Ontario

OMAFRA *Virtual Beef*

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In This Issue

Marketing Replacement Heifers – Questions to Consider

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Buying replacement heifers can be an efficient way to source females. You buy what you need either ready to breed or already bred. You can manage your cow herd as one **genetic unit** and run more cows by purchasing females that provide you with the **maternal traits** you require. Then you can focus bull selection on those traits (like growth and carcass) that will produce desirable feeder calves. It seems easy enough to step out and buy the females you want but several cow-calf operators call annually looking for names of producers who have F1 or crossbred replacement heifers for sale.

Figure 1. Selling Replacement Heifers for Breeding Can Increase Returns

…………….*continued on next page*

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There are many straightbred herds in Ontario that could benefit from an ongoing relationship with another breeder looking to source replacement females. Heifer calves generally bring a discount in comparison to their steer calf contemporaries when sold through the feeder market. Crossing your straightbred herd with a second breed that is known for its maternal traits could provide you with additional **options** when it comes to **marketing** your calves. The resulting crossbred calves would benefit from **heterosis** (hybrid vigour) resulting in improved gains and calf livability. Selecting the right breeds could also improve the marketability of the steer calves, while improving the returns on their heifer mates by increasing your marketing options. The top cut of the crossbred heifers could be retained and marketed as replacement females.

Figure 2. Cows from Female Lines Have Outstanding Maternal Traits

Understanding your customers' needs is a key in developing any successful product. You need to survey the marketplace and identify the critical factors which your customers are looking for in replacement heifers. Can you fulfill their needs with your current herd? Most commercial producers when asked would list the following criteria on their shopping list when it comes to replacement females:

- moderate frame
- easy keeping
- F1 female (prefer Continental x British in most cases, breed preference generally includes two of the following breeds: Hereford, Simmental, Black Angus, Red Angus, Gelbvieh)
- Heifers vaccinated and from a vaccinated cow herd
- functional (i.e. deep ribbed, good set of feet and legs, good udders)
- consistent/annual supply of these females
- performance information available on their sires, dams and/or the heifers themselves

It is important to investigate the opportunities in the replacement heifer market before making the leap. Here are some of the questions you need to answer before proceeding …

1. What breed crosses are likely to be the most marketable in your area?
2. Will you sell these potential replacement heifers at weaning, retain the heifer calves and market them as yearlings ready to breed, or as bred heifers the following fall?
3. Do you have the facilities and the management ability to develop the heifers to their full potential?
4. What will it cost you to develop these females?
5. Can you recover your costs based on your prediction of the market?
6. Is there potential to develop a contract with a producer looking to source replacement females on an annual basis?

The **female** is the **foundation** of the **herd,** and putting together a strong group of uniform females will put you well on the way to creating and marketing "reputation" cattle.

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Preventing Mouldy Hay Using Propionic Acid

Joel Bagg,
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Trying to make dry hay between rainstorms can be frustrating. When haymaking periods without rain are short, we frequently get into a no-win situation. Either the hay isn't dry enough to bale before the next rain and it gets rain-damaged, or it gets baled "tough" before it is quite dry enough and becomes mouldy, poor quality, dusty hay. Propionic acid can be used as a dry hay preservative to prevent mould when baling hay at moistures that would otherwise be too high.

Mould Damage
Moulds greatly reduce the value of dry hay, particularly when targeting the "quality" horse hay or dairy hay markets. **Moulds consume** hay **nutrients** and cause **dry matter losses**, as well as producing toxins that are detrimental to animal health. Mouldy, dusty hay contains spores that can cause respiratory problems, particularly with horses. Mould growth can even result in hay **fires** from **spontaneous combustion.**

Propionic Acid Preservatives
Propionic acid is an organic acid that acts as a fungicide, inhibiting the growth of aerobic micro-organisms that can cause heating and moulding. Other organic acids, such as acetic and citric acids are sometimes also included, but propionic acid is the most effective as a mould inhibitor.

The propionic acid **inhibits mould** growth while the bales "sweat' and "cure" down to safe moisture levels by dissipation and evaporation. Do not confuse organic acid hay preservatives with enzymes, bacterial inoculants or nutritive additive products, which differ in modes-of-action and effectiveness. Propionic acid is sprayed onto hay as it enters the baler. Equipment includes a baler-mounted applicator with a pump, nozzles, and tank.

Hay treated with buffered propionic and other organic acid products is safe to feed to live stock. Propionic and acetic acids are organic acids that are produced by microbes in the rumen (and the cecum and colon of horses) and then used by the animal as part of the digestion process.

The Hay Drying Curve
A standing crop of forage is about 70 – 80% moisture. Initially, the drying rate is quite rapid, but slows considerably when it gets to the low 20s. Getting the moisture down that last few percent before baling can take a lot of drying time.

Inevitably, there will be situations when the storm clouds are moving in, but the hay isn't quite ready to bale. Rain on almost-dry raked hay is much more damaging than rain on hay that has just been cut. Using **propionic acid** enables us to **bale** considerably **earlier**. This is especially true with poor, slow drying conditions, such as high relative humidity and low wind speed. With large square balers, the use of propionic acid is almost a necessity, because the moisture level must be very low to avoid spoilage.

Buffered Acid Products
The original propionic acid products were unbuffered, which meant they were highly corrosive, very volatile, and difficult to work with. Products now marketed are buffered to a pH of 5.8 – 6.0 with ammonium hydroxide. **Buffered** products are much **less volatile** and **corrosive**, making them much easier to use. Other ingredients sometimes included are surfactants and green colouring. Products differ in concentration of propionic acid, so purchase decisions should be based on the price per kg of active ingredient.

Follow Label Directions
Read and follow label directions. Enough acid must be applied using the correct rate of active ingredient at various moisture levels for it to work properly. Different products have different

concentrations of active ingredient. Using very dilute products provides greater coverage, but requires more water to be applied on the hay you are trying to dry.

Recommended Moisture Levels

Optimum moisture levels for safe storage vary according to bale type and density. Dry hay storage moisture guidelines **without** propionic acid for various bale types are:

Small square	15 – 18%
Large round (soft core)	13 – 16%
Large square & large round (hard core)	12 – 15%

Specific acid application rates at various moisture levels are detailed on the product labels. At lower moisture levels, product costs are typically in the $7 – 14 per tonne range. If targeting quality hay, these costs are easily recoverable. While some product labels indicate acid can be added to hay up to 35% moisture, this would be at a much higher risk of heating and spoilage, as well as significantly increasing the amount and cost of the product per tonne of hay, making this less practical. When using propionic acid, most hay producers seldom exceed 25% moisture.

Using Electronic Moisture Testers

An accurate measure of hay moisture is required to determine the proper application rate. Electronic moisture testers estimate percent moisture by measuring the resistance of a hay sample to electricity flowing through it. The wetter the hay, the more electricity flows through. There are 2 basic types - hand-held probes and in-baler sensors. In-baler moisture sensors enable the operator to monitor moisture on-the-go from the tractor seat. Sensors can be located in-chamber on square balers, and on the sidewalls of large round balers. In-baler sensors have the advantage of giving numerous, continuous readings. Application rates can then be adjusted either manually or automatically according to the moisture. In-baler moisture sensors with automatic applicators are virtually standard on large square balers, and are also available for large round and small square balers.

Electronic moisture testers are an excellent tool, but keep in mind that they cannot guarantee there are no errors in application rates. Hay can gain or lose 3 – 5 percentage points of moisture in an hour, and there can easily be 5 percentage points of variation in a windrow. Accuracy is affected by bale density, whether it is grass or alfalfa, whether it is plant moisture or dew moisture, and whether acid has already been applied. Electronic moisture testers need to be **calibrated** to the conditions and well maintained. Beware that digital readings do not give you a false sense of accuracy. Moisture testers should be used to supplement personal experience.

Applicator Capital Costs

Basic application equipment, including a small tank, pump and nozzles, starts at about $1,000. Probe-type hand-held moisture testers can be purchased for about $300. Of course, adding bigger tanks, in-line moisture sensors and automatic flow regulators can add a few thousand more to the cost.

When Is Using Acid Most Economical?

The main advantages of using propionic acid to preserve hay are less mould, reduced drying time, less potential rain damage and more weather suitable for baling. Using propionic acid provides baling flexibility. You can start earlier, quit later in the day and keep the baler baling when the weather isn't perfect.

There are three situations when propionic acid application to dry hay is most economical:

1. used strategically to **avoid rain damage** on **"almost-dry hay"** when the weather doesn't co-operate
2. **large, dense bales** that are difficult to dry to low enough moistures to avoid mould, and
3. custom operators and producers baling **large volumes** that can pass the costs on to customers that demand mould- and dust-free hay.

Baling at higher moisture also reduces mechanical harvest loss from leaf shattering and should increase forage quality. So, does it pay to use propionic acid all the time and bale at higher moistures to prevent leaf loss, or only strategically when the weather doesn't co-operate? This will depend on the expected amount of raking and leaf loss, the final value of the hay product and the nutritional requirements of what it will be fed to. Routine acid application to reduce leaf loss would be more economical on alfalfa hay than on mixed or grass hay, and more beneficial when targeting higher value, well-stored, high quality hay.

Cautions

There is a "learning curve" for a high batting average when making "no rain, mould-free" hay. Although a useful and successful tool, the use of propionic acid will add to that learning curve. Errors can result in mouldy hay, or even worse, a dangerously heating mow.

Uniform application at the **correct rate** is key. Uneven windrows or fields with wet spots will have varying moisture levels. Use a moisture tester to determine application rate, using the highest reading. If you use the average reading, you won't get enough acid on much of the hay to prevent spoilage. Spraying should be as uniform as possible to ensure good coverage.

Hay can still heat and become mouldy and discoloured if inadequate acid is applied. Tightly stacked bales in a confined area don't allow the bales to "sweat" and cure. The acid can dissipate in 4-6 months, which may be before hay moisture is low enough if conditions are unfavourable. Extended periods of high humidity will extend the curing time. Don't store treated and untreated dry hay in direct contact with each other as the moisture will migrate to the dry hay.

Some horse owners aren't comfortable feeding acid treated hay and prefer not to purchase it. There may initially be some propionic odour in the hay until it has dissipated. Be sure to inform hay buyers that propionic acid has been applied.

Conclusions

Propionic acid is most economical when used strategically to avoid the rain damage and mould associated with poor weather conditions. Propionic acid is also very effective with higher density bales, such as large squares, that need to be drier at baling to avoid mould growth.

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Beef Cattle's Response to Noise? Stress and Fear

Craig Richardson,
OMAFRA Animal Care Specialist

Certain types of noises are sources of fear for cattle. **Fear** creates **stress**. Stress makes cattle harder to handle both this time around and the next. Stressed cattle have **more bruising**, borderline **dark cutters** and **injuries**. As well, stress reduces weight gain, suppresses immune response and impairs rumen function. By reducing or eliminating the sounds most feared by cattle, handlers may greatly reduce the negative effects of the stress caused by this fear-evoking stimulus.

Why Noise Creates Fear

Sound is measured by intensity or loudness (decibels, or db) and frequency or pitch (hertz or Hz). (For some sound measurements see *Sound Facts* chart below). **Cattle** are **very sensitive** to moderately high frequency (high pitched) sounds. At higher frequencies, noise can be more irritating to cattle as compared to humans with our less sensitive ears. What sounds like a whisper to us is quite audible to cattle. Do not make noise in the 6,000 to 8,000 Hertz (Hz) range because cattle's hearing is most sensitive at these frequencies. These sounds can hurt their ears. Examples of these noises would be loud yelling, constant whistling and air exhaust from pneumatic equipment.

Sound Facts

- Hearing range for Humans is 20 to 20,000 Hz
- Hearing range for Cattle is 23 to 35,000 Hz
- At 20 Hz, humans hear very low pitch sound or very deep tones
- At 20,000 Hz, humans hear high pitched sound
- Normal speech is 500 to 4,000 Hz
- At 6,000 to 8,000 Hz range, cattle's hearing is most sensitive
- 0 db is the softest sound humans can hear, whisper is 30 db
- 50 to 60 db: normal speech
- 80 db: moderately loud music
- 95 db: lawnmower
- Two men shouting to encourage cattle movement averaged 86 db, and peaked at 95 db (ref. 6)
- Average noise of clanging in cattle chute, metal gates, etc. was 85 db, and-peaked at 94 db (ref. 6)
- 120 db: edge of human tolerance

Cattle are afraid of unexpected noises that are sudden and new to them. Noises heard during handling may be new and therefore frightening. A sound which is associated with a previous bad experience, such as:

- rough handling
- vaccination or branding
- loading for transport, and/or
- sales ring experience

may also invoke associated fear.

Cattle that have inherited a more excitable temperament are more "flighty", showing more fear-based behaviour. These behaviours include faster and faster tail lashing, raising their heads up as the herd mills around, struggling in the squeeze, kicking, and jumping fences. Animals in this excited state will cause other cattle to become excited. It is easier to **avoid noises** like yelling, whistling and clanging that cause this level of fear or agitation rather than to try to control a fearful animal. **Yelling** at or **hitting** a fearful animal will only make the **situation worse**.

Fear Creates Stress

In a research trial, cattle exposed to a noise showed significant increases in both heart rate and the pressure they applied to a pressure measuring squeeze. In addition, the sounds of clanging chains and banging gates were compared to human shouting. Both sounds created fear and stress responses in the cattle, but the **shouting** alone created significantly **more fear** in cattle than only the **metallic sounds**. Don't yell to make cattle move; it is counter productive and unnecessary in animal handling. Place padding of some form on any metal parts or chains in handling facilities, gates and vehicle partitions. Sound is not contained in a specific region of a handling facility. Noise can be heard by cattle outside of the handling area. Hearing fear-evoking sounds will increase the waiting cattle's stress level. This will impact on how they react when moved into the handling area.

Cattle that are fearful or agitated in the squeeze have been found to have lower weight gains, reduced tenderness and more borderline dark cutters. Stress during handling and transportation lowers both immune and rumen functions. Noise is an important cause of stress in transported calves. Stressed cattle arriving at the feedlot are slower to get on to feed and tend to have more health problems.

Figure 3. Transporting Cattle Can Cause Significant Stress.

At the sales barn, cattle that became agitated during handling were found to be more sensitive to unexpected events. These more temperamental cattle were more sensitive to sudden intermittent movements and sounds. Researchers observed increased sensitivity to the ringmen yelling and waving their arms, striking a plastic rattle-paddle on the ring fence and children yelling or running at ringside. The ringmen yelling "hey" or children yelling caused more of a startle response in the cattle than the amplified auctioneer's voice, gate slamming or phone ringing. Cattle held overnight in noisy abattoir holding pens were more agitated and more bruised compared to cattle staying in quieter abattoir pens.

Figure 4. Cattle Can Be Moved Gently Using A Rattle Paddle.

Figure 5. Understanding Cattle Psychology Reduces Loading Stress

Conclusions

Cattle have very **sensitive hearing**. Don't yell and whistle at them to make them move. A loud stressful handling experience will be remembered by cattle, making it even harder to handle them the next time. **Quiet** handling of cattle improves their **welfare**, the financial bottom line and **reduces stress** on both man and beast.

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Feeding Systems for Beef Cows

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There's Got To Be A Better Way!

During my travels around the province, I've had the chance to see many feeding systems at work in the beef cow business, as well as other sectors, including new dairy, beef feedlot, sheep and lamb feedlot facilities. I've come to the conclusion that there are many **poor feeding systems** on Ontario cow-calf farms. Overall, the understanding in our cow-calf sector of labour efficiency as it relates to feeding is poor.

But I hate being negative! There are many opportunities to improve labour, feed and cost efficiencies by improving winter feeding systems in the Ontario cow/calf industry. So let me focus on the many positive aspects that I have been exposed to …

The Challenge of Feeding Systems

In Ontario, umbrella recommendations are difficult to make. Keeping in mind that pasture is the cheapest and fastest way to feed, the issue of summer versus winter infrastructure is critical. If a farm truly maximizes the pasture resource (and minimizes annual feed cost) how much effort or money is justified in creating a winter feeding facility? There are some issues to consider such as ration cost, labour savings, feed wastage and safety. For example in a previous issue of *Virtual Beef,* the idea of commodity based rations to reduce hay use this past winter was explored. How does a person utilize those products that are so different from each other, or the typical beef cow ration? The answer is a flexible feeding system; and my favourite example is the **fence-line feeder**.

Why Fence-line Feeders?

Drive-through feeders are among the most time and labour efficient way of delivering large amounts of bulky feeds (which a cow ration is). The fence-line concept can be implemented in numerous ways, but its flexibility remains constant. The system can accommodate any forage, which is the cornerstone ingredient. It can

Figure 6. Fence-line Feeding is Fast and Efficient.

Figure 7. This Permanent Winter Feeding Paddock Would Benefit from a Fence-line Feeder

use big bales or bulk feed, round or square bales, wet or dry ingredients, silage or dry hay. The down side is capital investment, and perhaps inflexibility of location depending on the wintering site(s) used.

How Does Your System Compare?

- Forage feeding time should be no more than **15 seconds per cow** per day
- One person should be able to feed forage in a system with no additional help
- If concentrates are fed, they should be delivered even more rapidly than forage (or preferably *with* the forage)
- Does the system risk animals being contact with machinery during feed delivery? Such systems pose animal safety risks and are less time efficient
- Does the feeding system depend on people being in contact with animals during feed delivery? Such systems create human safety risks, especially in limit-fed situations!

What's the Bottom Line?

Simple systems are the most effective to ensure success. Although other systems can perform well, fence-line designs with ample bunk space allow for maximum flexibility with regards to forage type (silage vs. hay, bulk vs. bales), commodity feeding options and restricted feeding (limit-fed, or reduced hay) programs. And, not to be overlooked, they are safe for both the farmer and hungry cows!

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Making Feeder Cattle Purchasing Decisions

Dennis Martin,
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High energy feed such as grain corn is most often used in finishing rations for beef cattle. However, other feeds, generally in combination with corn or corn products can also be used. The issues this year are **cheap corn** (currently valued below cost of production) and relatively **strong replacement prices**, particularly for light weight grass type cattle. Other factors to consider when making purchasing decisions are a potentially weak summer fed market and a high Canadian dollar. Some would argue cheap feed and green grass means expensive replacements thus evaporating any potential profit.

Let's start by looking at feedlot performance cost of production (COP), and profit.

In its simplest form the profit equation is:

Profit = [Price Received - COP] X Volume

Many feedlot operators aim for a gain of 100 lbs/month, or an average daily gain of 3 lbs. or better per animal. For lots of reasons there can be a great range in gain or performance of feedlot cattle. This in turn affects cost of gain, breakeven price and potential profit.

Healthy cattle fed a balanced, quality ration, combined with the right genetics and body condition, are the keys to high performance. Youthful cattle that have the potential to perform well are worth more when purchased by feedlot operators. Cow/calf operators and backgrounders should always remember this!

Feed (despite low corn price) is still the single largest expense when calculating cost of gain. The following example looks at a typical high energy corn diet and ration cost.

Table 1. Finishing Diet (for 1200 lb. Cattle)

	Lbs Fed/Day
Dry Corn	25.0
Supplement/Premix	1.5
Dry Hay	3.0
Dry Matter Intake as % of Body Weight	2.1%

Table 2. Finish Diet Ration Cost, Calculated at Three Different Corn Prices*

Corn Price ($/tonne)	**Total Daily Feed Cost ($)**	**Total Feed Cost per lb of Gain ($/lb)**
$100.00	$1.50	$0.50
$120.00	$1.74	$0.58
** $140.00	$1.98	$0.66

* Assumptions: ADG @ 3 lbs/day, Supplement @ $350/tonne, Dry Hay @ $100/tonne
** Close to cost of production for corn

As indicated in Table 2, the price of corn can have a huge impact on cost per pound of gain. Other costs such as **yardage, health, marketing and interest** can easily account for another 25¢ per pound of gain and have to be included to calculate **Total Cost of Production**.

The fall of the year is the time when most calves and yearlings are sold and purchased. The following three charts look at the potential **breakeven sale price** based on purchase price and cost of production. If you know your COP, then these charts can be used as a tool to help determine the economics of feeding cattle.

Table 3. Breakeven Purchase and Selling Prices at Varying Costs of Production for Feeding 900 lb Yearlings to Slaughter Weight of 1400 lbs

Yearling Purchase Price ($/lb)	**Purchase Price ($/head)**	**Slaughter Weight Selling Price ($/lb)**		
		Cost of Production ($/lb)		
		$0.65	***$0.75***	***$0.85***
$1.00	$900.00	$0.88	$0.91	$0.95
$1.05	$945.00	$0.91	$0.94	$0.98
$1.10	$990.00	$0.94	$0.98	$1.01
$1.15	$1,035.00	$0.97	$1.01	$1.04
$1.20	$1,080.00	$1.00	**$1.04**	$1.08
$1.25	$1,125.00	$1.04	$1.07	$1.11

*Example: The highlighted breakeven sale price of $1.04/lb is based on COP of $0.75/lb of gain and a purchase price of $1.20/lb

Table 4. Breakeven Purchase and Selling Prices at Varying Costs of Production for Feeding 500 lb Calves to 900 lb Yearling Weight *

Purchase Price Calves ($/lb)	**Price/head ($)**	**Selling Price Yearlings ($/lb)**		
		Cost of Production ($/lb)		
		$0.65	***$0.75***	***$0.85***
$1.00	$500.00	$0.84	$0.89	$0.93
$1.10	$550.00	$0.90	$0.94	$0.99
$1.20	$600.00	$0.96	$1.00	$1.04
$1.30	$650.00	$1.01	**$1.06**	$1.10
$1.40	$700.00	$1.07	$1.11	$1.16
$1.50	$750.00	$1.12	$1.17	$1.21

*Example: The highlighted breakeven sale price of $1.06/lb is based on COP of $0.75/lb of gain and a purchase price of $1.30/lb

Table 5. Breakeven Purchase and Selling Prices at Varying Costs of Production for Feeding 600lb Calves To Slaughter Weight Of 1400 lbs

Purchase Price Calves ($/lb)	Price/head ($)	Selling Price Slaughter Cattle ($/lb) Cost of Production ($/lb)		
		$0.65	***$0.75***	***$0.85***
$1.00	$600.00	$0.80	$0.86	$0.91
$1.10	$660.00	$0.84	$0.90	$0.96
$1.20	$720.00	$0.89	$0.94	$1.00
$1.25	$750.00	$0.91	$0.96	$1.02
$1.30	$780.00	$0.93	$0.99	$1.04
$1.35	$810.00	$0.95	$1.01	$1.06

Points to Ponder ….. OTM (Over Thirty Months) Cost to Beef Producers

- Estimate 1 - 2% of the federal fed kill goes OTM, according to dentition.
- Discount on these carcasses is in the range of $0.30 - $0.40/lb rail grade.
- **Age verification** by **birthdates** entered into the **CCIA database** is becoming increasingly important!

For further information on using budgets to calculate your cost of production, refer to the ministry website at http://www.omafra.gov.on.ca/english/busdev/bear2000/Budgets/budgettools.htm

or contact Dennis Martin (see contact information below).

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