Virtual Beef

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Ministry of Agriculture, Food and Rural Affairs

Ontario

Reducing Rumen Methane to Improve Feed Efficiency and Counter Climate Change

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Climate Change

Climate change is **the** great environmental issue of our time. The vast majority of climate scientists agree that the increased concentration of "greenhouse gasses" (GHGs) in the Earth's atmosphere is responsible for the increase in global temperature since the early 1900's. The principle GHGs are carbon dioxide, methane, and nitrous oxide. They warm the atmosphere by trapping energy which is radiated by the earth and which would otherwise be dissipated into space. Scientists are confident that human activities have contributed most of the additional GHGs, and that their annual production must be reduced to prevent catastrophic changes to our environment. In Canada, agriculture contributes 8.3% of overall GHG emissions[i] human activities.

Why Methane from Cattle is Important

Although carbon dioxide (CO_2) is the dominant GHG, methane (CH_4) is much more potent, with a global warming potential 30X times greater than CO_2, per gram. In Canada, cattle contribute about 70% of overall agricultural methane emissions, with most of it coming from the rumen. This translates into about 40% of overall GHG[1] emissions by agriculture. So, even a modest reduction in the rate of methane production by cattle would have an important positive effect.

How Cattle Produce Methane

Cattle and other ruminants have a well-developed ability to utilize high fiber diets, thanks to symbiotic microbes in the rumen. Humans benefit from this as beef cattle play a vital role in converting high fiber feeds like hay (otherwise unusable by humans and other simple stomached animals) into large volumes of high quality meat protein. Since much of the land which is used to feed beef cows is not suitable for producing grains or oilseeds, the cows are consuming little food that could be used directly by humans. However, cattle are also a major source of methane. Most of it is produced by rumen microbes as a by-product of digestion, and exhaled by the animal. A much smaller source of methane is from the breakdown of manure.

Reducing Rumen Methane

Methane is not only bad from an environmental perspective, but it represents a 3-10% loss of energy (CH_4 is a major part of natural gas) from the digestive process. Reducing methane emission from the rumen would not only reduce GHG production, but could also result in more efficient use of feed energy by the animal. So strategies for methane reduction also have the potential to reduce feed costs.

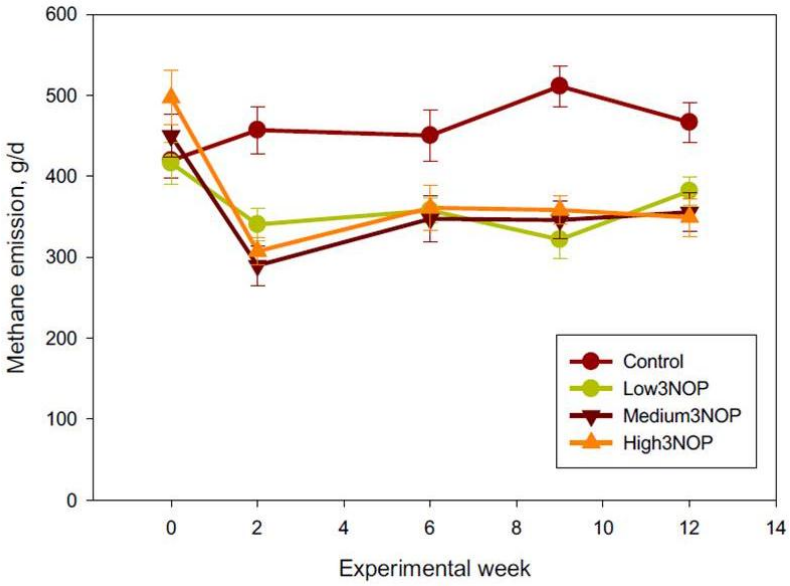
A number of methods to reduce the amount of methane produced in the rumen have been explored. They include various feed additives, adjusting the intake level and quality of forages, and manipulating the rumen microbe population. However, many of the beneficial effects which have been found diminish over time as the rumen microbes adapt to the new conditions. Other methods employ compounds which are themselves harmful to the environment, while some of the effective compounds have a negative impact on productivity.

A recent experiment by Penn State's Alexander Hristov and collaborators[ii] examined the use of a novel methane inhibiting compound, 3-nitroxypropanol (3NOP), in lactating Holstein dairy cows. The cows were fed a diet based on corn silage and alfalfa haylage. The 48 animals were assigned to one of four groups: 1. Control (0mg/kg); 2. Low Rate (40mg/kg); 3. Medium Rate (60mg/kg); and 4. High Rate (80mg/kg). The 3NOP was mixed with propylene glycol as a carrier, with all groups receiving the same amount of glycol.

The information collected over the 12 week trial included typical productivity measures such as feed intake, milk yield, milk fat, feed efficiency and body weight. Cow breath gas samples were obtained at 2 to 4 week intervals and analysed for methane, carbon dioxide and hydrogen[1]. **Methane** emissions were **dramatically reduced** with the addition of 3NOP to the diet (Fig. 1.). Compared with the control group, addition of **3NOP reduced** methane emission by **25%, 31%** and **32%** for the 40mg/d, 60mg/d and 80mg/d diets, respectively. Carbon dioxide emissions were not affected by 3NOP.

[1] The hydrogen measurement was related to mode of action of 3NOP.

Fig. 1. Breath Emission of Methane by Dairy Cows Fed Levels of 3-Nitroxypropanol.



Some of the **productivity results** are presented in Table 1. There were no significant differences for dry matter intake, energy corrected milk yield, milk fat% or milk true protein%. However, **body weight change** for the 3NOP groups was **greater** than the control group, on average gaining weight **80% faster** over the 12 week trial.

Table 1. Effect of 3-nitroxypropanol on productivity measures of dairy cows.

	Diet				Probability of an effect*	
Measure	Control	Low 3NOP	Med. 3NOP	High 3NOP	Control vs all Trts[1]	Linear effect [2]
Dry matter intake (kg/d)	28.0	28.0	27.7	27.5	>.10	>.10
Energy corrected milk yield (kg/d)	44.9	45.2	46.2	43.9	>.10	>.10
Milk fat (%)	4.08	3.98	4.02	4.25	>.10	>.10
Milk true protein (%)	3.06	3.14	3.12	3.13	**.07**	>.10
Body weight change (g/d)	210	353	451	330	**.05**	**.09**

* only probability values ≤.10 are shown
[1] comparison between the control group and pooled effect of the treatment groups
[2] Effect of **level** of 3NOP in diet on measures. (eg. Does dry matter intake vary with the amount of 3NOP in the diet in a linear (straight line) manner?

The Future

While research into using 3-nitroxypropanol is at a very early stage, it shows definite promise as a potential means of reducing methane emission by cattle. Although this initial experiment was with dairy cows, rumen function in beef cows is quite similar. An encouraging aspect from a beef industry perspective is the increase in cow weight gain which accompanied the reduction in CH_4 emission. This indicates that at least some of the energy which would have been lost in the production of methane gas was captured by rumen microbes and retained by the cow. And although the process of weight gain by lactating cows is somewhat different than that of growing cattle, it seems likely that 3NOP could have a similar positive effect.

Although 3NOP has to be supplied to the rumen on a daily basis, it should be relatively easy to add to a feedlot ration where a concentrate mix is fed. For animals fed only stored forages or grazing on pasture, it may be possible to add it to salt or mineral, or perhaps in the form of a slow release rumen bolus.

Many more trials are needed to verify these results and to test the additive over a wide range of cattle types and conditions. Safety for animals and people will also have to evaluated before the 3NOP could be considered for certification as a commercial product. But this experiment shows it does have potential and that it is possible to reduce the methane output of ruminants with minimal effect on performance.

[i] National Inventory Report 1990-2013: Greenhouse Gas Sources and Sinks in Canada –Executive Summary https://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=5B59470C-1&offset=4&toc=show

[ii] Hristov, AN et al (2015). An inhibitor persistently decreased enteric methane emission from dairy cows with no negative effect on milk production. PNAS 112 (34): 10663-10668.

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Ruminating on Feed Efficiency and Digestive Physiology

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Ontario maintains the highest corn consumption rate of all provinces in Canada, using approximately 4.1 million tonnes of corn grain for livestock feed, part of which contributes to feeding 775,000 head of cattle. With feed prices rising in the past decade and beef producers spending 75% of total costs on feed to produce finished beef, the need for producers to minimize costs while maintaining production is increasing. Selecting for a more feed efficient herd is a valuable opportunity for producers to reduce feed costs through reducing feed inputs. However, it is well known that incorporating feed efficiency into management strategies is impractical on-farm, since the common measure (residual feed intake; RFI) remains an expensive and time consuming method.

To try to solve this problem, researchers study “biomarkers” which are biological measures in an animal that can indicate other measures (ie. feed efficiency). So how do we study biomarkers and their relationships with feed efficiency? It is known that energy requirements differ between feed efficient and inefficient cattle; similarly, some cattle demonstrate higher productive performance than others when fed the same diet and housed in the same environment. This suggests there are individual differences in how efficiently cattle convert their feed to energy used for daily function[ii]. From this, we studied rumen parameters (Figure 1) to better understand the biological workings behind the rumen and its relationship with feed efficiency and digestive health to discover ways to improve performance.

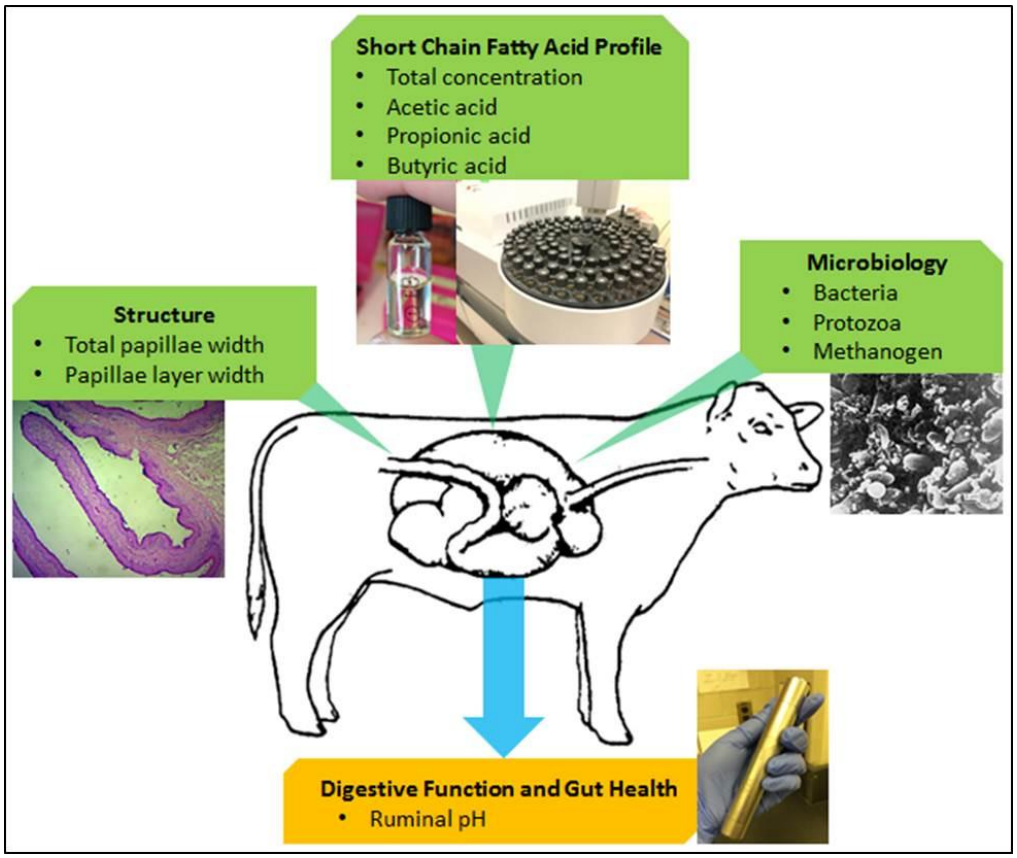

Figure 1. Rumen parameters and measurements. Left image showing rumen papillae under microscope. Upper-middle images showing rumen fluid being prepared for short chain fatty acid profile analysis. Right image showing microscopic image of rumen bacteria. Lower-middle image showing rumen probe to measure ruminal pH.

The Experiment

We used 48 crossbred beef cattle fed a high grain diet (78% high-moisture corn), which were separated into efficient (low-RFI) and inefficient (high-RFI) groups. Using a probe (Figure 1, bottom image) placed in the rumen sac, we recorded ruminal pH for 5 to 9 days (Figure 2A). At slaughter, digestive organs were removed and probes were collected (Figure 2B). Rumen fluid was also collected for microbial analysis and short chain fatty acid profiling (Figure 2C). Rumen tissue was collected from three sacs of the rumen and was prepared for microscopic analysis (Figure 2D).

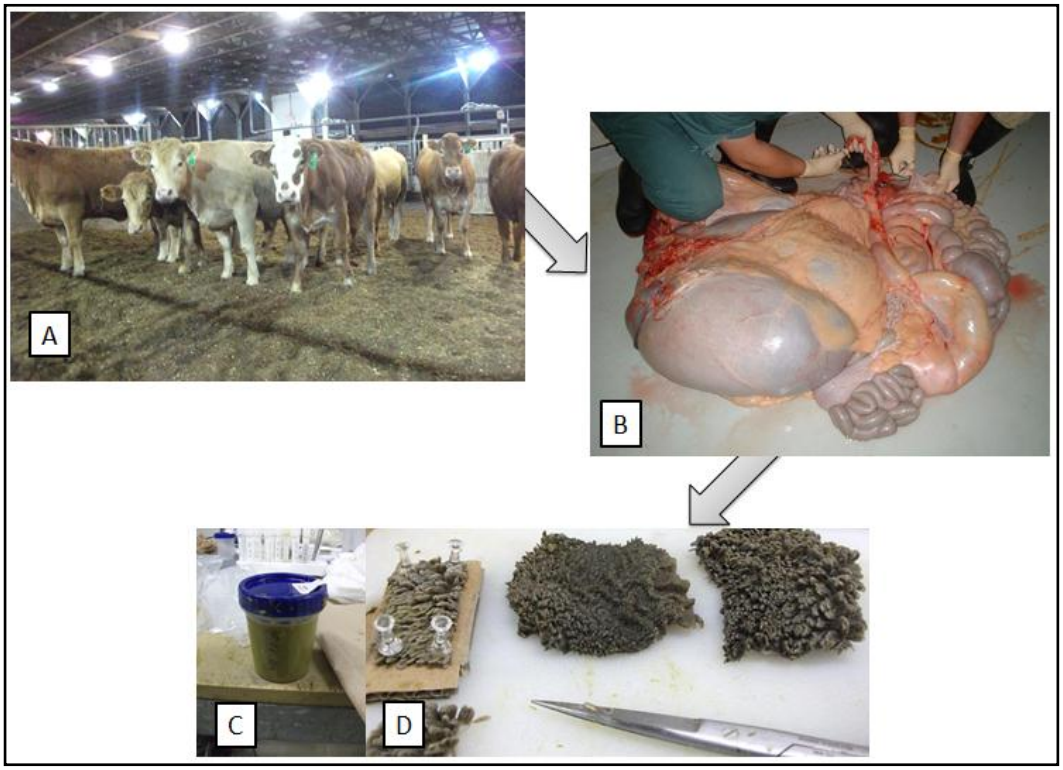

Figure 2. A: Cattle during ruminal pH recording. B: Digestive organs removed at slaughter. C: Rumen fluid sample. D: Tissue from rumen sacs being prepared for microscopy.

Ruminal pH

Ruminal pH is a measure of acidity of the rumen fluid and an indicator of overall health and digestive function. It is influenced by factors such as diet composition, microbial diversity, and nutrient absorption rate (Figure 1). The probe recorded ruminal pH continuously every 5 minutes. After slaughter, the data were organized to determine average time spent throughout the day within specific pH intervals defined by digestive condition (Table 1). Data revealed that cattle spent approximately 98% of their time above the acidosis pH interval, indicating healthy digestive function within the herd.

Table 1. Time (%) spent during a day within pH intervals of efficient and inefficient cattle.

Rumen condition	pH interval	**Efficient** (% time/day)	**Inefficient** (% time/day)
Acidosis pH	pH < 5.59	2.43	2.25
High-grain diet reference	5.60 < pH > 5.99	4.68	5.88
Optimal digestion	6.00 < pH > 6.39	12.27	14.20
High pH	pH > 6.40	77.59	76.67

We also developed a 24-hour profile of rumen pH, which was compared between efficient and inefficient animals (Figure 3). There were no differences in the average time spent in pH intervals or 24-hour pH variation between efficient and inefficient cattle. The pH profiles displayed a variation in pH through the day. This is shown by drops in pH after feeding events due to increased acid production from fermentation (Figure 3).

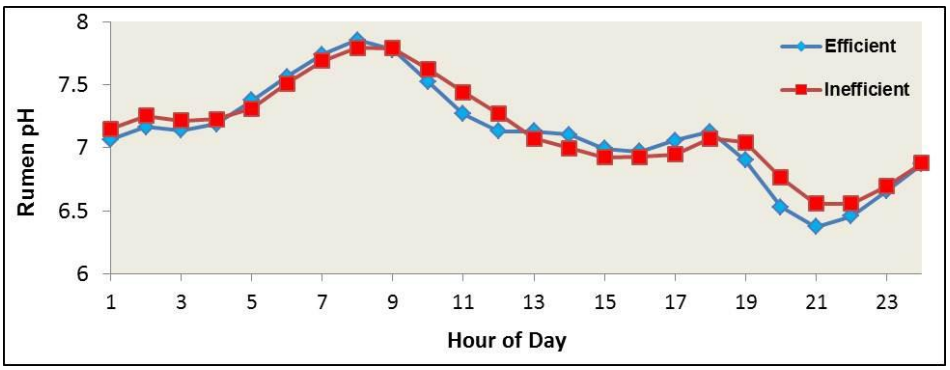

Figure 3. Average hourly ruminal pH over 24 hours compared between efficient and inefficient cattle.

Analyzing the Microbiota

The microscopic organisms living in the rumen represent the rumen "microbiota". The diversity in these microbial species is remarkable and unique to each animal. The microbiota is responsible for fermenting feed components including carbohydrates, proteins, fats, and other organic compounds[i]. Microbial analysis consisted of measuring the concentration of microbial species (bacteria, protozoa, methanogens) per mL of rumen fluid. Each microbial species performs different processes during feed digestion and produces different end products during fermentation, and may be different between cattle of divergent feed efficiency.

Short Chain Fatty Acid Profiles

Rumen fermentation produces end-products including short chain fatty acids which are absorbed across the rumen wall through papillae for energy use. Since these fatty acids account for up to 75% of daily energy supply for cattle, we used gas chromatography to measure the total concentration of all short chain fatty acids, as well as concentrations of the major fatty acids: acetic, propionic, and butyric acid. Our research revealed that more feed efficient beef cattle had higher total short chain fatty acid concentration compared to less feed efficient cattle[iii], suggesting that efficient cattle digest their feed more efficiently, producing more products for energy use from fermentation.

The Rumen Epithelium

The rumen epithelium is the tissue surface lining the rumen. It projects leaf-like structures called papillae (seen in Figure 1D); this epithelium goes through remarkable changes in structure to absorb energy sources, including short chain fatty acids from fermentation. We measured the epithelial thickness of papillae from the largest rumen sac, a measurement which is represented by the distance from the outer layer (corneum layer) to the middle (connective tissue) (Figure 4, right image). Preliminary studies did not show a difference in papillae thickness between feed efficient and inefficient cattle.

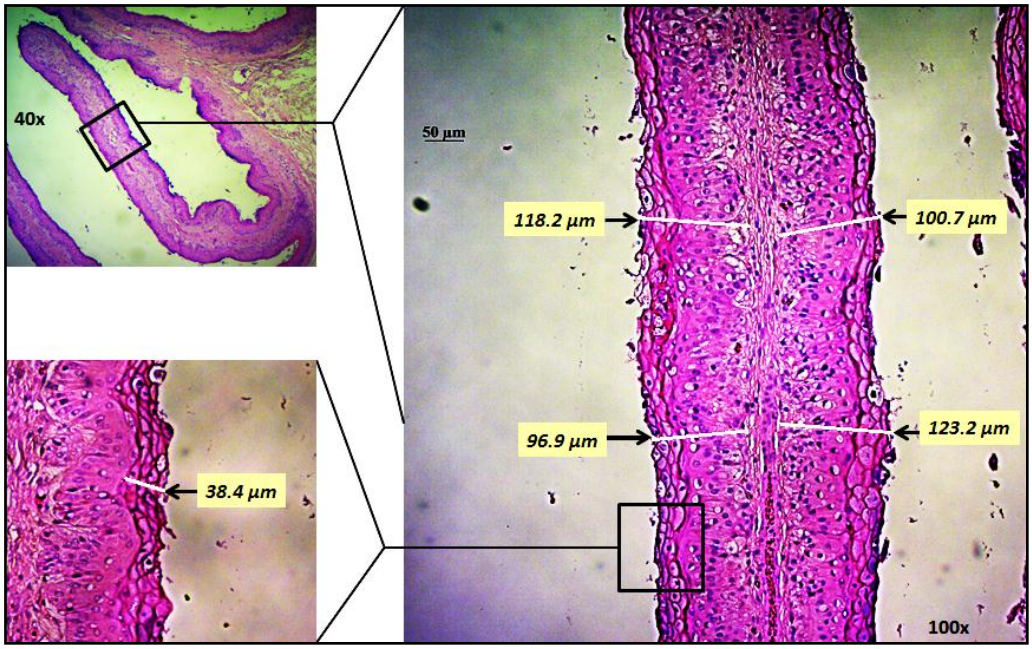

Figure 4. Upper-left image of rumen papillae at 40X magnification. Right image of where 4 areas of the papillae epithelium thickness were measured on the papillae at 100X magnification. Lower-left image at 100X magnification of corneum layer measurement.

Current Research

Since feed efficiency was associated with total short chain fatty acid concentration, we are continuing research to investigate further associations between feed efficiency and additional biological parameters. We are currently assessing papillae width thickness on papillae from other sacs of the rumen, as well as the corneum layer thickness (Figure 4, bottom-left image) as previous research has shown that forage-fed cattle have a thicker corneum layer compared to concentrate-fed cattle. Additionally, microbiota analysis and short chain fatty acid profiling is in progress on rumen fluid of heifers fed a forage diet, allowing us to compare the microbiota of cattle fed concentrate and forage diets in the context of feed efficiency.

Implications

Our research will expand our understanding of the biology of feed efficiency and rumen parameters and allow us to investigate digestive health screening methods to determine ways to engineer the rumen for improved function in areas such as feed digestion, digestive disease prevention, and greenhouse gas emissions.

Acknowledgements

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References

[i]Hungate, R.E. 1966. The rumen and its microbes. Academic Press. New York and London.

[ii]Lam, S.L., Munro, J.C., Cant, J.P., Guan, L.L., Steele, M.A., Miller, S.P., Montanholi, Y.R. Associations of rumen structure, function, and microbiology with feed efficiency in beef cattle. Book of Abstracts of the 66th Annual meeting of the European Federation of Animal Science, Warsaw, Poland 31 August – 4 September. Pg. 123.

[iii]Zebeli, Q., Khaiosa-ard, R. 2014. Cattle`s variation in rumen ecology and metabolism and its contributions to feed efficiency. Livestock Science. 66-75.

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Get With the Program…. Calf Clubs Still Pay!

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With the record calf prices in the fall of 2014, some producers believed that you could sell anything for good dollars and not worry about being part of a reputable prescribed sale.

Well, many sold for what seemed good dollars, but the Calf Rama week at Keady proved that even in a hot market buyers recognize and pay for the assurance of a good feedlot prep program [castrated, dehorned, bunk adjusted, vaccinated] and well- presented calves. As Table 1 shows, all 4 of the special calf club sales brought the consignors home significant dollars over the Ontario average prices in the same week.

The number of 500-600 lb steer calves on the market moved from 1076 (the week previous to Calf Rama) up to 2079 during Calf Rama week, and then back down to 997 the next week. The Ontario price for this category did a 6-7 cents/lb jump for Calf Rama, then dropped down 5 cents/lb for the week following. Similar results were seen for heifers. Note that the Calf Rama calves are included in the Ontario averages for the week, so the difference is actually even more pronounced.

Table 1. Calf Club Price Results for Fall 2014 vs Ontario Market [1]

Category	**Ontario Market** (Includes Calf Rama Sales) Oct 24 – 30	**Keady Calf Rama Week Sales**			
		Oct.25 Bruce Peninsula [2]	Oct.28 Georgian Charolais[3]	Oct.30 Bluewater Black Calf[4]	Nov.1 Central Calf[5]
500-600 lb steers ($/cwt)	$ 286.74	$ 321.89	$ 309.84	$ 308.81	$ 325.50
$ value @550 lb	$ 1577.07	$ 1770.40	$ 1704.12	$ 1698.455	$ 1790.25
$ difference/hd (Calf Rama-Ontario)	******	**$ 193.33**	**$ 127.05**	**$ 121.39**	**$ 213.18**
500-600 lb heifers ($/cwt)	$ 259.19	$ 280.98	$ 296.91	$ 268.13	$ 276.30
$ value @550lbs	$ 1382.43	$ 1545.39	$ 1633.00	$ 1474.71	$ 1519.65
$ difference/hd (Calf Rama-Ontario)	******	**$ 119.845**	**$ 207.46**	**$ 49.17**	**$ 94.105**

[1]all prices from Beef Farmers of Ontario Weekly Market Reports. @ BFO
[2]Bruce Peninsula Calf Club Sale
[3]Georgian Bay Premium Charolais Calf Association- Pre-sort sale
[4]Bluewater Black Calf Club Sale- Pre-sort sale
[5]Central Calf Association Sale

Table 2 compares the average of Calf Rama prices with the estimated prices from non-club Ontario sales during the same week.

Table 2. Calf Club Price Results for Fall 2014 vs Non-club Prices[1]

Category	**Ontario Market Excluding Calf Rama Sales[2] Oct 24 - 30**	**Calf Rama Sales Only Oct 24 - 30**
500-600 lb steers ($/cwt)	$258.80	$313.51
$ value @550 lb	$1423.40	$1724.30
$ difference/hd (Calf Rama -Ontario)	**********	$300.90
500-600 lb heifers ($/cwt).	$238.96	$282.01
$ value @550lbs	$1314.28	$1551.06
$ difference/hd (Calf Rama-Ontario)	**********	$236.78

[1] all prices from Beef Farmers of Ontario Weekly Market Reports. @ BFO
[2] estimated using provincial price summary and Calf Rama data

The estimated price advantage for the Calf Rama sales was dramatic – an additional $300/hd for steers and $237/hd for heifers. This works out to +55 cents/lb for steers and +43 cents/lb for heifers!

In studies over 10 years the numbers show that Calf Club Program Sales have excelled for cow-calf producers in a down market, an average market, and now in a hot market. The logical suggestion from this would be to “Get with the Program”!

So what does that mean to me when I start planning for the 2016 calf crop? It means now is the time to start planning how those calving hitting the ground in will be marketed. Consider linking up with one of the many calf club or other special sales across the province which feature properly prepared, feedlot -ready calves. Research their particular protocol. The basics of castration and dehorning are best done as close to birth as possible. The question of which vaccines to use, and their timing, may be dictated by what sale you hope to be part of.

So pick a program, talk to the club or sales facility and find out what you need to do to make your calves “fit the program”. Then do it and …“Get with the Program”.

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De-Coding the Code –Chapter 3-Animal Health

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The new Code of Practice for the Care and Handling of Beef Cattle was released in the fall of 2013. This is the industry’s statement on how it collectively thinks cattle should be raised and handled. So if you are part of the industry, this is YOUR document and you should know what is in it. You can download a copy from https://www.nfacc.ca/. Get over the fact that it is 60 pages long. Only the first half is the actual code, and that is laid out with a lot of space to make it easy to read. The second half contains references, a glossary, contacts and extension information.

When we break the Code down chapter by chapter, and work through it that way, it gets much easier to understand and put it into practice. It is not prescriptive about HOW we get to an outcome, but that we DO get there. **Requirements** that producers **need** to **provide** are highlighted in a yellow box for quick and easy reading. This is followed by some **recommendations** that almost always would be part of a Best Management Practices system (BMP’s) for raising beef.

Chapter 3 is generally about Animal Health (3.1) It states that “Pain and discomfort caused by health issues impact an animal’s well-being such that good animal welfare requires good animal health”. Disease prevention is extremely important. Herd health management and biosecurity protocols (consider taking the Beef Biosecurity course offered as part of GF2), can help prevent and contain diseases. Producers need to be able to promptly recognize and treat animal health issues in order to optimize animal welfare.

Veterinarians play a key role in helping producers meet these animal health obligations. Although the specific regulations vary among provinces, in order for veterinarians to prescribe some classes of medications and vaccines, they must have a valid Veterinarian/Client/Patient Relationship (VCPR). **This is the case in Ontario**. An effective Herd Health Management Program also contributes to cattle well-being by providing a strategy for disease prevention, rapid diagnosis and effective treatment.

The desired outcome is that cattle are in optimum health. So in the case of **Herd Health Management.,** the producer requirements are…

REQUIREMENTS
Establish an ongoing working relationship (VCPR) with a licensed practicing veterinarian and develop a strategy for disease prevention and herd health.

RECOMMENDED PRACTICES

a. maintain accurate animal management and health records.

So that it is easy to understand, and makes sense if our goal is to have productive cattle that we are hoping to make a profit from.

Section 3.2 refers to Sick, Injured, and Cull Cattle

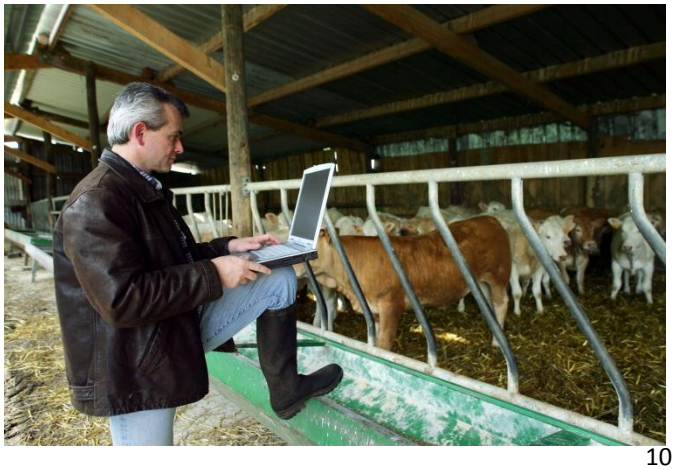
So the "requirements " say you will monitor cattle-or watch for any sick ones, provide appropriate care/treatment, and then continue watching to see if it works-and if it doesn't you will talk with your Vet again. Then if the animal isn't responding, isn't likely to get better and is experiencing severe pain and distress to the point, where it won't eat or drink then you will do the humane thing and euthanize it. If it is something really different that the animal has then you will check with the VET that it isn't a reportable disease. The recommended practices make a lot of sense as well!

REQUIREMENTS
Monitor cattle health on an ongoing basis to ensure prompt treatment or care.
Provide appropriate care, convalescence or treatment for sick, injured or lame cattle without delay.
Monitor the animals' response to therapy or care and, if the initial treatment protocol fails, then reassess treatment options or seek veterinary advice.
Euthanize (or cull*) without delay cattle that:
• are unlikely to recover, or
• fail to respond to treatment and convalescent protocols, or
• have chronic, severe, or debilitating pain and distress, or
• are unable to get to or consume feed and water, or
• show continuous weight loss or emaciation.
****If culling, Requirements for transporting compromised animals must be followed (refer to Section 5 - Transportation). Suspicion of a reportable disease as defined by the* Health of Animals Act *(www.laws.justice.gc.ca./eng/acts/H-3.3) and various provincial acts must be brought to the attention of a veterinarian.***

RECOMMENDED PRACTICES

a. consult a veterinarian to address new, unknown, or suspicious illness or death losses
b. consult a veterinarian if the incidence of a known illness suddenly increases
c. consult a veterinarian for the most appropriate treatment options when an animal is sick
d. monitor the progress of treated cattle
e. dispose of dead cattle according to applicable provincial/municipal regulations.

So if you don't recognize the illness, you will ask your Vet (you could ask George next Door, and he may know what the problem is) however your Vet probably will have the answer and also what you can treat it with-then you will watch to see if it gets better. If by some chance it doesn't get better, but dies then you will dispose of the deadstock according to Provincial and Municipal rules (after all if you have already taken the hit on the cost of losing the animal-the last thing you need, or want, is a charge and/or fine for improper disposal).



Section 3.3 looks specifically at health conditions related to feedlot cattle.
It starts by discussing- **managing the risk of bovine respiratory disease.** The Listed risk factors are:

- Non-vaccinated cattle
- Recent weaning
- Transportation and handling
- Sudden or extreme changes in weather
- Commingling of cattle from various sources.

That sounds like a pretty typical fall for most feedlots! And then as early detection and treatment will decrease chronics and mortalities … the requirement is:

> ***REQUIREMENT***
> ***Monitor the behaviour of newly-arrived feedlot cattle to facilitate the early detection of illness.***

The recommended or Best Management Practices (BMP's) that follow out of this are:

RECOMMENDED PRACTICES
A. categorize newly-arrived cattle according to risk for BRD and other illness and apply appropriate receiving protocols
B. whenever possible, buy calves of known source, vaccination history, and health status

Again, these are common sense ideas that should help feedlot operators keep more calves alive and thus have a greater potential for profit.

Section 3.3.2 deals with LAMENESS whether from injury, nutrition, or infection. Although this is under the feedlot section, it still applies to cow herds and backgrounders. Requirements are:

> ***REQUIREMENTS***
> ***Design, implement, evaluate and adjust your feeding program to reduce the risk of nutrition-induced disorders, and consult your veterinarian or a nutritionist when needed.***
>
> ***Transition cattle from high-forage to high-energy rations gradually to avoid abrupt dietary changes.***

RECOMMENDED PRACTICES
a. see Appendices D, E and F to assist in decision-making around culling and euthanasia
b. manage pen conditions to minimize mud and standing water
c. work with your veterinarian to identify and resolve sudden increases in the incidence of lameness.

> ***REQUIREMENTS***
> ***Provide appropriate care, convalescence or treatment for lame cattle without delay.***
> ***Monitor the animals' response to therapy or care and, if the initial treatment protocol fails, then reassess treatment options or seek veterinary advice.***
>
> ***Promptly cull or euthanize lame cattle that have a poor prognosis for recovery, or that do not respond to therapy or care (See Appendix E).***

Section 3.3.3 looks at Nutritional Disorders Associated with High Energy Feeding

RECOMMENDED PRACTICES

a. monitor feed bunks to assess prior consumption and adjust feeding accordingly
b. include forage of effective particle length in all diets to reduce sub-acute ruminal acidosis
c. consider adjusting rations to prevent digestive disorders when cattle feed intake is interrupted (due to storm, power outage, machinery breakdown, etc.)

So again, a big-dose of common sense - cattle are expensive, feed is expensive, and profit lies in making the best of both, to create weight gain.

Section 3.3.4 deals with the feedlot problem of Buller-steer Syndrome.
Buller-steer syndrome is an occasional behavioural problem among feedlot steers, where one steer (buller) is repeatedly mounted by a group of other steers (riders). If not promptly removed from the pen, the buller steer can become exhausted, have reduced feed and water intake, and develop traumatic injuries.

REQUIREMENTS
Bullers must be promptly removed from their pen.

RECOMMENDED PRACTICE
A. monitor closely for relapse if bullers are re-introduced to their home pen

Section 3.3.5 looks at Managing Pregnant Heifers in the Feedlot
This problem is a creation of the cow-calf herd-but has to be dealt with by the feedlot industry. It's another good reason for knowing the cow-calf producer and their operation if you are buying and feeding heifers. However, once you have the problem in the feedlot, you may choose to create a program to terminate pregnancies or create a suitable calving area (your Vet will be a great resource for either). However, it is YOUR Feedlot so it is YOUR Problem!

The recommended Practices are directed toward the cow-calf producer as they create (and thus can solve the problem!)

REQUIREMENT
Consult with your veterinarian to develop a program for managing pregnant heifers in a feed lot.

RECOMMENDED PRACTICES

a. prevent pregnancy in heifers destined for feedlots. If possible, inform feedlot buyers if there is a chance that heifers have been exposed to a bull
b. consult a veterinarian if considering spaying to prevent pregnancy in heifers destined for the feedlot. Spaying is a very infrequent practice; however, if done, it should be carried out by a Veterinarian using appropriate pain management.

Section 3.4 deals with Safety and Emergencies
Emergencies may arise, and can compromise human and cattle welfare. Some pre-planning will assist producers in responding to such events in a timely and effective manner. The thing with emergencies is that we think (and hope) they will never happen. But sometimes they do and are weathered easier if we have done a little pre-thinking and preplanning. For many in Eastern Canada we only need think back to the Ice-Storm. Water became the BIG PROBLEM. Even if you had feed, the cattle wouldn't eat if they did not have water. So first you make sure that the people are alright, and then you start to think about the cattle. Many fire departments would deliver water to farms –but many producers found they had no method to hold the water. This is when having a couple of empty water troughs up in the hay mow became pretty cheap insurance (again, hope you never need them-except perhaps to hold some ice and cool-ones at a summer Bar-B-Q!). Likewise a supply of small square bales (that could be man-handled to where needed –can sit for years if under cover but be invaluable if Mother Nature takes a swing at proving SHE IS BOSS!

REQUIREMENTS
Have a current emergency response plan to provide feed, water and care for cattle in case of emergencies. Review this plan with all responsible personnel so it can be implemented.
Ensure emergency contact numbers are readily accessible and current.

So for ALL beef Producers …
If, as a beef producer, these **Requirements** and **Recommendations** seem new or extreme to you, then you need to be having a conversation with your Veterinarian, Provincial Beef Association or local Beef Extension folks. That conversation needs to focus on how you can change the operation around, to provide what is asked for in the Code. Both your farm and the whole industry will be judged by your compliance.

So that concludes Chapter 3 of the Beef Code of Practice, and nothing in it is too extreme. It essentially breaks down to observing or watching your cattle-if there is a problem, talking with your Vet, and then taking some action! Most beef producers in Ontario and the rest of Canada are already implementing these practices. The challenge for most will be to have a paper trail, or to create one, that can prove to our consuming public that we are providing quality care to our cattle.

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The Bovine Ontario Animal Health Network and the impact to industry

Melanie Barham DVM, Ontario Animal Health Network Coordinator, University of Guelph

The Ontario Animal Health Network is a program **new** to the bovine sector. The Bovine Network was assembled in May 2015.
The overall **goal** is to **improve bovine health** in Ontario through:

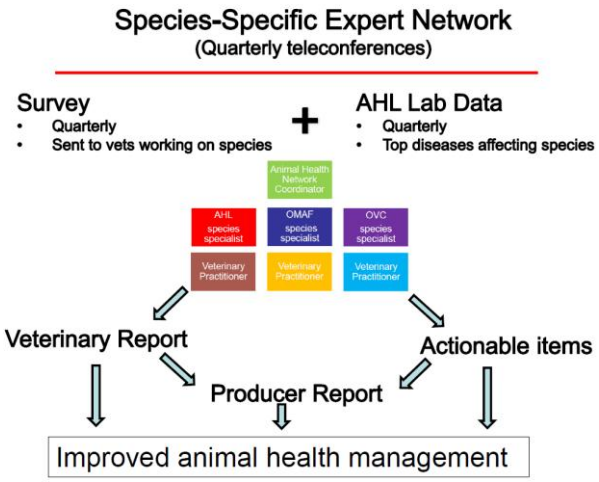
- communication
- surveillance
- information sharing

These activities will allow the Network to improve emergency preparedness and provide timely information on outbreaks and disease trends to veterinarians and producers for better decision making. As well, the Network will provide funding to follow up disease outbreaks and for projects to address Network related issues.

What can producers expect to see?

- Your veterinarian will be asked to complete the OAHN bovine survey every 3 months about what they've been seeing in general in their practice. The survey is quick (<5 mins), and completely confidential – no client specific information is shared.
- Your veterinarian will receive a complete report for Ontario after the surveys are complete and the OAHN group has met.
- A producer report is currently being developed for the bovine sector.
- Resources are available for cattle producers at www.oahn.ca, as well as reports and other information. Veterinarians can log in to access veterinary reports.
- Our Facebook and Twitter feeds feature daily news on disease, welfare, and cattle concerns for producers and veterinarians. Follow us at: @OntAnHealthNet for twitter, and search "Ontario Animal Health Network" on Facebook.
- Podcasts are available for veterinarians and producers at www.oahn.podbean.com. 20 free audio recordings (featuring many species) are available with Ontario specific topics.
- Subsidized testing is being made available for certain infectious diseases so that more can be learned- currently being finalized for 2015. Last summer, some mastitis testing at the Animal Health Laboratory was subsidized through OAHN and its parent program DSP. We have also investigated several outbreaks in 2014/2015.

- Research projects involving your veterinarian may be offered to you for participation (subsidized testing, surveys, etc.)- currently under development



How can I benefit from OAHN?

- Share this article with your vet. If they practice in Ontario on cattle, we need their response and to contact with them to ensure they have access to the research projects and testing. Vets can sign up to receive reports, updates and surveys by emailing oahn@uoguelph.ca.
- Follow us on Facebook or Twitter. If you aren't interested in social media, we publish our top social media links on the site every week, www.oahn.ca Sign up for our newsletter on the same site.

A species specific Expert Network guides the development and implementation of the program.

Who is part of the Expert Network?

Southern Ontario: Dr. Sherri Christie, Mildmay
Northern Ontario: Dr. Crystal Throop, Temiskaming
Eastern Ontario: Dr. Dave Douglas, Navan
Animal Health Lab: Dr. Jim Fairles, Guelph; Dr. Andrew Brooks, Kemptville
OMAFRA: Dr. Ann Godkin, Elora; Tom Hamilton, New Liskeard
OVC: Dr. Dave Kelton, Dr. Steve LeBlanc, Dr. Todd Duffield, Dr. Laurent Viel, Dr. Dan Kenney, Guelph

Where can I learn more?

Questions? Comments? Contact Dr. Melanie Barham at (519) 824-4120x53364 or oahn@uoguelph.ca. Or contact any of our network members (see list above).

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Welcome to Rajan Niraula, Engineering Specialist on Livestock Structures and Equipment focusing on Dairy and Beef working out of the Clinton Resource Centre. Rajan.Niraula@ontario.ca

Welcome to Anita Heeg, Feed Ingredient and By Products Specialist working out the Woodstock Resource Centre. Anita.Heeg@ontario.ca