and V. Anderson, 2010, Harvesting, Storing and Feeding Corn as Earlage AS-1490 NSDU [www.ag.ndsu.edu/pubs/ansci/livestoc/as1490.pdf](http://www.ag.ndsu.edu/pubs/ansci/livestoc/as1490.pdf) for additional background. There may be more approaches to storage of earlage than corn silage.

Typically, earlage is priced off corn grain based upon their relative energy values (Table 1). Adjustments for livestock producers who are purchasing earlage “on the stump” follow the same logic as described for corn silage.

**Example:** Assumptions for the example:

- Local corn price that matches earlage delivery date): \$4.50/bu
- Earlage is 38% dry matter / 62% moisture
- Earlage is worth 90% of corn grain delivered at the feedbunk (based upon relative energy values from Table 1)
- Shrink in ensilage storage: 12%
- Cost of storage (Structure: depreciation and interest): \$4.00/ton
- Cost of harvesting, hauling, filling: \$10.00/ton (less confident in these estimates than silage)

Calculations:

- Calculate price delivered to feedbunk:  $0.90 \times \text{No 2 corn/bu} = 0.90 \times 4.50 = \$4.05/\text{bu}$  on a 15% moisture / 85% dry matter basis since No. 2 corn is quoted on that basis.
- Convert to 38% moisture / 68% dry matter on \$/ton basis if that is how loads will be measured:

- Convert to price/lb dry matter:  $(\text{price}/56)/0.85 = (\$4.05/56)/0.85 = \$0.072/\text{lb DM}$
- Convert price/lb DM price to wet basis / ton:  $(\text{DM price} \times \text{DM}) \times 2000 = (\$0.072 \times 0.38) \times 2000 = \$54.72 / \text{ton at 38\% dry matter}$
- Calculate cost of harvesting, hauling, filling, and packing + storage/ ton:  $= \$10 + \$4.00 = \$14.00/\text{ton}$
- Calculate net tons delivered/ton in field  $= 1.0 - \text{shrink} = 1 - 0.12 = 0.88 \text{ ton net} / \text{ton in field}$
- Calculate net value/ton in the field:  $\text{net tons delivered to feedbunk} \times \text{price} - \text{cost of delivery} = 0.88 \times \$54.72/\text{t} - \$14.00/\text{t} = \$40.72 \text{ \$/ton in the field @ 38\% dry matter}$

### Other Considerations:

#### Buyers:

- Buyers should consider offering some guarantee of payment as sellers get nervous when they deliver \$40,000 worth of corn to a farm that will be feeding up the inventory after delivery. Not having prior business connections with person they don't know, and may be more acceptable if a guaranteed note from their lender up to a set dollar amount is provided; others are setting up an escrow account with a third party such as a lender to draw out of as the corn product is delivered.
- Ask the crop owner if there is a mortgage on the crop, and if there is, how the payment should be handled (this will avoid legal hassles down the road).
- Both the buyer and seller need to agree upon a defined procedure of how moisture content of the feed stuffs will be sampled and moisture measured to help in determination of percent moisture for price calculations.
- Be clear on the method and location that will be used to select the price of corn if corn silage and/or earlage are priced off number 2 corn. Often set by selecting a date in the future like the opening bid price on the second Tuesday of November at the local grain elevator.

#### Sellers:

- Consider how the yield will be determined will every load be weighed or random loads be selected for moisture and be weighed. The other alternative is to try to estimate the tonnage of the feed in the silo or pile, this is considered to be a random guess and least desired option.
- What will be the requirements for payment for the purchased feed stuffs? Be clear if you expect payment upon completion of harvest or will you allow some form of installment payment plan. A down payment of 10 to 25% is common with installment payments for the balance of the feed over several months can be advantageous for both seller and buyer. Some farms have selected to set up a 12 month payment plan that takes advantage of the monthly changes in commodity prices to reset payment prices made each month. Delayed payment options can also provide some income management over more than one year and have tax planning value as well.

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