Virtual Beef

ISSN 2291-188X VOLUME NO. 16 ISSUE NO. 61 NOVEMBER 2019

In This Issue

This publication is available in electronic format at www.omafra.gov.on.ca/english/livestock/beef/news.html. Single paper copies may be obtained by calling 1-877-424-1300.

Direct general questions and suggestions to: Megan Van Schaik, Editor at Megan.VanSchaik@ontario.ca or call 519-820-4175. For inquiries regarding content of a specific article contact the author.

Ministry of Agriculture, Food & Rural Affairs

Ontario

The “Pros” of Protein and the Merit of Methionine Supplementation in Late Pregnancy

Madeline Collins and Dr. Katie Wood, University of Guelph

The last trimester is a crucial period for the cow to maintain body condition and body weight before lactation, while supporting rapid fetal growth and development. During this period over 60% of the growth of the calf and associated membranes occurs and nutrient requirements of the cow increase to support this growth (Bauman and Currie, 1980). Traditionally, a protein supplement may be provided to pregnant beef cows and has been shown to improve cow performance (Larson et al., 2014). On lower quality pastures, some producers may feed pregnant cattle an additional protein supplement at or above protein requirements in an attempt to improve dam health and future calf growth. However, this also adds energy to the diet, and it is not known if energy or protein has a greater impact on these factors. In addition, although protein supplementation can positively impact cow performance, it can also increase the nitrogenous waste excreted via feces and urine (Burgos et al., 2010). As the demand on producers to reduce their environmental impact increases, alternative options for oversupplying protein must be explored. One option is direct feeding single amino acids -- which are the building blocks of protein, in order to provide a more complete protein to the animal. Methionine is most likely the first limiting amino acid in forage-fed beef cattle (Waterman et al., 2012). As a methyl-group donor methionine may also impact fetal programming responses, and influence future calf performance. Therefore, a recent trial was completed to assess the influence protein and methionine supplementation has on the performance of pregnant beef cows.

What we did

At the University of Guelph Elora Beef Research Center, ninety-nine cows and thirty-nine heifers were fed one of six diets formulated to either 90, 100, or 110% of total metabolizable protein (MP) requirements (NRC, 2016), with or without 9 g/d of rumen-protected methionine (Smartamine®M, Adisseo Inc.) for 60 days before their expected calving due date (*Table 1).* The cattle were individually fed in a calan gate system and offered a base TMR diet containing straw and haylage. Each individual animal was fed their respective supplement, such that their individual energy requirements for their weight and stage of pregnancy was equal between all protein treatments. Protein was balanced using soybean mean and energy was adjusted using palmitic fat. During the trial, cow performance was measured via body weight change. Pregnancy corrected body weight change was calculated to estimate weight of the cow without the fetus, associated membranes, and fluids (Silvey and Haydocks, 1978). Additionally, blood samples were taken prior to calving to monitor metabolic changes in the cow and total tract digestibility (TTD) was measured to estimate impact on diet digestibility.

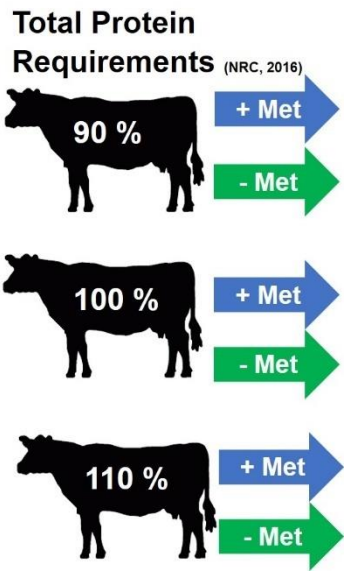

Figure 2: Schematic of treatments allocation for cows and heifers fed for 60 d prior to expected calving due date.

Results

Cows fed at 90% MP requirements lost body weight (see *Table 1*), pregnancy corrected body weight (BW), and had reduced total tract digestibility. When cattle were fed above MP requirements they had higher dry matter (DM), crude protein (CP), acid detergent fiber (ADF) and energy (NEm Mcal/kg) digestibility. Supplemental MET did not affect cow performance; however blood results suggest rumen protected methionine supplementation increased glucose and reduced essential amino acids (EAA), branch chain AA (BCAA), and ketogenic AA serum concentrations (*Table 2*). Increasing dietary protein increased circulating urea concentrations (P <0.001) and reduced NEFA concentrations (P <0.03). This may suggest that although methionine had little impact on large-scale measurement like BW or body condition changes, there were differences in metabolic pathways, where methionine cows has increased glucose availability. If experimental treatments were more extreme this may have translated into performance differences. Neither protein or methionine supplement impacted calf birth. Thus, feeding cows below their MP requirements may limit late gestation performance and minimize forage digestibility.

Table 1. Performance and apparent total tract digestibility of cattle fed at 90, 100, and 100% metabolizable protein content in the diet

Variable	Metabolizable Protein % in Diet		
	90%	100%	110%
Body weight gain (kg)	-5.7[a]	2.8[b]	4.5[b]
Pregnancy corrected BW (kg)	-30.8[a]	-21.9[b]	-22.9[b]
DM % digestibility	66.8[b]	67.2[b]	68.7[a]
CP % digestibility	64.1[c]	67.8[b]	72.0[a]
ADF % digestibility	58.4[b]	58.5[b]	59.9[a]
NDF % digestibility	60.1[ab]	59.6[b]	61.0[a]
Energy % digestibility	72.1[b]	72.3[b]	73.6[a]

[z] Different superscripts differ P>0.05. Methionine did not differ P > 0.10

Table 2. Serum amino acid and metabolite concentration in cattle fed with(without) rumen-protected methionine

	Treatment								
	Metabolizable protein content				Methionine			P-Value	
Variable	90% MP	100% MP	110% MP	SEM	MET +	MET -	SEM	Protein	MET
Total Protein g L^{-1}	69.20	68.67	70.45	1.04	70.09	68.79	0.98	0.09	0.06
Urea mmol L^{-1}	3.42[a]	3.96[b]	4.56[c]	0.25	3.92	4.04	0.24	<.001	0.28
BHBA µmol L^{-1}	312	302	279	13.3	291	305	11.4	0.12	0.29
NEFA mmol L^{-1}	0.68[a]	0.65 [ab]	0.55[b]	0.05	0.62	0.63	0.05	0.028	0.84
Cholesterol mmol L^{-1}	5.05[a]	4.44[b]	3.79[c]	0.20	4.36	4.49	0.19	<.001	0.38
Insulin µg L^{-1}	0.20	0.21	0.22	0.03	0.21	0.21	0.03	0.72	0.95
Glucose mmol L^{-1}	3.66	3.61	3.70	0.06	3.74	3.58	0.06	0.54	0.02
Insulin Glucose ratio	5.76	5.70	5.38	0.84	5.39	5.84	0.78	0.84	0.43
Total Essential AA[z]	1000	1006	992	19.55	977	1022	17.15	0.83	0.02
Non-Essential AA[y]	1575	1531	1466	33.77	1514	1534	30.53	0.01	0.46
Glucogenic AA[x]	1816	1775	1705	37.02	1750	1780	33.43	0.01	0.33
Branch-Chain AA[w]	447	448	441	8.71	432	458	7.27	0.79	0.01
Ketogenic AA[v]	230	227	223	5.13	218	235	4.51	0.48	<0.01

[a,b,c] Means within a dependent variable that have uncommon letters differ (P<0.05). Interaction between protein and methione did not differ (P > 0.1)

[z]Essential AA = Arg, His, Ile, Leu, Lys, Met, Phe, Thr, Trp, and Val

[y]Nonessential AA = Ala, Asn, Asp, Cys, Gln, Glu, Gly, Pro, Ser, and Tyr

[x]Glucogenic AA = Ala, Asn, Asp, Cys, Gln, Glu, Gly, His, Met, Pro, Ser, and Val

[w]Branch chain AA = Ile, Leu and Val

[v]Ketogentic AA = Leu and Lys

Implications in the Beef Industry
This study suggests that feeding beef cows below their metabolizable (MP) requirements was detrimental to performance and digestibility. Weight loss due to MP restriction could negatively impact the cow's ability to lactate and rebreed successfully. Additionally, a reduction in digestibility may limit digestion and absorption of nutrients. Therefore, during late gestation producers should ensure their cattle are supplied adequate metabolizable protein, even when energy requirements are met.

Although methionine supplementation did not impact cow performance or digestibility parameters measured in the study, serum markers indicate that methionine is causing a change in glucose and AA metabolism in late gestation. However, this study yielded no evidence that methionine can replace additional protein in the diet to improve cow performance or apparent total tract digestibility during late gestation. Current work is underway evaluating the impacts of these treatments on offspring performance as a result of late gestation protein and methionine supplementation.

---------- VB ----------

Madeline Collins and Dr. Katie Wood
University of Guelph, Guelph

---------- VB ----------

Nitrates in Silage

Christine O'Reilly, Forage and Grazier Specialist, OMAFRA

Fast-growing crops can accumulate nitrates under dry weather conditions. This is most common in corn, but sorghums, sudangrass, millets, cereals, and Italian ryegrass can all accumulate high levels of nitrates. The risk of nitrate accumulation is higher this year due to growing conditions. Deadly nitrogen gases from high-nitrate forages can be produced during ensiling and silos should not be entered for at least three weeks after harvest. When fed, high nitrate concentrations in forages can cause nitrate poisoning in livestock. Nitrate poisoning negatively affects animal health and productivity but there are ways to manage the risk.

Why are high nitrate levels a problem?
Nitrogen oxide gases (NO, NO_2, N_2O_4) can form from the breakdown of nitrates during ensiling. High-nitrate forages can lead to greater releases which can quickly reach lethal levels. Nitrogen oxide gases are heavier than air, may be reddish or yellow-brown in colour, and have a bleach-like smell. Nitrogen oxide gases will accumulate in low-lying places, such as around the base of a silo or in the feed room below a tower. When ensiling forage that may have high nitrate concentrations, do not enter the silo for at least three weeks after harvest. If you must enter the silo to level or cover the silage, do it immediately after filling and leave the blower running while anyone is in the silo.

Nitrates (NO_3-N) in forage are converted to nitrites (NO_2-N) in the rumen. Normally, the nitrites are quickly converted to ammonia (NH_3-N) by rumen bacteria and is absorbed into the blood stream to be excreted with urine. When there are high levels of nitrates in the feed, the rumen microbes cannot keep up with nitrite production. The nitrites form methemoglobin in the blood, which reduces oxygen-carrying capacity. Signs of acute nitrate poisoning in animals include staggering, vomiting, laboured breathing, blue-grey mucous membranes, and death (typically within three hours). Chronic nitrate poisoning often appears as reduced weight gain, early-stage abortions, and premature births.

Which growing conditions elevate nitrates in crops?
There are several factors that are known to increase the risk of high nitrates in fast-growing crops and weeds:

- **High soil nitrogen fertility.** This could be from fertilizers, manure applications, legume plow-down crops or winter-killed alfalfa.
- **Hail, frost, or prolonged cloudy weather.** Under these conditions plant roots are taking up nitrates, but the leaves are unable to turn those nitrates into amino acids fast enough to prevent accumulation.
- **Periods of dry weather followed by a rain.** Nitrates move with soil water into the roots, so a flush of water after a dry spell will move lots of nitrogen into the plant. It takes 5-7 days for the crop to metabolize all that nitrate, so concentrations are highest during the first week after the rain event.

While the above conditions are good general guidelines, growing conditions in 2019 have added some complexity to the crop nitrate puzzle. In fields where smearing and compaction at planting have affected root development, the crop may experience moisture stress even under normal levels of precipitation. Fields showing symptoms of moisture stress may be at risk of accumulating nitrates following a rain that revives them.

What can producers do to manage nitrates?

Proper fermentation can reduce nitrate levels by 25-65%. It is important that the crop is at the correct moisture level for the silo being used (*Table 1*). If the crop is too wet or too dry it will not ferment properly, and the nitrate concentration will remain high. Baleage is generally too dry to ferment completely, so do not expect baleage to reduce nitrate levels as much as ensiling. Nitrate levels are stable in dry hay; if they are high at harvest, they will always be high.

Table 1. Correct moisture content for silage crops.

Type of Silo	% Moisture Content	% Dry Matter Content
Horizontal (bunker) silo	65% - 70%	30% - 45%
Bag silo	65% - 70%	30% - 45%
Tower silo	62% - 67%	33% - 38%
Oxygen-limiting tower silo	55% - 60%	40% - 45%
Baleage	50% - 60%	40% - 50%

Nitrates accumulate most in the lower parts of the plant, so raising the cut height is commonly recommended to lower nitrate levels in the feed. However, if forage inventories are a concern, a better approach is to harvest at the normal cut height, allow the crop to ferment for at least 3-5 weeks, and then conduct a lab test for feed nitrates so the forage can be diluted if needed before feeding. Guidelines to interpret forage nitrate lab results are in Table 2 below.

Testing the forage is the only way to know whether the level of nitrates may pose a problem. Most laboratories that conduct feed and forage analysis offer a nitrates test. Be sure the sample is representative of the feed, and it should be frozen to keep the nitrate levels from changing between the farm and the lab. The test results may report nitrates in a few different ways: as nitrate (NO_3) or as nitrate-nitrogen (NO_3-N). These measurements may be expressed as a percentage or in parts per million (ppm).

Table 2. Guidelines for forage nitrate levels on a dry matter basis in cattle rations

	NO_3-N (ppm)	**NO_3 (%)**
Generally safe	<350	0.15
Generally safe for non-pregnant livestock. Limit to 50% of total ration for bred animals.	350-1130	0.15-0.5
Limit to 25%-50% of ration for non-pregnant livestock. DO NOT FEED TO PREGNANT ANIMALS.	1130-2260	0.5-1.0
DO NOT FEED.	>2260	>1.0
Adapted from Glunk et al. 2015		

To reduce the risk of acute nitrate poisoning, feed animals several meals a day, rather than one large one. Livestock fed once a day tend to eat a very large meal when the feed arrives; if the ration is high in nitrates, there is a large spike in their methemoglobin levels about eight hours later. Feeding twice a day results in ruminants eating smaller meals, and a smaller methemoglobin spike four hours after each meal.

Sources

Bagg, J. 2012. Potential nitrate poisoning and silo gas when using corn damaged by dry weather for silage, green chop or grazing. Ontario Ministry of Agriculture, Food, and Rural Affairs. Available from: http://www.omafra.gov.on.ca/english/livestock/dairy/facts/info_beware.htm

Glunk, E., Oslen-Rutz, K., King, M., Wichman, D., Jones, C. 2015. Nitrate Toxicity of Montana Forages. Montana State University Extension. Available from: http://animalrange.montana.edu/documents/extension/nittoxmt.pdf

Yaremcio, B. 1991. Nitrate poisoning and feeding nitrate feeds to livestock. Alberta Department of Agriculture and Forestry. Available from: https://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex851/$file/0006001.pdf

---------- VB ----------

Christine O'Reilly, Forage and Grazier Specialist
Ontario Ministry of Agriculture, Food & Rural Affairs
Christine.OReilly@ontario.ca

---------- VB ----------

Debunking The Myths of Farming in the North

Barry Potter, Agriculture Development Advisor, OMAFRA, Verner

What is keeping farming from expanding in the north? A recent study, "Understanding the Barriers to Livestock Production in the Clay Belt: An Economic, Social, and Environmental Analysis" by Wayne Caldwell, PhD, RPP, MCIP, Sara Epp, PhD, Isabelle Chouinard-Roy, M.A., Anthony Miron, B.A.A., Gabriella Miron, B.A.A., looked at some of the challenges to expanding agriculture in the great claybelt region of northern Ontario. Hearst University, teaming up with the University of Guelph looked at barriers and opportunities for livestock production in the north.
There were four major objectives of the study:

1. Explore the opinions on livestock production with the local general population, including First Nations and Mennonites to identify the advantages as well as the perceived difficulties related to this topic;
2. Explore and understand perceptions of livestock production with experts (farmers, entrepreneurs, local association members from northern Ontario and from the south, decision makers from government agencies and OMAFRA);
3. Identify the difficulties and obstacles to the establishment of livestock farms; and
4. Propose the means and the actions necessary to reduce/eliminate these obstacles.

The intention of understanding of these barriers is to identify opportunities to expand the livestock industry within the Clay Belt.

While considering solutions for expanding agriculture in the north, ten myths were discussed and addressed:
1) Language
2) Jobs
3) Social Activities/Recreational Opportunities
4) Weather
5) Healthcare
6) Post-secondary Opportunities
7) Nothing Grows in the North
8) No Agriculture Services in the North
9) Isolation/Remoteness
10) No Youth

1) **Language:** It is often perceived in the north that you need to speak French to survive. The reality is that while a large part of the Clay Belt's population is fluent in French, most of it is bilingual. In fact, almost 90 % of the population in the Clay Belt considers themselves bilingual or speaks only English.

2) **Jobs:** Often start-up farming operations need outside income to assist with the large capital payments required in farming. Often there is concern expressed about job availability. The reality is there are many diverse jobs in northern Ontario including those in the service sector, tourism industry, mining, and others. In fact, a study conducted by the Far North East Training Board (FNETB) with data from Statistics Canada predicted that between 2016 and 2036, over 40 % of the region's employed labour force will retire.

3) **Limited social and recreational opportunities in the north:** There is a diverse cultural and recreational subculture in the north. Most towns have festivals and concerts throughout the year, as well as being right in the best snowmobiling / ATV trails in the province. Hunting, fishing and camping opportunities are in abundance.

4) **Weather:** Some people think that its always cold in northern Ontario. While winters may be longer in the north, summer temperatures are not so different than those in southern Ontario. In fact, if we compare average summer temperatures between Kapuskasing and Guelph, the difference is only two or three degrees Celsius.

5) **Healthcare services in northern Ontario are extremely limited:** While access to medical specialists is limited in northern Ontario, most communities have access to doctors, dentists and nurse practitioners. The specialists are located in regional centres for the most part, similar to southern Ontario.

6) **There are no post-secondary opportunities in northern Ontario:** Across northern Ontario, there are numerous universities, colleges and technical institutions.

7) **The climate and landscape do not permit agriculture:** There are vast regions in northern Ontario with suitable soils and climate to produce a range of crops and livestock. "With new technologies and a warming climate, crop yields are improving and the range of crops that can be grown in northern Ontario is also increasing" (Caldwell et al., 2018). As the average number of heat units has increased so has the number of crops available because of the increasingly favourable growing conditions. For example, corn silage, soybeans, winter wheat and rich pastures that can support cattle farmers are becoming increasingly common in the region.

8) **No Agriculture Services in the North:** There are concentrations of agricultural services in a number of communities, that service broader areas. A few examples include abattoirs, veterinarians, farmer's markets, farm equipment sales and rentals, feed and seed, livestock sales and transport, certified crop advisors, value-added services and hardware, and building supplies. A map of these services is available at this following link: https://www.enhancinglocalfood.com/

9) **Isolation/Remoteness:** There is a worry about living in remote conditions. Many communities in northern Ontario have a strong sense of community with well-developed social networks to support area residents.

10) **No Youth:** While many young people do head to other areas of the province for education, there is a strong ground swell of youth staying to be educated and work in northern Ontario. In the last few years, an entrepreneurial movement has been observed in the Clay Belt, where young entrepreneurs moved back into the region to launch various businesses and initiatives. For example, la cordonnerie Francoeur de Kapuskasing, La Chèvre laitière de Hearst Ltée and la Fromagerie Kapuskoise.

The full study with solutions for agriculture in the north can be found here: https://www.legroupeinnovanor.ca/research-livestock-production

---------- VB ----------

Barry Potter, Agriculture Development Advisor
Ontario Ministry of Agriculture, Food & Rural Affairs
barry.potter@ontario.ca

---------- VB ----------

Marketing Immature or Frost Damaged Corn: Livestock Feed Harvesting and Storage Alternatives for Corn Originally Intended as Dry Grain Corn

Ben Rosser, Corn Specialist, OMAFRA, Megan Van Schaik, Beef Cattle Specialist, OMAFRA, and James Byrne, Beef Cattle Specialist, OMAFRA

This article originally appeared on Field Crop News on October 18, 2019

In many parts of the province, 2019 proved to be a challenging year to get crops in the ground in a timely fashion. The impacts of spring conditions are still felt as we approach harvest and there are concerns about reaching levels of physiological maturity or quality necessary for grain corn harvest (Fig 1). While there are various approaches to managing a late crop, alternative harvest and feeding options for livestock should not be overlooked as a solution. High moisture corn products make excellent feed for livestock, especially ruminants, but the success of using these feedstuffs is dependent on management related to harvest timing, processing, storage conditions and feeding.

Figure 1. Frost injury of upper leaves during grain fill in low lying area of corn field.

High-Moisture Corn

High moisture corn is a nice feed ingredient for livestock producers. The benefit of high moisture corn is that it can be harvested earlier, does not have to be dried and has similar energy and protein levels as dry corn. High-moisture corn can be harvested at 24-36% moisture (optimally 28-32% for proper fermentation) and must be ensiled in upright silos, bunker silos or silage bags. Sealed storage is the best option to reduce spoilage. Processing through rolling or grinding is a necessary step to achieve effective ensiling. A finer particle size leads to better packing, exclusion of oxygen during storage, and reduced risk of spoilage.

From a feeding perspective, high-moisture corn has similar energy and protein content as dry corn but generally has higher digestibility and is more palatable. Finer grind size and higher digestibility increases risk of digestive upsets such as acidosis and this feed ingredient must therefore be managed accordingly. Targeting a uniform grind size that optimizes a reduction of both fine and whole particles is ideal for nutrition and storage reasons.

Cobmeal or Snaplage

Cobmeal, also known as high moisture ear corn or earlage, is closer to corn silage in terms of the way in which it is stored and fed. This feedstuff must be ensiled and is primarily fed to ruminant livestock. Cobmeal is made up of the grain and cob portion of the plant and may include some husks and stalks. It is typically harvested by combine like high moisture corn, but with the combine set to also retain cob. The extent to which husks and stalks are included depends on how it is harvested.

Snaplage is a similar product that is harvested with a snapper header on a forage harvester and includes corn grain, cobs, and husks. Optimal dry matter at harvest is 65% to reduce risk of seepage and spoilage during storage.

The energy level of cobmeal typically falls in between that of corn silage and high moisture corn. Nutrient specifications will vary depending on harvest method, maturity of corn, and other growing conditions. As with other feedstuffs, it is important to test through laboratory analysis before feeding out. Higher maturity and increased inclusion of the shank, husks and stalk will decrease the energy density of the feed. However, the addition of the shank, husks and stalk have the added benefit of containing effective fibre, which helps protect the rumen from acidosis, and increasing overall tonnage captured during grain harvest operations. The amount of effective fibre contained in cobmeal may help reduce the amount of other forage required in the ration to maintain optimal rumen health.

Corn Silage

Corn silage is the obvious alternative to taking off grain corn, however the harvest window for corn silage is less forgiving due to constraints associated with necessary moisture levels for storage. Corn silage must be ensiled to allow for proper fermentation, either through permanent structures or temporary silage bags. If corn silage is not harvested at the optimal maturity and moisture levels, nutritional value is compromised, and storage spoilage becomes a greater risk. Clostridial fermentation, nutrient loss through seepage, reduced yield, and incomplete fermentation are all risks associated with taking off corn silage at high moisture levels (greater than 70% moisture). Poor packing and increased risk of spoilage become a concern when moisture levels are too low at harvest (less than 60% moisture for most storage methods). Suggested moisture contents for various storage methods are presented in Table 1.

Table 1 - Suggested silage moisture contents for various silage storage methods.

Storage Method	Silage Moisture Content
Conventional Upright Silo	60-65%
Horizontal Silo	65-70%
Oxygen Limiting Silo	50-60%
Bag Silo	60-70%

Source: Adapted from Pub 811 Agronomy Guide for Field Crops

If a corn grower is trying to determine if their grain corn field could still be sold and harvested as silage, whole plant moisture samples should be taken. Half to 2/3 milk line progression (from dent end to kernel tip at cob) has traditionally been used as a general indicator for proper whole-plant moisture content for silage harvest, though this is not always reliable and can be influenced by hybrid characteristics (stay green, silage traits), frost damage or moisture stress. Keep in mind that corn affected by frost can appear to be dried down but a whole plant moisture assessment may tell you otherwise. Nitrate accumulation is also of concern after a frost. For more information on frost damaged corn silage, visit http://www.omafra.gov.on.ca/english/crops/facts/frost_silage.htm.

Remember that corn silage is not the only alternative harvest option. If the conditions are not right for taking corn silage off as a dry grain corn alternative, consider the other options outlined in this article.

Table 2 – Comparison of nutrient specifications of corn-based feeds (NRC values)

Corn Feed Type	Dry Matter (DM) (%)	Total Digestible Nutrients (TDN) (% DM)	Neutral Detergent Fibre (NDF) (% DM)	Crude Protein (CP) (%DM)
Dry-rolled Corn	87	88	9.7	8.8
High-moisture corn	71	90	9.9	8.8
Corn Earlage	63	84	21	8.1
Corn Silage	33	68	43	8.2

Source: Nutrient Requirements of Beef Cattle, Eighth Revised Edition 2016

Note: *Nutrient specifications for corn-based feedstuffs will vary from crop to crop and will depend on corn maturity, growing conditions, and other factors. Laboratory analysis is recommended.*

For more information on feeding corn-based ingredients, refer to OMAFRA's livestock homepage at www.omafra.gov.on.ca/english/livestock/index.html.

Pricing

Pricing of dry corn alternatives is typically negotiated between the buyer and seller considering corn grain vs feed value and local supply and demand. It is important for each party to know their costs and negotiate to an acceptable price.

In general, the corn seller would not want to sell the crop for any less than the market value of the grain corn less harvesting, transportation, drying and any elevating or marketing costs they will no longer incur. If more than just grain is

being harvested, the value of nutrients removed from non-grain portions (corn silage particularly) should also be considered.

Similarly, the most a buyer would be willing to pay would depend on the quality and would be no more than the cost of landing alternative feeds on the livestock farm to match the feed quality components of the corn feed less transportation and harvest costs to get the silage to the farm.

In either case, it will require some assumptions, such as grain corn yield and grain quality/price. One very rough rule of thumb often used for pricing corn silage is 7.7 bushels of grain per tonne for a good corn crop. This number should be adjusted downwards for frost or drought damaged crops. For the feed buyer, feed samples for quality should be taken. To make transaction fair, good, representative moisture samples should be taken as incorrect moisture assumptions for high moisture corn or silage can have a large impact on price paid on a dry matter basis. Any grain corn price assumptions should be corrected to 15.5% moisture.

For more details, considerations and framework for developing a fair price, visit https://fieldcropnews.com/2014/08/pricing-corn-silage-in-2014/.

Test Weight

Test weight may be lower in corn that does not complete grain fill or reach physiological maturity (black layer) before a frost. Test weight is one factor used for grading at elevators and end-users and price discounts may apply if it is low (Table 3). Experience and research suggest corn test weight has little impact on livestock feeding performance with the exception of poultry species. If a grower has very low test weight corn that can still be harvested as grain corn, marketing directly to livestock feeders who are less sensitive to test weight may be an alternative to selling heavily discounted corn into the commercial grain handling stream.

Table 3 - Minimum test weight requirements and potential discounts for various grain corn grades.

Grade	Test Weight Minimum		Potential Discount[1]	
	kg/hl	lb/bu	$/tonne	$/bu
1	68	55.6	0.00	0.00
2	66	52.8	0.00	0.00
3	64	51.4	2.00	0.05
4	62	49.7	6.00	0.15
5	58	46.5	12.00	0.30

Source: Adapted from Table 1-9, Pub 811 Agronomy Guide for Field Crops

1 – potential discounts are general indication from survey of posted elevator discount schedules, spring 2016, and not an indication of what actual discounts are or should be. Actual discounts may vary considerably depending on year and location.

Other Considerations

If the corn producer has crop insurance, they should contact Agricorp before implementing any alternative harvest strategy.

References available upon request.

---------- VB ----------

Ben Rosser, Corn Specialist, Megan Van Schaik, Beef Cattle Specialist, and James Byrne, Beef Cattle Specialist
Ontario Ministry of Agriculture, Food & Rural Affairs
Ben.Rosser@ontario.ca
Megan.VanSchaik@ontario.ca
James.Byrne@ontario.ca

---------- VB ----------