



Virtual Beef

ISSN 2291-188X

VOLUME NO. 23 ISSUE NO. 69 WINTER 2023

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Direct general questions and suggestions to: Havelah Carter, Editor at havelah.carter@ontario.ca or call 519-820-4175. For inquiries regarding content of a specific article contact the author.

Benefits of Compact Calving

James Byrne, Beef Cattle Specialist, OMAFRA

An OMAFRA Special Sales Analysis: Ontario Calf Buyers Questionnaire and Ontario Cow-Calf Producer Questionnaire, (Van Schaik, Chaffe 2018, unpublished), demonstrated that Ontario calf buyers prefer to purchase and are willing to pay a premium for calves that are uniform in weight and presented in larger lots. To deliver calves to these specifications and capture those premiums requires that the calving spread, (i.e., the number of weeks between the start of calving and the end of calving), is as short as possible. A tight or short calving spread is also referred to as compact calving.

To maximize the benefits of compact calving for spring calving herds, producers should aim to calf 60% of the herd within the first 4 weeks of the start of calving and 80% of the herd within 8 weeks of the start of the calving. The 2017 Ontario Cow Calf survey showed that 54% of mature cows (64% for heifers) calved in the first 21 days and 87% calved by day 63. The breeding season length was 118 days for mature cows and 107 days for heifers. The recommended breeding length is 63 days or 8 weeks. The higher the percent of calves that are born within this 8-week interval, the greater the potential value of these calves for the reasons mentioned above. Research by Funston et al. (2012) showed that calves born from cows bred within the first 21 days of the breeding season had weaning weights 39 lbs. heavier than later born calves. Depending on the preferred date of calving, which is farm specific, a producer may also be able achieve a higher gross revenue by having a larger number of calves for sale when calf prices are high.



Figure 1: Cow with calf at foot. Picture: James Byrne, OMAFRA.

There are other benefits to compact calving that are sometimes not recognized. As calving is concentrated into a short intense period, producer fatigue is reduced. Research has consistently noted that where the calving season is long, calf mortality is higher compared to situations of shorter, tighter calving periods. Typically, calf mortality incidence is very low at the start of the calving, but as the season progresses and workload on the producer increases, calf mortality increases. There are several factors for this. Longer calving periods provide pathogens an opportunity to build up in sheds and an opportunity for older calves to pass disease on to younger, more susceptible animals. Producers' attention to detail on this point at the start of calving may lag as calving drags on. High hygiene standards at the start of the calving period can lapse unintentionally when calving is over a long period of time.

It has been observed that compact calving reduces the rate of dystocia, (calving difficulties). This may be due to that fact that as most cows are calving around the same time, their calf size will be similar. Additionally, managing cows to be in good body condition score at calving is simpler as the dietary requirements for gestation and lactation stages are more alike for the whole herd. A long calving season means that the dietary requirements of the earlier calvers will be different to that of the late calvers. A long calving period can lead to a complex feeding requirement, i.e., feeding cows in mid pregnancy, late pregnancy, and early lactation. This can lead to late calving cows being either in poor body condition or more commonly, over conditioned. Both situations increase the risk of calf difficulties.

Moving to a compact calving system though can be challenging and depending on the current calving pattern, may require several years to achieve. To establish a compact calving pattern, determine the start of the breeding season and keep the breeding season to 10 weeks. This will ensure that all cows bred in this 10-week breeding period will calf within the 63-day calving target. Cows that do not breed within this 10-week period should be culled. If you are struggling to reduce the spread, have replacement heifers bred and in-calf at the beginning of the breeding season. Over time, the remaining outliers of the group will be eventually culled out or sold.

Where the calving pattern means that there are only a small number of cows who do not go in-calf over this 10-week breeding period, using replacement heifers plus culling is a very good approach. If the current calving pattern means that there would potentially be a large number of cows who do not go in-calf within the 10 week breeding period a more manageable and financially acceptable approach is to extend the breeding season to 12 weeks to breed more of cows, but reduce the breeding period to 11 weeks the subsequent year and 10 weeks the year after. This approach means that the culling rate each year is more manageable.

If you are using a stock bull for your breeding purposes, it is critical that he is both fit and fertile prior to the start of the breeding season. A bull breeding soundness examination should ideally be carried out at least 12 weeks prior to the start of the breeding season but no later than 6 weeks prior. Any issues discovered must be fixed as a matter of urgency and if not correctable, seek an alternative option including the purchase of a new bull. Compact breeding seasons requires the correct bull to cow ratio to prevent overworking the bull. For yearling bulls use a maximum of 15 to 20 cows per bull and for mature bulls a maximum of 30 to 40 cows per bull. A plan on how to deal with the bull post breeding should also be in place.

Replacement heifers should be bred 2 weeks prior to the start of the main herd breeding season. Heifers should be bred prior to the main herd to ensure they calf down ahead of the main herd. The post-partum interval, (i.e., the number of days between calving and rebreeding), is longer for 1st calf heifers than mature cows. So having heifers' calf down before the main herd will ensure they rebreed within the subsequent target 10-week breeding period. Pregnancy check heifers as soon as practical and if discovered not in calf, they can be fed for selling. Mature cows should also be pregnancy checked as soon as practical and, if found not in-calf, should be earmarked for culling at weaning time. It is economic fallacy to maintain an empty mature cow over the winter-feeding period.

Developing a compact calving pattern requires both planning and management. It may take a few years to get right but once achieved it will deliver significant economic benefits

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----- VB -----
 James Byrne, Beef Cattle Specialist
 Ontario Ministry of Agriculture, Food & Rural Affairs
James.Byrne@ontario.ca
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Understanding Cattle Prices

Steve Duff, Chief Economist, OMAFRA

Farmers are faced with a wide range of market information and opinions on market prices. These sources of market information and opinion often offer conflicting views which can make marketing decisions for individual farmers quite difficult and stressful. It is useful for each farmer to have a general understanding of how prices are both determined and discovered.

Price determination refers to the big picture or overall price levels for a commodity. Price discovery pertains to how an individual farm or business arrives at a transaction price for their commodities. These two concepts are fundamentally different things. Every farmer should have some basic understanding of the factors that affect price determination for the commodities they produce. This will help you anticipate the direction of price movements over time. Understanding how prices can be discovered and anticipated gives you the best chance of maximizing sales price. This in turn, gives you the best chance of being as profitable as possible. None of these pieces of knowledge or understanding are a guarantee and sometimes the price discovery mechanisms farmers use, tell something quite different than the price determination factors. Being able to observe and understand why price discovery is telling you something different is key to being able to avoid such situations in the future. It will also improve your chance of maximizing sales price.

Price determination is the interaction of the broad forces of supply and demand that determine the overall market price level. Feeder cattle supply in Ontario is driven by several factors including cow inventories, lagged feeder cattle prices, time of year, and availability of feed. Feeder cattle demand in Ontario is driven by several factors including: fed cattle prices, feed prices, time of year, retail beef prices and frozen stocks of beef. For Canadian livestock producers, price determination is based on global, but mostly United States (US) meat supply and demand forces. These forces, such as livestock inventories, production, competing meat prices, consumption, and trade all come into play to determine a base price level. As long as trade in meat and livestock is free and open, Canadian pricing is going to be determined through US markets. If Canadian prices get too out of line with US markets, supplies will either move into or out of Canada, rapidly. This process is called arbitrage. In the case of cattle, the overall price level is ultimately expressed as a representative, or widely quoted US cattle price. This might be futures contract price or a regional price such as Nebraska steers. The representative price chosen and used for price determination is really determined based on where your farm is located and the major US markets most influential to your local market. Price discovery is a transaction that can take place at the market or individual farm level.

In general, however, price discovery in Canadian agriculture and in this case cattle, takes the form of this formula:
 Canadian Price = US Price ÷ US/Canada Exchange Rate – Basis

Whether the observed market price is an auction transaction, a formula price for a contract, or a spot market negotiation, the final prices are going to follow this basic formula.

In the Ontario cattle sector context, the US base or representative price is almost always the Chicago Mercantile Exchange (CME) futures market price for feeder or fed cattle. Note that market prices reported are in US dollars per hundredweight of live animal and further details on each futures contract are available at the links below:

Nearby Chicago Mercantile Exchange (CME) feeder cattle futures price
www.cmegroup.com/trading/agricultural/livestock/feeder-cattle.html

Nearby CME live cattle futures price www.cmegroup.com/trading/agricultural/livestock/live-cattle.html

The basis is in many ways the most difficult part of the price discovery process. This is the local or regional component of the price. It's the difference in price between one region and a CME futures contract. Regions that have excess cattle will be on an export basis. This is often referred to as a negative basis where the local price is lower than the reference price (CME contract) adjusted for exchange rate. Normally, Ontario feeder cattle are on an export basis for most of the year. At times, local shortages for example can flip prices to an import basis and this has widely been the case for the last two years. The tricky part about the basis is that it is something that is only observed or understood after the cattle are sold. It is not known before you sell your cattle what the basis will be, rather all you know is what the basis has been lately, the factors that affect the basis, and what the basis is normally for that time of year. Understanding these factors is key to helping you maximize the sales price you receive for your cattle.

OMAFRA does a weekly calculation of Ontario feeder and fed cattle basis and provides it on its statistics website:
<https://data.ontario.ca/dataset/average-weekly-cattle-prices>

The following is an example basis calculation for January 20, 2023:

- BFO average 500-599 pound steer price \$275.99 per hundredweight
- CME Mar 2023 close \$177.92 USD per hundredweight
- CDN dollar exchange rate 0.747 January 20, 2023 basis = $\$275.99 - \$177.92 \div 0.747 = + \$37.81$

Note that the average feeder cattle basis for at or on Jan 20 for 2017 to 2021 was + \$26.52, on import basis. And the basis on this day in 2023 was + \$37.81, an import basis. This is a clear indication of the short supply of Ontario feeder cattle and the strong demand for what feeder cattle supply is available.

There are two very unique aspects about cattle that make using price discovery formulas and basis very challenging. First, feeder cattle, are one of the only agricultural commodities that are primarily sold by auction. The majority of other agricultural commodities, including fed cattle, tend to be sold on a spot cash market, a direct negotiated contract or a direct formula price. Second, cattle are not a homogeneous or standard product. Homogeneous products like a bushel of corn that are generally very similar can be easily standardized in terms of pricing and grades. Cattle have several attributes that greatly affect market price such as weight, sex, breed, frame, pre-condition (dehorned, castrated, vaccinated, age verified, etc.), and ability to be grouped and sold with one or more other cattle that have similar attributes. Auction markets bring cattle buyers and sellers together and for feeder cattle provide the best method of price discovery. Market summaries are available online and for some of the auctions in farm newspapers such as the Ontario Farmer or BFO website on a daily and weekly basis. But as a potential seller, it is important to understand the characteristics each market has relative to the feeder cattle you are planning to sell. For example, some sales do not place requirements on the characteristics of the cattle being sold which can result in more variable numbers of buyers, sellers, and available cattle from one week to the next. In many parts of Ontario there is a growing number of "special" sales that are designed to bring together a larger number of buyers and sellers and in turn provide buyers with a larger availability of feeder cattle that are very consistent in terms of a quality feedlot prep program (castrated, dehorned, bunk adjusted, vaccinated) and presentation.

Previous virtual beef articles have shown these types of sales can be quite beneficial: [vbn0219 Eng.pdf \(beefquelp.ca\)](#)

Regardless of where you sell your cattle or the characteristics of your cattle, the following are some key pieces of information that should be tracked every year to help you manage price expectations and hopefully give the greatest chance for success:

- Know your per sold animal cost of production and track over time
- Record your market prices received and the attributes your cattle had and if these attributes have changed over time
- If you sold at a specific auction, record the weight and frame category, low, high, and average price and the volume sold and where your cattle fit into that range.
- If you didn't sell at a specific auction, pick one close to your area and record every year using it as a reference, and relate the price you received to the average price.
- Record the CME feeder cattle futures and exchange rate for the day your cattle sold and calculate your own basis and compare to the weekly basis provided by OMAFRA <https://data.ontario.ca/dataset/average-weekly-cattle-prices>

Canada's cattle sector is part of a highly integrated North American market. One benefit of being a small price taker in this North American market is that it enables quite clear linkages for price determination and discovery. The CME futures prices provides Ontario farmers with a solid tool to help plan and manage price expectations. Using CME futures prices, coupled with local market info from the BFO, OMAFRA or your own sales results, producers can help see for themselves where their cattle fit into this broader market picture over time. Doing so provides each producer with the best possible chance for pricing success in a cattle world with clearly no guarantees.

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Steve Duff, Chief Economist
Ontario Ministry of Agriculture, Food & Rural Affairs
stephen.duff@ontario.ca

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Disease in feedlots from the perspective of the epidemiological triangle

Havie carter, Provincial Beef cattle specialist, OMAFRA

The complexity of disease can make managing cattle health a difficult task. Many common illnesses in feedlots including bovine respiratory disease, and gastrointestinal diseases are classified as multifactorial diseases. This means that it is not one singular factor, but the interaction between several factors that cause the disease. This concept is well illustrated by something called the epidemiological triangle (Figure 1).

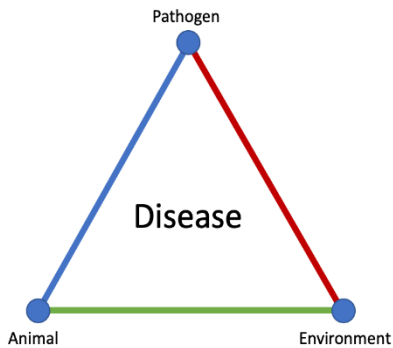


Figure 1. The epidemiological triangle

The epidemiological triangle is divided into three categories: the animal's susceptibility to disease, environmental factors, and infectious pathogens that cause disease. It is the interaction of these three categories which identifies the level of risk for disease.

In this case, the animal refers to the cattle that will be affected by the disease. Their susceptibility to the disease can be attributed to several factors such as genetics, nutrition, age, breed, stress, if they have been sick before, and where they fall in the pecking order of the herd.

The pathogen is the agent that is responsible for causing the disease. In feedlots, there are various microorganisms such as bacteria, viruses, and parasites that can spread via feed, water, feces, and the environment.

The environment includes anything related to the living conditions of the cattle. Examples include feed and water quality, cleanliness, air quality, bedding, stocking density, and the weather.

The more of these factors that can be improved on farm, the lower the risk of disease will be. For example, it is vital to ensure the cattle have dry bedding and water, especially this time of year (Figure 2). If the cattle are on a wet pack, they will use more of their energy reserves to maintain body heat and a lack of water can lead to dehydration. Any animal that has low energy and is dehydrated is at a high risk of developing a disease (Popkin *et al*, 20).

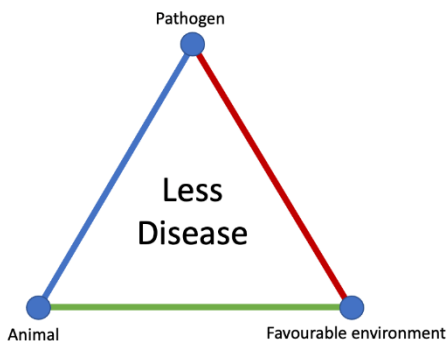


Figure 2. Epidemiological triangle with favourable environmental conditions

For instance, bovine respiratory disease (BRD) is a major health concern and is the most significant disease in feedlot cattle (Gagea *et al*, 2016). It is also a primary example of a multifactorial disease. Unfavourable environments such as poor air quality, overcrowded pens and temperature fluctuations can increase the risk on BRD. Although there have been

several research and medical advances in preventing and treating BRD, it is still the top cause of sickness and accounts for 54-66% of all deaths in feedlots, resulting in severe economic losses (Gagea *et al*, 2016).

It has been determined that the highest risk period for contracting BRD is within the first three weeks of feedlot arrival. Coinciding with this discovery, stress is one of the main factors contributing to sickness in feedlots and is likely why BRD developed the nick name “shipping fever” (Taylor *et al*, 2010).

The prevention of BRD can be challenging due to its multifactorial nature. There have been several accounts of BRD causing pathogens being found in the nasal passages of healthy cattle (BCRC, 2022). This means these healthy animals are still carriers of the disease. These healthy carrier animals can pass the disease to other cattle in the herd that have less favourable health or environmental conditions. Furthermore, the carrier can become sick if their environmental or health conditions change and become less favourable. This is comparable to an adult having a bacteria or virus that can cause a cold but is showing no symptoms. This person can still be contagious and pass the pathogen to someone who has a weaker immune system and will likely get sick and show symptoms.

Clinical signs of BRD include laboured breathing, fever (>40°C/104°F), discharge from the nose and eyes, reduced appetite, and coughing. Generally, cattle with BRD tend to separate themselves from the herd which makes them easy to spot. Although BRD is most common within the first few weeks at arrival, it can still occur later which is why it is important to continue to diligently check each pen throughout the entire finishing process.

Lameness, such as strawberry foot rot is a multifactorial disease, as it is caused by a variety of factors. These can include infection of the foot with the bacteria *Dermatophilus congolensis*, being a young or immunosuppressed animal, improper nutrition, poor hoof hygiene, genetic predisposition, trauma, and being chronically exposed to wet conditions. Strawberry foot rot is the most common cause of lameness in Ontario feedlots. Any measures that can be taken to improve the cattle’s environment or the animals’ health will reduce the risk of lameness within the herd (Figure 2).

Similarly, acidosis can be multifactorial due to the combination of factors that can disrupt the balance of the gut microbiome. This common disease is primarily a result of a high concentrate and low forage diet. This can lead to an overgrowth of acid-producing microorganisms in the rumen, which causes the pH to drop. However, there are other factors related to stress that can increase the risk of acidosis such as reduced feed and water availability or consumption.

There are numerous preventative measures that can be taken to improve environmental factors and host factors to reduce the risk of diseases including BRD, Lameness and acidosis. Implementing a combination of these management strategies will help to effectively reduce stress and therefore, decrease the risk of disease in the herd and improve the health and productivity of the cattle.

- **Biosecurity:** implementing strict biosecurity measures can help to reduce the risk of disease transmission in feedlots. This includes avoiding mixing different groups of cattle, regularly cleaning and disinfecting pens and equipment and reducing cross-contamination between farms by removing dirt and manure and disinfecting your boots before entering another barn.
- **Vaccination:** Vaccinating cattle against common respiratory pathogens can help reduce the incidence of BRD. It is important to work with your veterinarian to develop an appropriate vaccination program for your herd.
- **Proper nutrition:** providing adequate nutrition to cattle in feedlots can help to improve their overall health to reduce their susceptibility to disease. This includes providing an effective ration as well as ensuring that the feed is of high quality and free from contaminants. Consulting with a nutritionist can help ensure the ration is well balanced.
- **Environmental management:** proper environmental management in feedlots can help to reduce the risk of disease. This includes providing adequate ventilation, maintaining appropriate temperature and humidity levels, and avoiding overstocking the pens.
- **Early detection and treatment:** Regularly monitoring the health of the cattle and promptly treating any animals that show signs of illness can help to reduce the spread of disease.
- **Culling:** Culling animals that are chronic carriers of disease pathogens can help to reduce the spread of disease in the herd.

The epidemiological triangle is a useful tool for understanding how diseases spread and how to prevent them. By identifying factors associated with an unfavourable environment that increase the cattle's susceptibility to disease, it will be easier to develop and apply targeted interventions and preventative measures to reduce the risk of disease in the herd.

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Havelah Carter, Provincial Beef cattle specialist
Ontario Ministry of Agriculture, Food & Rural Affairs

havelah.carter@ontario.ca

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