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Innovative Watering System in the North

Gary Sliworsky, Agriculture Development Advisor
Ontario Ministry of Agriculture, Food and Rural Affairs

Pine River Ranch is a cow/calf operation located just north of Pinewood in the Rainy River District in Northwestern Ontario. It is owned by Amos and Heidi Brielmann and their son Timo. The farm comprises approximately 5000 acres of hay and pasture land. They have a herd of 550 Angus and Angus cross cows which they calve in May, on pasture. The focus of the farm is to sell yearlings, usually in September. All calves are wintered and then grazed in the following year.

In the 1990's Pine River Ranch began to examine the environmental impact of its farming practices. The whole farm is in permanent hay or pasture so soil erosion was not a major factor except along the river banks and creeks that the cattle could access. The Pine River and its tributaries flow for miles throughout the property. Realizing that cattle not only deposit manure along the waterways but also destabilize the banks, they established fenced-off riparian zones along all waterways on the property.

Every fenced-off creek or waterway provided a new challenge in developing alternative water sources for the 1500 head of grazing and overwintering cattle. After extensive consultations with different grazing schools, the Ministry of Natural Resources, the First Nations Watershed Program, the Rainy River Soil & Crop Improvement Association and the Ontario Ministry of Agriculture, Food & Rural Affairs, they decided to drill wells at key locations and pump the water through pipelines to multiple locations. This system provided water to about two thirds of their

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1-877-424-1300

Direct general questions and suggestions to:
Tom Hamilton
tom.hamilton@ontario.ca
705-647-2087

For inquiries regarding content of a specific article contact the author.

Virtual Beef is compiled by the OMAFRA Beef Team & edited by Tom Hamilton, Beef Program Lead, Production Systems Ontario Ministry of Agriculture, Food and Rural Affairs

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pastures. For the remaining pastures and the wintering lot, where there was no available hydro, they began researching solar powered dugout pumps and solar powered deep well pumps.

Their intensive grazing program meant different requirements for water availability and pumping distances. However, they were grazing relatively large groups, meaning a solar powered system had to be designed that could supply enough water to satisfy a large group of animals at all times. If water was not always available, the cattle would tend to gather around the water trough and spend less time grazing. Another challenge was to provide a reliable water source for cattle year round, for those grazing in late fall (October) and early spring (April) when waterlines were susceptible to freezing during the night, and especially for the calves and young cows kept in the wintering lot.

Over the years, and with assistance from Kelln Solar, a small company from Lunsden, Saskatchewan, they were able to overcome most of the challenges. Kelln Solar's major input was in helping to design the water system at Pine River Ranch's wintering lot. This site requires a system capable of supplying enough water for up to 600 calves and an additional 250 cows in peak times – and it has to remain operational at -40 C. The area of the wintering lot is approximately 105 acres. This requires water to be pumped 200 metres in one direction and over 600 metres in another direction in order to service three separate watering locations within the wintering lot. The solar setup had to be able to efficiently pump water from a 100 metre deep drilled well. The lift requirements and the friction losses throughout the system had to be overcome with the least amount of energy use possible.

A high efficiency 60 volt ETA submersible pump was installed. This pump is capable of pumping over 40 litres per minute through a 600+ metre waterline. To keep the pump operating requires nine, 128 watt solar panels which charge ten, 6 volt Trojan batteries. The batteries are housed in a small shed near the well. To prevent drinking water from freezing, large double-walled insulated plastic water troughs were installed. As there is no power supply to prevent ice build-up, the troughs were then covered with an insulated lid in which several drink tubes were installed (Figure 1). These drink tubes are round and large enough for a cow to put her nose in to drink. The plastic material which they are made

of has a very smooth surface and the drink tubes widen out towards the bottom, so any ice build-up can be easily pushed down by the cattle. The water will then flow up around the ice permitting the animal to drink. When the animal leaves, the ice will flow up to the top of the tube again and act as a lid.

These energy-free winter water troughs are an excellent invention requiring absolutely no energy and minimal maintenance. The system can efficiently supply water to a large group of animals in a remote area (Figure 2). The size of the water trough is crucial since the energy in the water will prevent ice build-up over an extended period of cold weather. The experience of the Brielmans has brought them to the conclusion that twice the volume of the holding capacity of the water tank has to be circulated each day in order for the heat in the water to keep the drinking tubes from freezing completely.



Figure 1. Insulated water trough; solar panels to right.

The final system was put in place in 2005 and has now been used successfully for eight winters. Only a couple of changes have been made during that time. One has been to improve the water troughs by installing a different type of lid that is better insulated and fits more tightly over the troughs. This tends to keep the ice build up in the drinking tubes to a minimum. The other change has been to upgrade the solar panels to ones which are more efficient, especially on overcast days.

The knowledge gained at Pine River Ranch has led to assisting other producers in the area in designing solar powered winter water systems of their own,

(Continued on page 3)

from both wells and dugouts. These systems allow for feeding cattle during the winter months away from the barnyard in areas which do not have hydro. This is beneficial in that it reduces the manure loads in barnyard areas and has the animals spreading the manure naturally.

The development of this watering system, in conjunction with the establishment of the riparian zones along the farm's waterways, was recognized with a Premier's Award for Agri-Food Innovation in 2006.



Figure 2. Cattle in wintering yard.

----- VB -----

Gary Sliworsky

Agriculture Development Advisor

Ontario Ministry of Agriculture, Food and Rural Affairs

gary.sliworsky@ontario.ca

----- VB -----

'P' in Your Cow Mineral? Are you overfeeding phosphorus?

Christoph Wand, Beef Cattle and Sheep Nutritionist
Ontario Ministry of Agriculture, Food and Rural Affairs

Phosphorus in Livestock Diets - Economics and Environment

Not so many years ago, we provided or advocated supplemental phosphorus (P) to most livestock just to make sure we had enough. By 'we', I include government feed regulators, feed industry, consulting nutritionists, producers and academia. Since then, we have learned that excess P has environmental

and economic consequences. This is because environmental P is implicated in algal blooms in surface water and is one of the primary reasons P from agriculture is addressed under Ontario's Nutrient Management Act. Only about one-third of ration phosphorus leaves the farm in the form of meat or other livestock products, meaning that the other two-thirds accumulate on the farm. This is a good thing, as this means the majority of P becomes or remains part of the cropping/forage cycle and will eventually boost the P test of all feeds – cash crops and forages – grown on the farm.

Grains Are High in Phosphorus

Corn, barley, wheat and other feed grains routinely tests around 0.3% P. By comparison, the P requirement for an 800 lb. steer gaining about 3.75 lbs/day is about 0.25%. As a percent of ration, P requirement trends down as cattle become bigger, and is reduced at lower rates of gain.

An important development on the P front is the advent of distiller's grains and other grain by-products like corn gluten feed and steep water. By the very nature of the fermentation process, the P (and many other nutrients) is amplified three-fold in distillers' grains. Therefore, rations that use distillers are certainly another case where P is not limiting. In fact, in many cases there is excess P. The grain-based cattle finishing industry has learned that it can comfortably formulate rations without supplemental phosphorus.

Ontario Forages May Have Enough Phosphorus

So what lessons can be learned by the forage based sectors like cow-calf and backgrounders from the grain feeding sector? Perhaps that it is time to re-evaluate the practice of routine P supplementation here as well, in particular, because it is an expensive nutrient to supplement. In the past, much prominence was given to the idea that a high P vitamin-mineral premix aids fertility in beef cows. It would appear those recommendations originated in range conditions and not intensive farming conditions as seen in Ontario. The requirements for a lactating beef cow and a backgrounding (pasture) steer are about 0.22% and 0.20% respectively and have been addressed in previous editions of VB (Volume No. 8 Issue No. 23, July 2009 <http://www.omafr.gov.on.ca/english/livestock/beef/news/vbn0709.pdf>).

(Continued on page 4)



Figure 1. Many Ontario pastures and conserved forages fed to beef cows are high enough in phosphorus (P) to enable mineral programs that include zero supplemental P as has been implemented with high grain rations over the last decade.

Included are four leads or pieces of information that demonstrate many Ontario pasture and forages will, in fact, have enough P for beef cows and grass cattle without P supplementation. The only way to know is to sample your forages and get them analyzed:

2012 Forage Summary from A&L Labs, London. Link:

http://www.alcanada.com/index.htm_files/AL-FEED-FORAGE-SUMMARY-2012.pdf

2012 Forage Summary from SGS Labs, Guelph. Link:

<http://www.agtest.com/articles/FORAGE%20SUMMARY%202012.pdf>

Historic (2002) Feed Summary, OMAFRA Factsheet. Link:

<http://www.omafra.gov.on.ca/english/livestock/dairy/facts/03-103.htm>

2012 Grey-Bruce Pasture Data as in Figure 2.

What these four data sources indicate is that there is a significant body of evidence that shows forages routinely test above 0.25% P, and many test towards and over 0.3% P, a trend that was also evident in previous years as evident in the OMAFRA link in number 3. Most of these average values exceed the minimum threshold of 0.22% needed, indicating many of the individual lab analyses also will. There is a chance that data sources 1 to 3 (laboratory results) are biased towards dairy operations due to their increased likelihood of participating in forage testing. Source number 4, however, represents beef grass farms only.

(Continued on page 5)

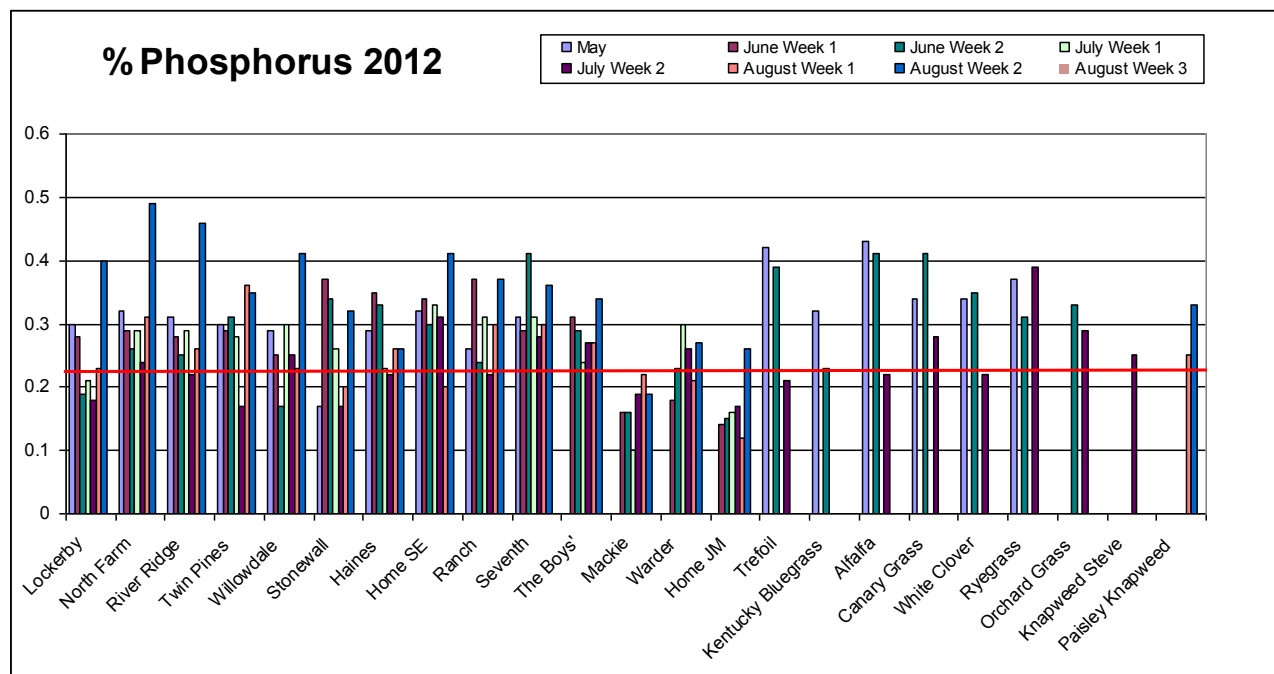


Figure 2. Phosphorus content of forage samples from Grey-Bruce Pasture

Phosphorous data taken on Grey and Bruce County pastures in 2012 as part of an OCA funded study on pasture trace mineral levels is shown in Figure 2. The graph depicts the requirement for lactating cows of 0.22% P as a horizontal red line. The nine right-most column represent pure species from the same paddock of one farm. Two properties clearly indicate they are low in P and require supplementation, two are periodically low, and the remainder met the requirements over time and likely require no supplemental P for lactating cows.

Trace Minerals Are Needed

Keeping in mind that P is only one nutrient in a multitude of individual essential mineral elements in a 'mineral premix', it remains important that the mineral supplementation addresses elements that are indeed deficient or limiting. Ontario is almost universally deficient in selenium, so that is one that needs to be done right. Salt, zinc, copper and other trace-minerals may also be limiting. In cases of confinement or winter feeding, vitamins A, D and E also likely warrant attention. So, this is to say that just because one mineral element can be removed from the mix, it does not mean that a 'mineral' supplement can be neglected due to these other nutrients needing attention. Then of course there are also the very clear cases where P is limiting and must be supplemented as in Figure 2.

So... Do or Don't Your Cows Need P?

Supplemental P for livestock (as monocalcium phosphate or dicalcium phosphate) is a significant expense. There is a good chance you don't need it! **The only way to tell is to undertake forage testing** and build a library of tests over time such that you can begin making informed long-term mineral supplementation decisions on your home-grown pastures and forages. Using this information you and your feed advisor or feed industry partners can save some money on individual mineral constituents you don't need, and focus your efforts on minerals or feed additives you do! 'Test and Supplement' as required is the word on phosphorus in your cow-calf nutrition program.

----- VB -----

Christoph Wand
Beef Cattle and Sheep Nutritionist
Ontario Ministry of Agriculture, Food and Rural Affairs
christoph.wand@ontario.ca

----- VB -----

In 2013, Get with the Program.... Calf Clubs still Pay!

Nancy Noecker, Beef Cow-calf Specialist
Ontario Ministry of Agriculture, Food and Rural Affairs

With the record calf prices in the fall of 2012, 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 set program and well presented calves. As the chart below shows all 4 of the special calf club sales brought the producers home significant dollars over the Ontario average prices in the same week.

Again note that these calves are included in the Ontario averages so the real difference is actually even more pronounced. The number of 500-600 lb. steer calves on the market moved from 1000 to 1800 the week of the Calf Rama and then back to 1400 the next week. The price for that category did a 5-7 cent jump for that week and then back down 7 cents the

week following.

In studies over 10 years, the numbers show that Calf Club Program Sales have excelled for 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 as I start my 2013 or calving or look forward to it. It means now is the time to start planning how those calves hitting the ground right now will be marketed. The basics of castration and dehorning are best done as close to birth as possible. The question of which vaccinations and when they should be done may be dictated by what club 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".

----- VB -----

Nancy Noecker, Beef Cow-Calf Specialist
Ontario Ministry of Agriculture, Food and Rural Affairs
nancy.noecker@ontario.ca

----- VB -----

Table 1. Calf Club Results for Fall 2012 vs. Open Ontario Market¹

	Week of Oct 20 - Oct 27	Keady Calf Rama Week			
		Oct.20	Oct.23	Oct.25	Oct.27
Avg. Price	Ontario Market Average	Keady -Bruce Char	Keady Geor- gian Char	Keady Black Calf	Keady Cen- tral
500-600 lb. steers (\$/cwt)	\$ 162.26	\$ 179.31	\$ 180.57	\$ 183.14	\$ 177.95
\$ value @ 550 lb	\$ 892.43	\$ 986.21	\$ 993.14	\$1,007.27	\$ 978.73
\$ difference per steer (special sale minus mar- ket avg.)		\$ 93.78	\$ 100.71	\$ 114.84	\$ 86.30
500-600 lb. heif- ers (\$/cwt.)	\$ 144.17	\$ 154.16	\$ 154.18	\$ 155.55	\$ 157.36
\$value @ 550lbs	\$ 792.94	\$ 847.88	\$ 847.99	\$ 855.53	\$ 865.48
\$ difference per heifer (special sale minus mar- ket avg.)		\$ 54.95	\$ 55.06	\$ 62.59	\$ 72.55

¹all prices from OCA Market Reports.

Stop the Pain

The case for pain control in calves

Barry Potter, Agriculture Development Advisor
Ontario Ministry of Agriculture, Food and Rural Affairs

Research suggests that beef calves of all ages experience stress when they are handled or when management practices are applied to them. Some of these procedures may cause pain. The recently released Canadian Code of Practice for Beef Cattle contains strong recommendations for producers to use pain blocks, such as anaesthesia, in dehorning animals over 4 months of age or castrating animals over 9 months of age. These ages represent a compromise between what is achievable on farm versus the amount of pain an animal suffers. Can we do something to reduce pain in our animals? Is it worth it from a management perspective? Is it the right thing to do?

Let's consider the impact of alleviating pain at castration time. Some people say the impact of castration is so quick that the animal gets over it without any loss of weight. However, calves given a local anaesthetic prior to castration have been shown to weight 35 lbs. more at the end of the trial than calves castrated without any pain alleviation.

Often times these production impacts are hard to measure. But new methods of measuring the neurological impact on calves under stress from dehorning or castration show that we can reduce the pain animals feel from these invasive procedures. Recent research at Iowa State examined the impact of aspirin on reduction of cortisol, a measure of stress in calves. Calves were split into groups, either uncastrated, untreated and castrated, or treated and castrated. In the trial, calves which did not receive aspirin ended up having higher levels of cortisol.

At a recent Dairy Animal Welfare conference at Guelph, Hans Coetzee, Iowa State University, discussed the use of non-steroidal anti-inflammatory drugs (NSAID) used to reduce pain in dehorning calves. He presented research to indicate the impact of the use of these drugs. Heinrich et al. (2009) demonstrated that 0.5 mg/ kg meloxicam intramuscular (IM) combined with a corneal nerve block reduced serum cortisol response for 6 hours in 6-12 wk. old calves, compared with calves receiving only local anesthesia prior to cautery dehorning. Furthermore, calves receiving meloxicam had lower heart rates and respiratory rates than placebo treated

control calves over 24 hours post-dehorning. Stewart et al. (2009) found that meloxicam administered intravenously (IV) at 0.5 mg/kg mitigated the onset of pain responses associated with hot-iron dehorning in 5 week old calves compared with administration of a corneal nerve block alone, as measured by heart rate variability and eye temperature. These findings indicate that administration of meloxicam at 0.5 mg/ kg IV or IM decreases physiological responses that may be linked to pain and distress associated with cautery dehorning in preweaning calves.

Meloxicam is an injectable product (Metacam) approved for use in calves in Canada. Its label directions are quite specific: "As an aid in improving appetite and weight gains when administered at the onset of diarrhoea, in combination with oral rehydration therapy, in calves over one week of age. For relief of pain following de-budding of horn buds in calves less than 3 months of age." So if we can dehorn prior to 3 months of age, Metacam can be useful in reducing pain in calves.

Pain block to reduce immediate pain from dehorning is possible. Work with your veterinarian to learn how to properly block the nerves going to the area around the horn. There is a valley or soft spot on the side of the calf's head between the eyes and the horn. By slowly inserting a needle here and fanning the pain block medication into this area, nerve pain can be blocked to the horn area. Calves can be dehorned with much less stress than without any pain block. Regardless of their age, calves will benefit from the use of pain medication for invasive procedures.

Using a pain block, and a pain medication can help lower cortisol or stress levels in calves. The benefits are many fold for the producer: calves are easier to handle when they are not feeling pain, will have reduced sickness and a shorter recovery time afterwards, and increased weight gain as compared to unmedicated animals. The Code of Practice recommends using them for dehorning and castrating when animals are a certain age. The research shows a benefit to the animal at any age. Work with your veterinarian to develop a program that works for you and your animals.

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

----- VB -----

Does Pasture Calving Make Sense?

New Liskeard systems research compares barn vs. pasture

Tom Hamilton

Beef Program Lead-Production Systems
Ontario Ministry of Agriculture, Food and Rural Affairs

The most stressful time of year for most cow-calf producers is calving season. You've invested a lot into those cows – hay, pasture, minerals, and a bull to breed them, just to mention a few items. And the cow only gets one opportunity per year to pay you back. It all rides on getting a live, vigorous calves that will grow steadily to weaning without problems. If you're calving in winter or early spring, cold weather can be a challenge for both calves and people! Calving problems are a concern, and once the calf is up and nursing, the risk of a scours outbreak is always in the back of your mind. These worries lead to multiple barn checks day and night, and as calving season wears on, you and your family are getting worn out.

For small herds, confinement calving in a barn is a viable option. Of course, you have to keep up with the bedding and be on top of any sickness that flares up. Night checks are a tiring chore, but with small numbers, it's not too bad. But if you want to expand up to 80-100 cows or more, the combination of building costs, calving time labour and increasing risk of disease outbreak is daunting. Is there a practical way to manage large numbers of cows while reducing the amount of calving time labour, stress and risk per cow?

Ongoing work at the New Liskeard Agricultural Research Station¹ (NLARS) has compared traditional barn calving in late winter with pasture calving in early summer. A recent review of this data included records from 1998 – 2012, including 1,172 winter born calves and 1,146 summer born calves. These results, collected over the past 15 years gives great insight into what producers can expect if they switch from barn calving to pasture calving.

The original New Liskeard beef herd was split into two management groups. The Winter calving group was bred starting in May, and calved in Feb-Mar. The pregnant cows wintered in an open front barn, with near-term cows brought into enclosed, non-heated calving pens. After a newborn calf was successfully mothered up by the cow, the pair was

returned to the open front barn. These cow-calf pairs went to pasture after green up in May.

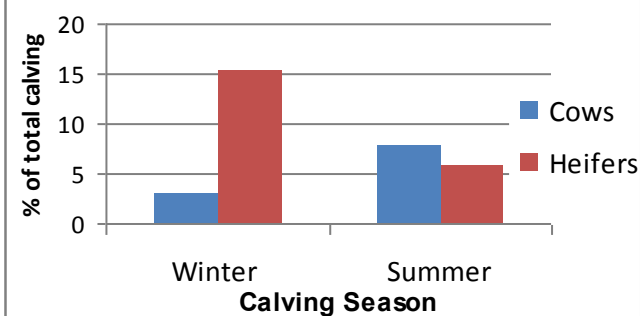
The Summer calving group was bred starting in September. Cows went to pasture in May, and calved on grass in June-July. If a cow required assistance at calving, it was either helped on pasture or brought back to the barn for more serious intervention. After pasture season, the cow-calf pairs were moved to open barns, with weaning occurring in January.

Calving Outcomes

Getting live calves and healthy cows is the goal of any calving system. In order to ensure this is achieved, it is common for producers to check on cows around the clock and intervene quickly if they think a cow is having trouble giving birth. But what happens when the cows are calving out on pasture, away from our intense surveillance?

It turned out that the pasture calving cows received far less assistance than their barn calving herd mates (Fig. 1). Only 1.8% of mature cows calving on pasture received assistance, compared with 4.6% of barn calving cows (Table 1). So the assist rate for barn calving cows was 2.5 times greater than that of pasture cows. First calving heifers showed a similar pattern, with only 5.9% of pasture calving heifers receiving assistance, while 15.5% of barn calvers were assisted. This gave an assist rate for barn calving heifers which was 2.6 times greater their pasture counterparts.

Figure 1. Rate of Calving Assistance



Pasture calvers received much less assistance when giving birth, but did this compromise calf survival? The answer is no ... the survival rate of pasture born

(Continued on page 9)

calves was the same as that of barn born calves, about 95% from birth to weaning. So providing much less assistance did not compromise the weaning rate of pasture born calves. There are several potential reasons for this. It could be that the barn calves got unneeded help, just because they were close at hand. Another reason could be that the pasture cows were less stressed when calving, since they were not confined and were under much less intense human observation. This may have allowed them to more fully express their innate calving ability. Another potential factor is birth weight, as pasture born calves averaged about 2 lbs lighter at birth.

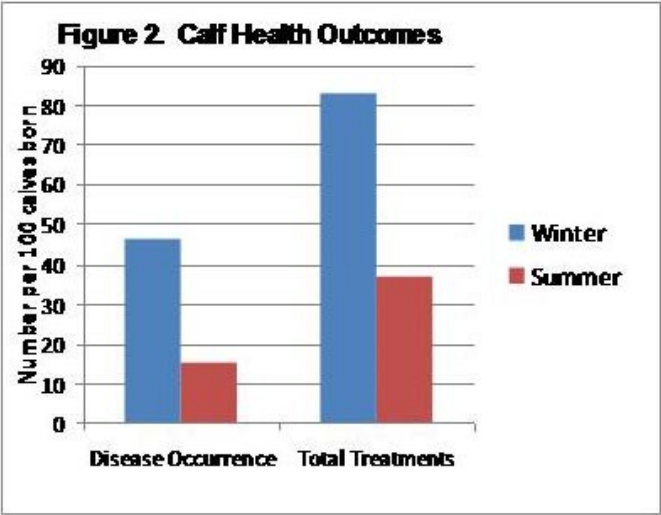
Calf Health

Calf health records were available from 2005-2012. They were summarized to give both the number of separate disease occurrences and the total number of treatments administered (Table 1). For example, a calf identified as having scours and treated on 4 consecutive days would be classed as having 1 disease occurrence and 4 total treatments. If the same calf was later treated for respiratory problems and given a course of treatments over 3 days, it would be classed as having 2 disease occurrences and 7 total treatments.

The results showed that Winter born calves had a disease occurrence which was 3 times greater than that of Summer born calves (Fig.2). As well, the treatment rate for Winter calves was 2.25 times greater than that for Summer calves. A likely reason for the improved health status of pasture calves is the environment they were born into. In barn calving, the overall density of animals and repeated use of calving pens can lead to the build-up of disease causing microbes, in spite of diligent clean up and lots of bedding. This can get to the level where the calf's defences are overwhelmed. In contrast, the pasture environment is likely to have much less contamination since the animals would be entering a relatively clean environment in spring, and have much more area per head than those in confinement.

Calf Performance

Calves were weighed at around 200 days of age, and adjusted weaning weights (AWW) were calculated by BIO². Winter born calves were slightly heavier, with an average AWW of 646 lbs., compared with the Summer born calves at 633 lbs., a 13 lb. advantage for the Winter group.



Summary

Compared with cows calving in a barn in Winter, pasture calving cows in Summer had a much lower rate of calving assistance. Despite significantly less intervention at calving, the pasture born calves had an equally high rate of survival from birth to weaning. As well, the pasture born calves also showed a much improved health status. Barn born calves had a rate of disease occurrence which was 300% greater and a treatment rate that was 225% greater than those born on pasture.

In this long term study, Summer pasture calving showed significant benefits over Winter barn calving in terms of ease of calving and health status of calves. These advantages should be associated with lower labour costs and less stress on workers at calving time, as well as reduced facilities costs since calving barns and pens would not be necessary. Pasture calving may be a viable alternative system for traditional cow-calf operations wanting to increase cow numbers while reducing calving time labour per cow and reducing facilities costs per cow, or for the start-up of new large scale beef cow herds.

¹part of Kemptville College, University of Guelph

²Beef Improvement Opportunities, Guelph. Adjusted to 200 days of age, for age of dam, sex of calf and for twins

(Continued on page 10)

Table 1. Calving System Comparison *			
	Calving Season		Statistical Significance ¹
	Winter	Summer	
Assisted Births - Heifers (%)	15.5	5.9	***
Assisted Births - Cows (%)	4.6	1.8	**
Calf Survival, Birth to Weaning (%)	95.4	94.9	NS
Disease Occurrence (# per 100 calves born)	46.7	15.5	***
Total Treatments (# per 100 calves born)	83.0	37.0	***

*Explanation: NS = non significant ; ** = $p < .01$; *** = $p < .001$

----- VB -----
 Tom Hamilton, Beef Program Lead-Production Systems
 Ontario Ministry of Agriculture, Food and Rural Affairs
tom.hamilton@ontario.ca

----- VB -----

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<http://www.omafra.gov.on.ca/english/busdev/diversifyfarmbus/valueadded.htm>

Upcoming Workshops and Webinars

Workshops are being planned in different locations throughout Ontario for Winter 2013.

Registration fliers and dates of all scheduled workshops will be posted at: <http://www.omafra.gov.on.ca/english/busdev/diversifyfarmbus/valueadded.htm>

ADD NEW VALUE TO YOUR BUSINESS WORKSHOPS

[February 26](#), Clinton Resource Centre

[March 5](#), Lions Club Hall, Wyoming

[March 13](#), Macaulay Church, Picton

[March 18](#), Purvis Hall, Kemptville

[March 20](#), Cobden Community Centre (Rear Entrance)

[Webinar Series - Feb. 27 and 28, 2013](#)

A webinar is basically a workshop or seminar offered over the web and teleconferencing for audio.

Why choose the webinar format? If you prefer the convenience of learning from your own home, being able to participate regardless of weather, and you have access to a reasonable Internet bandwidth and are comfortable using the Internet-this is an ideal option for you. Take advantage of this facilitated online session to exchange ideas with others as you learn how to turn your idea into reality.

To be notified of upcoming workshops contact the
Agricultural Information Contact Centre at 1-877-424-1300 or at ag.info.omafra@ontario.ca.

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Livestock producers can apply now for additional support

Application forms are now available through the [2012 Canada-Ontario Forage and Livestock Transportation Assistance Initiative](#) for Ontario livestock breeders who are facing severe forage shortages due to this summer's dry weather. This AgriRecovery initiative helps producers in designated drought areas by offsetting extraordinary transportation costs incurred to feed or to transport eligible livestock to sources of hay, silage, straw or green feed.

Eligible breeding livestock includes:

- Beef cattle
- Elk
- Deer
- Goats
- Sheep
- Horses (bred for meat, pregnant mare's urine or sale of offspring).

Eligible producers must apply for funding by March 22, 2013. Funding may be provided in the following ways:

- Up to \$0.14 per tonne, per kilometre for the transportation of eligible feed to eligible livestock.
- Up to \$0.075 per kilometre per head to move eligible cattle and horses to available feed.
- Up to \$0.05 per kilometre per head to move eligible sheep and goats to available feed.

AgriRecovery provides targeted, disaster-specific programming when assistance is needed beyond existing programs like AgriStability, Production Insurance or the Risk Management Program.

[More information](#) is available on agricorp.com or by contacting [Agricorp](#). 1-888-247-4999

[Program Guidelines](#)