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Guidelines for Pricing Corn Silage and Earlage from Immature Corn

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The weather challenges leading to late planting season last spring (2011) have raised a concern about 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. 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 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.

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

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

Corn type	Dry matter	TDN, %	NE_m, Mcal/lb	NE_g, 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	82	94	1.06	0.73	10.0	45
High Moisture Corn	75	90	1.02	0.70	10.0	40
High 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

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.

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.

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 Mr. Dennis Stein, Farm Management Educator who maintains an up-to-date set at his WWW site. Go to https://www.msu.edu/user/steind/ and download *Custom Machine and Work Rate Estimates*. Dennis has estimates for silo and bunker filling tasks including tasks separated out from harvest through filling and packing to complete operations. 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): $7.50
- 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: $8.25/ton
- Corn silage (plant) yield / acre @ 32@ moisture delivered: 12 ton

Calculations:
- Calculate price delivered to feedbunk: 10 x $7.50= $75.00/ton
- Calculate cost of harvesting, hauling, filling , and packing + storage/ ton: = $8.50+$4.25 = $12.75/ton
- Calculate net tons delivered/ton in field = 1.0 – shrink = 1 – 0.17 = 0.83 ton net / ton in field
- Calculate net value/ton in the field: net tons delivered to feedbunk x price – cost of delivery = 0.83 x $75/t - $12.75/t = $49.50/ton in the field ($0.077/lb dry matter)
- Value/acre = 12 ton/acre x $49.50/ton = $594/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 $46.40/ton based upon reducing the value of silage from $75.00 to $71.25/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 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): $7.50/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 x No 2 corn/bu = 0.90 x 7.50 = $6.75/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: (price/56)/0.85 = ($6.75/56)/0.85 = $0.142/lb DM
  - Convert price/lb DM price to wet basis / ton: (DM price x DM) x 2000 = ($0.142x0.38)x2000 = $107.90 / ton at 38% dry matter
- Calculate cost of harvesting, hauling, filling , and packing + storage/ ton: = $10+$4.00 = $14.00/ton
- Calculate net tons delivered/ton in field = 1.0 – shrink = 1 – 0.12 = 0.88 ton net / ton in field
- Calculate net value/ton in the field: net tons delivered to feedbunk x price – cost of delivery = 0.88 x $107.90/t - $16.00/t = $79 $/ton in the field @ 38% dry matter

Other Considerations:

- Offer some guarantee of payment as sellers get nervous when they deliver $40,000 worth of corn to a person they don't know, and may never meet - routinely some farms are getting a guaranteed note from their lender up to a set dollar amount; others are setting up an escrow account with a third party such as a lender to draw out of as the corn 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).
- 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.