



NOVA SCOTIA DEPARTMENT OF AGRICULTURE

Beef Production Manual

A Guide for 4-H Leaders
and Beginning Farmers

Beef Production Manual

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Disclaimer

This manual is intended to be a resource that provides educational information for 4-H leaders and people who are interested in raising livestock. It covers topics such as breeds, husbandry, nutrition, health, safety, and business.

This manual's appendix includes a section that outlines topics and activities for 4-H meetings. The content included in this guide is meant for reference only.

Readers who require additional information, specific regulations, or more details are asked to contact the Nova Scotia Department of Agriculture Regional offices for assistance:

<https://novascotia.ca/agri/programs-and-services/regional-services/>

While steps have been taken to ensure the content in this booklet is accurate, recommendations, guidelines, and regulations may change at any time. Authority rests with the relevant regulatory body.

Introduction

Cattle are large ruminant animals that were first domesticated around 10,500 years ago from the wild Aurochs cattle (*Bos primigenius*). Domestication is thought to have occurred in two areas simultaneously: the Near East, and the area that is now Pakistan. The word “cattle” originally meant movable personal property, as cattle were often used as money or in the barter system. It is thought that owning cattle is the oldest form of wealth. Cattle historically, and today, are used mainly for their food products (milk and meat), leather, and, in developing countries, for draft power.

Cattle species have recently been reclassified into the species *Bos taurus* with three subspecies: *Bos taurus taurus* (European cattle), *Bos indicus* (zebu-type cattle), and the extinct *Bos primigenius* (Aurochs). As cattle were bred and developed for various uses, distinct breeds were formed, some breeds specialized in producing dairy products, while others specialized in producing beef. Today it is estimated that there are over 1,000 breeds of cattle worldwide. Beef cattle are raised for their meat.

There are three main stages in the beef production cycle:

Cow-calf operations, where cattle are bred for their offspring;

Backgrounding operations, where the offspring from cow-calf operations are fed and prepared for entering feedlots; and

Finish operations (feedlots) where those feeder cattle are sent for fattening and then on to slaughter.

This cycle is not the only option though. More and more producers are opting to raise their cattle to market.

Section 1: Selecting an Animal

What must you consider when selecting a beef animal? What are the most important factors? How do you decide? The following information will help you select an animal.

Purchasing and Selecting Stock

The first decision you must make is what type of beef operation you want to have. In Nova Scotia, most beef farms are either cow-calf operations or finish operations. A cow-calf operation maintains a breeding herd and sells feeders (weaned calves). A finish operation buys feeders and finishes them—that is, raises them to slaughter. Some farms both breed cattle and raise the calves through to finish. If you are looking to set up a finish operation, you will likely purchase a steer or possibly a heifer. If you want to set up a cow-calf operation, you will be looking for a heifer, a mature cow, a bull, or a group.

As a farmer/producer you need to keep the following points in mind when you are deciding between finishing a heifer or a steer for market:

- Heifers grow slower but will fatten at a lighter weight than steers.
- Depending on the breed, heifers will finish approximately 70 kg (154 lbs) lighter than steers. So, if you finish a heifer and a steer at the same weight, the heifer will be fatter.
- Heifers are often more active than a steer, so they require more energy per unit of grain and more feed per unit of weight gain than a steer.
- There is always the possibility the heifer may be or become pregnant.
- Heifer calves can often be purchased at a lower price than steers.
- Instead of being slaughtered, heifer calves may be bought as breeding stock.

Crossbred or Purebred?

Another decision you must make is whether you are going to buy a purebred (single breed) or a crossbred (mixture of breeds).

A purebred calf is one whose parents are of the same breed, with no other breeds present in their background. These animals may be registered with their breed organization. Although many people prefer a registered purebred, it is not always necessary and may cost you extra money.

A crossbred calf has parents of different or mixed breeds. The calf will have characteristics of more than one breed, and, hopefully, the most desirable characteristics of each.

Commercial breeders often prefer crossbred animals for the following reasons:

- They may inherit the desirable characteristics of each breed.

- Crossbred calves often have hybrid vigour. This means their performance is even greater than the average performance of their parents. Hybrid vigour is present if traits are enhanced due to the mixing of parental genes. Most often, the greatest improvements are in fertility, growth rate, and feed conversion.
- Due to higher milk production, some breeds of cows have higher pre-weaning gains.
- Crossbred calves will finish earlier than some of the larger-framed purebred cattle.

Assessing an Animal's History

An animal's history and previous management will affect how the animal grows, develops, and maintains its overall health. When building a comprehensive history of an animal, you should consider the following:

Date of Birth/Age Verification

- Ask for an age-verification certificate.
- Does the certificate match the tag number?

Weaning

- What was the weaning date?
- What was the weaning weight?

Breeding Considerations

- Is the animal a purebred or crossbred?
 - If crossbred:**
 - What are the major breed influences?
 - Will this cross's traits help meet your cattle and beef production goals?
 - If purebred:**
 - Will the breed's traits help meet your cattle and beef production goals?
 - Does the animal have registration papers?

Castration

- When was the steer castrated?
- What castration method was used?
- Was the castration complete?

Horns

- Is the animal horned, dehorned, or polled (bred to be hornless)?
- When was the animal dehorned?
- What method was used to dehorn?

- Is there any regrowth, and, if so, will the process have to be repeated?

Health

- Does the animal look healthy?
- Is it alert?
- Does it have an appetite?
- Is the animal active?
- Is its coat smooth and shiny?
- Are the eyes bright and clear?
- Are the ears upright or dropping?
- Does the animal drink water when it is provided?
- Is the animal urinating and passing manure normally?
- Is there evidence of disease or parasites?
- Is the animal too fat or too thin?
- What is the animal's current weight?
- Ask for vaccination and deworming records.

Disposition

- Is the animal calm and comfortable around people and other animals?
- Does it seem agitated?
- What is its status in the herd?

Implants

- Has the animal received any implants?
- If so, with what product?
- When was it implanted?

Some Things to Avoid:

- Eyes: Wild, fiery, scared
- Legs: Fidgety, pawing, kicking
- Stance: Charging, shaking, cowering

What to Consider When Selecting an Animal

Follow these steps when you are selecting an animal:

1. Know the characteristics of the ideal or perfect animal.

2. Compare any and all available animals to each other, as well as to the ideal animal.
3. View the front, rear, and sides of the animal from a distance. This gives you an overall impression of the animal.
4. Move in for a close examination of each animal.
5. Check for any signs of illness (such as dull coat, sores, respiratory issues etc.).
6. View the animals once again from a distance.
7. Make your decision.

Where to Buy – Auctions vs. Private Sale

Beef animals are often purchased either from an auction or through a private sale.

Here are some things to consider when purchasing a beef cow:

- Find out what the calf was fed.
- Has this cow been receiving adequate nutrition for optimum growth and productivity?
- Look at the performance records of the animal's parents.
- Adjust your expected prices to suit market conditions.

At an Auction:

Your expectations for quality and health should be the same as if you were buying from a private producer.

- Arrive early. Bidding occurs quickly and you will need time to examine the animals.
- Examine the cows for sale and highlight the most desirable animals on your list.
- Decide what the animal is worth and write the price down next to the calf's number. By doing this, you will prevent yourself from overpaying.

Don't get caught up in the auction and bid just to buy. Remember what you want and what you are willing to pay.

Conformation

Learn how to recognize the characteristics that make an ideal feeder steer (one that is mature enough to be placed in a feedlot where they will be fattened prior to slaughter). Consider the following when picking one out:

Frame size -The frame of an animal is its skeleton. If a calf has a small



frame, it will never be able to reach a large size. Ideally, a feeder calf will reach 455 - 555 kg (1,003 - 1,223 lbs) in a reasonable amount of time without carrying excess fat or waste. Frame score is calculated by comparing the hip height and the age of the calf.

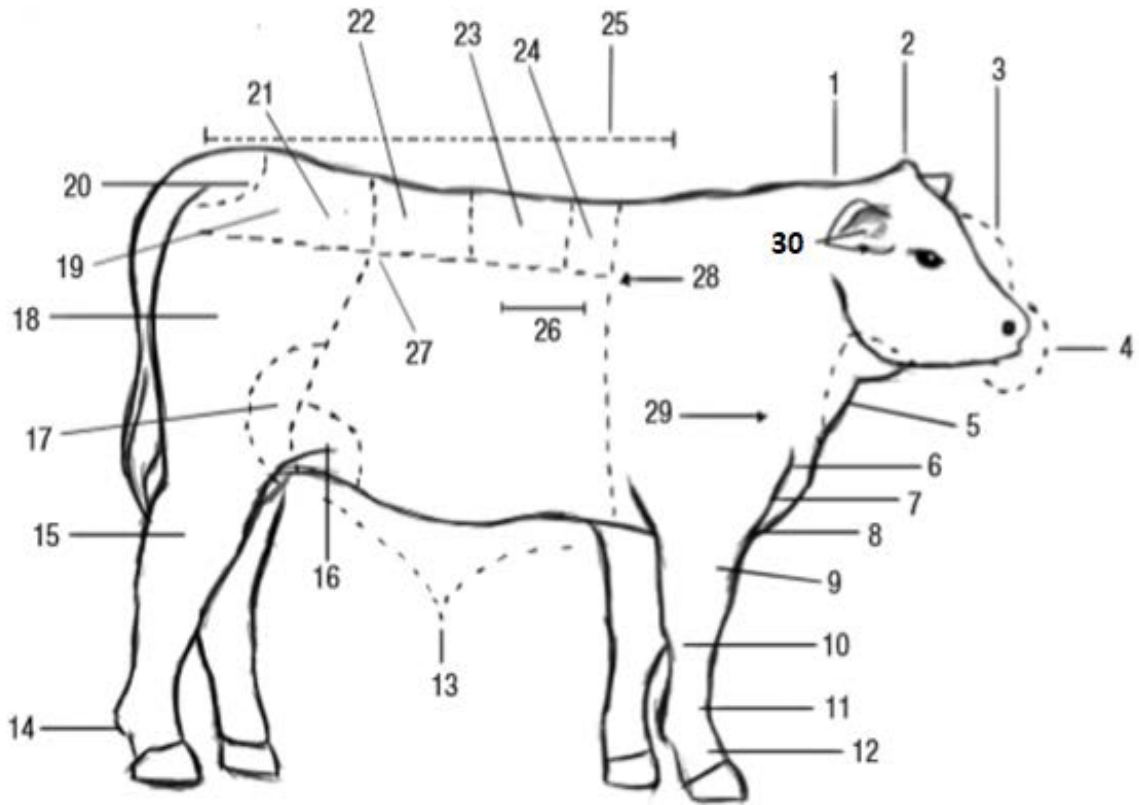
Muscling - If a calf's rear feet are placed close together when it stands, it most likely lacks muscle. When viewed from the side, the cow should be widest through its stifle region (#17 on the diagram below). An ideal calf will be thick through the centre of its round as this is where the most expensive cuts of meat are located.

Volume and Performance - A deep-bodied animal that can consume large amounts of food is ideal as it will mature and reach market weight quickly. Indications of performance are rib cage length depth and spring of ribs, as well as depth of flank and width of chest floor.

Trimness - Ideally, a calf will be trim through its brisket and flank (#7, and #16 on the diagram below). Excess flesh in these areas results in a less profitable animal. Mature-looking calves tend to be wastey (have too much fat compared to meat) when they are finished as they deposit fat earlier than a trim animal.

Structure, Soundness, and Balance - Strong bones and a correct skeletal structure are essential for a healthy and sound animal. You can observe structure in the angle of the shoulder and pastern (#12 on the diagram below), the levelness of topline (#25 on the diagram below) and hip, and in the animal's movement. Balance is the overall attractiveness of the animal; it should be evenly balanced from front to back.

Parts of a Cow



1. Crest	7. Brisket	13. Underline	19. Pin Bone	25. Topline
2. Poll	8. Chest Floor	14. Dew Claw	20. Tail Head	26. Ribs
3. Face	9. Forearm	15. Hock	21. Rump	27. Hooks
4. Muzzle	10. Knee	16. Flank	22. Loin	28. Heart Girth
5. Dewlap	11. Shank	17. Stifle Region	23. Back	29. Shoulder
6. Point of the Shoulder	12. Pastern	18. Quarter	24. Crop	30. Ear

Image Copyright: 4-H Alberta

Conformation		
	Good Qualities	Bad Qualities
Skeletal Frame Size	Large frame	Small narrow frame
Muscle - Heifer	Big hip and top Heavily muscled Wide base	Narrows from hook to pins Lightly muscled Narrow base
Muscle - Steers and Bulls	Big hip and top Wide from stifle to stifle Square Muscular top Muscle is well defined	Narrow unshaped top Flat quartered Narrow base Flat stifled
Volume, Performance	Deep body Good spring of rib Wide chest High volume	Flat ribbed Narrow chest Shallow, tight rib
Trimness, Condition	Well finished Trimmer through brisket, flank	Too fat/skinny Wastey
Structure, Soundness, Balance	Sound Wide track Level topline and hip Smooth shoulder	Topline roaches Straight shoulder Tight moving and hipped
Femininity	Attractive Long front Thin/feminine neck Smooth shoulder	Deep fronted Bold and coarse shoulder Wastey front Thick and coarse fronted

Beef Breeds

In the beef cattle industry, there are many different breeds to choose from. There are important differences between these breeds that you must consider before making a decision. Some breeds have been bred with an emphasis on carcass quality and growth characteristics, while

others have been bred for their hardiness and maternal qualities. They all look different in size, shape, and colour. Purebred cattle are not the only option; there are many crossbred options. You can learn more about cattle breeds by talking to producers, looking at cattle magazines, breed association webpages, and promotional material.

Angus

Angus cattle are adapted to harsh weather and are undemanding, adaptable, and good natured. They mature early and have a high carcass yield with nicely marbled meat. Angus are widely used in crossbreeding to improve carcass quality and milking ability. They are polled, and this gene is passed on, so calves should be hornless. Females calve easily and have good calf-rearing abilities. The main difference between Red Angus and Black Angus is colour.



Image Copyright: Clark Angus Ranch

Weight: Bulls 1,045 kg (2,304 lbs), cows 568 kg (1,252 lbs); milk yield: 1,820 kg (4,012 lbs)

Charolais

The Charolais breed originated in central France. They are a medium- to large-framed beef cow with a white-to-cream coat colour. They have a deep and broad body with heavily muscled loins and haunches. The breed has demonstrated superior growth abilities, efficient feedlot gains, and carcass cut-out values. With excellent meat conformation and a relative late maturity, they are well suited to fattening for high-finished weight. The Charolais are useful for all-purpose cross breeding, however heifer calving can be difficult.



Image Copyright: holtkampcattle.com

Weight: Bulls 1,136 kg (2,504 lbs), cows 727 kg (1,603 lbs); milk yield: 1,818 kg (4,008 lbs)

Herefords

These cattle were kept in Herefordshire in western England for centuries. Herefords are medium-framed cattle with a distinctive red body colour and white on the head, front of the neck, brisket, underside, and switch. They have well-developed forequarters, a deep brisket, broad head, and stocky legs. Herefords are generally docile and fast-growing cattle with good beef quality.



Image Copyright: Oklahoma State University

Weight: Bulls 1,045 kg (2,304 lbs), cows 682 kg (1,504 lbs); milk yield: 1,588 kg (3,500 lbs)

Limousin

Limousins originated in France. They are medium- to large-framed beef cattle with a reddish-gold or straw-coloured coat. Bulls tend to have a darker coat colouring. The Limousin has a long body and exceptional rump. They are well muscled with a relatively small head. On feed, they show high daily weight gain with high carcass yield. This breed can be temperamental but, overall, they are well suited to all-purpose crossbreeding. Calves have moderate birthweights that result in lower incidences of calving problems compared to other breeds. There is also a consistent pattern of increased weaning and yearling weight in crossbred calves.



Weight: Bulls 1,091 kg (2,504 lbs), cows 727 kg (1,603 lbs); milk yield: 2,272 kg (5,009 lbs)

Shorthorn

This breed originated in England. Their coat colour ranges from red to roan to white. They are a medium-size breed known for their early maturity, adaptability, mothering ability, reproductive performance, hardiness, good disposition, feed conversion, and longevity. In the feedlot, these cattle attain market weights and finish at an early age.

Weight: Bulls 1,045 kg (2,304 lbs), cows 636 kg (1,402 lbs); milk yield: 1,814 kg (3,999 lbs)



Image Copyright: Beef Shorthorn Association of Australia

Simmental

Originally, this breed came from Switzerland. They are one of the more docile and easier-to-manage breeds. Simmentals are known for their long and straight topline with deeply muscled back and loin. They are medium-to-large cattle with strong bones. Females have a productive lifetime of ten to twelve years and high milk production. Simmental colour varies from pale gold to dark reddish brown, with a white head. They have excellent feed conversion and carcass yield. They are suited to all-purpose crossing with smaller breeds.



Image Copyright: Toro Muco Ranch

Weight: Bulls 1,273 kg (2,800 lbs), cows 727 kg (1,603 lbs); milk yield: 3,629 kg (8,000 lbs).

Section 2: Care and Management

Code of Practice

Canada's National Farm Animal Care Council has developed a *Code of Practice for the Care and Handling of Beef Cattle* that outlines proper care and handling techniques for a variety of livestock animals. The code contains recommendations for housing and management practices, as well as transportation and processing. Find the full code at <http://www.nfacc.ca/codes-of-practice/beef-cattle>.

These codes of practice are nationally developed guidelines that serve as the foundation for ensuring farm animals are looked after using sound management and welfare practices that promote animal health and well-being. Codes are used as educational tools, reference materials for regulations, and the foundation for industry animal care assessment programs. The code aims to provide feasible and scientifically informed approaches to meeting an animal's health and welfare needs, contributing to a sustainable and internationally competitive farming industry.

The management provided by the person(s) responsible for the daily care of animals has a significant influence on the animals' welfare. Those responsible should be trained in ensuring cattle will be treated humanely. The Beef Cattle Code of Practice states producers should consider the following key aspects and freedoms of responsible care of cattle:

- Shelter for protection and comfort
- Feed and water to maintain optimal health
- Freedom of movement, exercise, and opportunity to express most normal behaviours
- Company of herd mates
- Footing that reduces the risk of slipping
- Disease prevention and control
- Veterinary care, diagnosis, and treatment
- Freedom from unnecessary pain and discomfort
- Emergency preparedness for fire, mechanical breakdowns, and the disruption of feed supplies

For the codes of practice for other livestock species visit: <http://www.nfacc.ca/>

Housing

Beef cattle can be housed in a number of ways. How they are housed depends on their age, size, and reproductive state. The National Farm Animal Care Council Beef Cattle Code of Practice outlines the desired outcomes for cattle housing as follows:

- All beef operations must have access to equipment or facilities for the safe handling, restraint, treatment, segregation, loading, and unloading of cattle.
- All cattle grouped together must have enough space to have a normal resting posture, be able to move freely, and have access to feed and water.
- All cattle are kept under conditions conducive to their safety, health, comfort, nourishment, and humane handling.
- Cattle can express natural behaviour.
- Cattle are not adversely affected by extremes in weather, such as cold, floods, freezing rain, storms, and heat waves.
- Indoor air quality and ventilation is sufficient (ammonia levels <25 ppm).

Some examples of beef cattle housing include

- | | |
|--------------------|---------------|
| • Range conditions | • Corrals |
| • Fields | • Indoor pens |
| • Yards | • Stalls |

Some geographical features can also be used as housing for cattle, such as wooded areas or other areas that are sheltered from the wind and sun.

One of the main factors to consider when you are deciding on housing for your cattle is the cow's ability to cope with sudden changes in climate or adverse weather conditions. The cow's coping ability depends on the following:

- **Age** - Newborn calves or older cattle are more susceptible to adverse weather.
- **Body condition score** - Is the cow in good enough condition to withstand a harsh climate?
- **Nutrition** - Is there access to adequate feed, water, and shelter?
- **Health status** - Are the cows healthy or do they need medical treatment?
- **Stress** - Newly arrived feedlot cattle may experience stress and be less able to adapt.

Requirements for Housing Cattle

Cattle need to have access to areas, either natural or human made, that provide relief from adverse weather that may cause a serious risk to the animals' welfare. You should promptly assist individual cattle that show signs of not coping with the weather.

Some types of facilities for beef cattle can range from a stanchion barn to a tarp barn. Each type of housing has its pros and cons. You'll have to decide which type fits your production style and sizing requirements. No matter the type of facility, it must meet the above requirements. See the section in the National Farm Animal Care Council code of practice for a

list of signs of environmental distress. A link to the code of practice can be found at the end of this manual under Additional Resources.

Grazing Management

Cattle are ruminants and grazing is an obvious choice as a feeding option. Continuous grazing, rotational grazing, and management intensive grazing are all grazing systems used by beef producers in Nova Scotia. Your own preferences, existing infrastructure, land base, and the size of your herd will be factors that determine which one you use.

Continuous grazing is the practice of turning a herd of cattle onto a defined area of pasture and leaving them there for the grazing season. To ensure the pasture can support the herd throughout the season, the stocking rate must be determined by the forage production during the lowest production period – typically July and August. Animals can be added or removed throughout the season to adjust stocking density and allow the forage stand to recover. This system takes the least amount of management.

Drawbacks of a continuous grazing system:

- Meat production per unit of land is low.
- Most of the forage produced in the spring is wasted.
- Grazing is selective and, with time, causes the quality to decrease.

Three types of **managed grazing** are described below. Their advantages over continuous grazing include

- More of the produced forage is used
- Higher numbers of animals can be supported by the pasture
- More production per unit of land
- Faster recovery times and longer productivity
- The opportunity to take a cut of silage or hay if there is excess forage in the spring
- Desirable legumes and grasses are able to persist from year to year.

Rotational Grazing

Rotational grazing is the practice of moving livestock through paddocks to graze on grass that is at an optimum height for production. Rotational grazing often involves fencing a pasture into many small paddocks, enough paddocks so the livestock do not return to graze on grass until it has fully recovered. The paddocks are grazed in sequence and the cattle are removed from a paddock before they start to graze new plant growth, ideally within three days. In general, livestock are put into the paddock when the forage is 25 - 30 cm (10 - 12 inches) tall. The cattle are taken out when the forage is grazed down to approximately 8 cm (3 inches) and

the paddock is given a rest. The relatively high stocking density for the size of the paddock forces the animals to be less selective in their grazing. This results in the paddock being grazed more evenly. Well-managed rotational grazing systems have been shown to provide four to six weeks more grazing time than a continuous grazing system.

Management Intensive Grazing

Management intensive grazing is similar to rotational grazing, but the livestock are rotated more frequently. The fence is moved ahead once or twice daily to provide enough forage for a specific amount of time. Back-fencing is frequently included in this system to prevent animals from re-grazing. This is one of the most labour-intensive grazing systems but results in the smallest waste of forage, least damage, and highest-quality feed.

Mob Grazing

Mob grazing is management intensive grazing with very high stocking rates (200,000 - 750,000 kg/ha; 178,435–670,000 lbm/ac) and grazing duration of just hours. This system is good for rejuvenating a worn-out pasture.

There are other pasture management systems that may suit your land base and production goals, for example swath grazing, bale grazing, forward grazing, limit grazing, and stockpile grazing. You should also consider what you will be grazing. Typically, in Nova Scotia, beef producers graze perennial grass mixes, but it is possible to graze annual grasses, cereal grains, peas, and even corn.

Rest period is the number of days required to rest the pasture and allow the forage stand to recover. After grazing, it takes approximately 20 days for a pasture to recover in the spring. In the summer it takes 30 - 45+ days to recover. The forage stand's species makeup, grazing system, and weather is an important factor in the recovery and rest period.

Stocking Rate

Stocking rate is defined as “the number of animals on a pasture for a specified time period.” Stocking rate is typically expressed as animal units per month (AUM) or animal units per hectare (AU/ha). A mature beef cow, with or without a calf, is 1 AU whereas three feeders or replacement heifers would be 1 AU. An AU is a standard unit used in calculating the relative grazing impact of different classes of livestock. It is important to have the correct stocking rate as there is a very fine line between getting the most animal performance and getting the most production per hectare.



(<http://transterraform.com/wp-content/uploads/2014/04/Cell-Grazing-Hay-Valley.jpg>)

Estimating the Stocking Rate of Your Pasture:

- Grazing animals eat about 2 to 5 per cent of their body weight per day in forage dry matter.
- Average animal weight x 0.025 = forage dry matter needed by one animal per day.

Example calculation:

450 kg (1,000 lbs) beef cow x 0.025 = 11.25 kg (25 lbs)

Forage is only 30 to 40 per cent dry matter. The cow would need to eat

100% - 40% = 60% dry matter

11.25 ÷ 60% = 18.75 kg (41.66 lbs)

So, the cow would need to eat 18.75 kg (41.66 lbs) of pasture to meet its daily requirements for dry matter intake. The quality of the forage can cause this number to increase or decrease based on its nutrient content.

For more information about rotational grazing, fencing, and growing pasture, read the pasture manual at <http://www.perennia.ca/portfolio-items/forages/?portfolioCats=124>

Nova Scotia Grass-Fed Beef

Raising and finishing cattle on grass is a real possibility here in Nova Scotia because our climate gives us the ability to grow high-quality forages. In some cases, producers have managed to keep their cattle on pasture for as much as ten months of the year through different grazing and stockpiling techniques.

Raising grass-fed beef has some advantages over grain-fed, including reduced feed costs, being more environmentally friendly, and being able to fetch a premium price. There is also the advantage of grass-fed beef having desirable nutritional qualities, including Omega 6:3 ratio, which is close to 1:1 compared to grain-fed beef, which comes in around 6:1. Grass-fed beef also has higher levels of conjugated linoleic acid (CLA), which is considered to be a super fat

and is found to result in a reduced risk of diabetes, cardiovascular disease, obesity, and cancers.

For more information on raising grass-fed beef, read the publications and fact sheets found online at <http://www.perennia.ca/portfolio-items/beef/?portfolioCats=129>

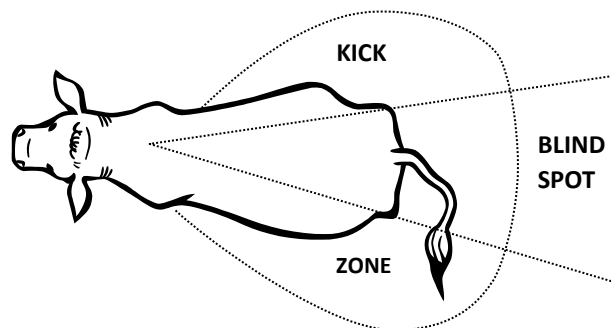
NOTE

You can increase your cattle's condition and productivity by carefully managing your pastures. For more information on pasture management and fencing see the *Introduction to Livestock* link as well as the *Livestock Fencing Guidelines* link under Additional Resources at the end of this manual.

Handling Cattle

When working with cattle, the most important factor to your safety is your attitude. Be patient and calm, but firm. Do not lose your temper. Cattle can sense when you become angry or upset and will respond accordingly. There is less risk of injury to the animal, as well as the handler, when cattle are handled quietly and calmly.

Cattle can be startled by sudden movements, shadows/light beams, or loud noises, so you should avoid yelling and moving abruptly. You must also make sure to avoid approaching cattle from directly behind. Their blind spot is directly behind them and approaching in this direction may spook them as they do not see you coming.



Electric prods should only be used to assist in moving cattle when animal or human safety is at risk or as a last resort when all other humane alternatives have failed. Do not use an electric prod repeatedly or on the animal's face, udder, anal, or genital regions.

You should evaluate your cattle-handling techniques frequently and make improvements as needed. You may need to make changes in lighting, noise, equipment, environment, or handling methods if there are excessive numbers of cattle that exhibit the following behaviours:

- Falling during handling
- Stumbling after being released from a chute
- Requiring the use of electric prods
- Running or jumping when leaving a chute
- Vocalizing as a result of restraint

When entering an enclosed area, such as a pen or pasture, make sure you always have an escape route. It is important to note that cows can be very protective of their young, so extra caution should be taken when handling mothers and their babies.

If you need to lead a cow using a halter, make sure the rope halter is well fitted. It should rest midway between the nose and eyes. Never wrap the lead line around your hand. If you need to tie a cow, use a slip knot that can be quickly released. The easiest way to securely tie a cow is to use a collar and a lead rope.

Transportation

The federal requirements for animal transport are enforced by the Canadian Food Inspection Agency (CFIA) with help from federal, provincial, and territorial authorities.

Ensure all the animals to be shipped are fit and healthy for transportation before shipping. Know how long the trip will take and plan to make stops to provide food and water. If you are transporting cattle longer than 24 hours, they must be fed and watered no more than five hours before departure.

While loading, cattle should be segregated based on age, weight, sex, and temperament.

All cattle must be able to stand in a normal position without coming into contact with the roof or the upper deck of the trailer. The trailer should have adequate ventilation, protection from weather extremes, and have safe, secure footing. Cattle should be handled in a humane manner at all times.

- For more information on transporting animals in Canada, check out the CFIA's brochure *Livestock Transport in Canada*. This brochure outlines regulations around transporting animals, whether an animal is fit for transport, and transport practices including handling and suitable vehicles to transport animals. http://www.inspection.gc.ca/DAM/DAM-animals-animaux/WORKAREA/DAM-animals-animaux/text-texte/livestock_transport_pdf_1528296360187_eng.pdf

Dehorning

The simplest way to dehorn an animal is through breeding: use homozygous polled (hornless) bulls in your herd to eliminate the need for dehorning. Cows need to be dehorned so they are safer to handle and are less likely to cause injuries to other animals. Calves should be dehorned when they are very young because there is less horn tissue, so pain and chance of infection is reduced. Avoid dehorning around weaning to reduce stress.

Consult with your vet and the code of practice to see which dehorning method is recommended. The two most common methods of dehorning young calves are chemical and electric dehorning. Chemical dehorning involves putting caustic chemical onto the surface of the horn. Electric dehorning uses a hot iron to kill horn cells at the base of the horn.

Castration

Castration is the process of removing the testicles from a male animal and typically happens within the first week of life. Castration is done at an early age for several reasons: it can be done quickly, which minimizes pain and distress in the animal; and it allows for easier handling of the animal during the procedure. For animals to be castrated at an older age, consult your local veterinarian for recommendations on pain control methods.

Castration is performed to prevent unwanted breeding, to reduce aggression amongst other animals and toward handlers, and to improve meat quality of the animal. Castration can be done surgically, or through non-surgical methods, such as the use of a band, elastrator, or burdizzo. Producers must ensure when using elastrator bands that they capture both testicles and haven't left one or both testicles while only removing the scrotum. This can result in infections and/or cryptorchid, which is when the testicle(s) is trapped against the abdomen.

The National Farm Animal Care Council states in its beef cattle code of practice the following requirements and recommended practices for castration of beef cattle:

Requirements

Castration must be performed by competent personnel using proper, clean, well-maintained instruments and accepted techniques.

Seek guidance from your veterinarian on the optimum method and timing of castration, as well as the availability and advisability of pain control for castrating beef cattle.

Castrate calves as young as practically possible.

EFFECTIVE JANUARY 1, 2018: Use pain control, in consultation with your veterinarian, when castrating bulls older than six months of age.

Recommended Practices

- *Consult your veterinarian about pain mitigation strategies for castration.*
- *Avoid castrating at the time of weaning to reduce stress.*
- *When castrating weaned cattle, use banding to reduce the risk of excessive bleeding, and for operator safety.*
- *Ensure that tetanus vaccinations are current when applying bands to castrate bulls over 180 kg (400 lbs).*
- *Monitor calves after castration. Check calves frequently to ensure they are nursing or eating, and there are no signs of infection and/or abnormal post-surgical bleeding.*
- *Identify and record improperly castrated cattle or those with undescended testicles for appropriate further management.*

Livestock Mortality Management

Mortalities do happen on farm, whether they are planned (such as when harvesting an animal) or unplanned (such as through disease or sickness). How you manage the carcass after the fact is an important part of farming in a sustainable manner.

On-farm mortality disposal through rendering or incineration is an option that is less available and acceptable. Therefore, mortalities more often must be managed on farm.

An alternative method of dead-stock disposal is an adaption of traditional composting, described as burial in an above-ground biofilter or “biopile.” This method involves the use of a carbon amendment and a two-phase composting method to accelerate the decomposition of the carcass in an environmentally safe manner.

The *On-Farm Livestock Mortality Management* manual describes the benefits associated with this type of composting as

- Prevention of nuisances associated with flies, vermin, and odours
- Low operational costs
- Reduced risk to ground and surface water
- Nutrients in dead stock are recycled
- Increased on-farm biosecurity

This manual includes further information and directions in completing above-ground biofilter composting and can be found at

<http://www.nsfa-fane.ca/efp/wp-content/uploads/2018/08/On-farm-Livestock-Mortality-Management-NSDA.pdf>

Traceability and Identification

In Nova Scotia, farmed cattle fall under the Nova Scotia Premises Identification (PID) program. Farm owners should apply for a PID number. A PID number is a unique number, based on national standards, that is assigned to a premise. Each premise will be issued a single PID number, regardless of the number of animal types or premise types on that parcel of land. Either the owner or renter of a land location may apply for a PID for a location. Land ownership must be indicated on the application.

A premise is defined as a parcel of legal land where animals are grown, kept, assembled, or disposed of. Premises include farms, hobby farms, stables, feedlots, pastures, hatcheries, egg-grading stations, abattoirs, assembly yards, auctions, sale facilities, rendering plants, zoos, petting farms, fair grounds, racetracks, competition facilities, and veterinary facilities etc.

Benefits of the PID program include the ability to

- Notify premise owners of disease outbreaks in their vicinity and recommend biosecurity precautions
 - Determine which species are near a disease outbreak
 - Respond in a rapid and informed manner when emergencies occur
 - Address all phases of emergency management (preparedness, prevention, response, and recovery)
- Reduce the impact of marketing restrictions by enabling quicker resolution of emergency situations

You can find the application form to apply for a PID on the website listed under Additional

NOTE

For more information on traceability, see the information sheet in the appendix at the end of this manual.

Resources at the end of this manual, by calling 902-890-3377, or by emailing NSPID@novascotia.ca.

Cattle Identification

Traceability is key to protecting food safety, as well as animal and public health. The Canadian Food Inspection Agency (CFIA) regulates and enforces animal identification while the Canadian Cattle Identification Agency (CCIA) administers the identification program and the Canadian Livestock Tracking System (CLTS) database. This database has a record of information for animal identification, premise identification, and animal movement. This way, if there is a health or safety concern, cattle can be quickly traced back to their original farm and the problem can be contained.

It is a federal requirement that all cattle raised in Canada are tagged with an approved CCIA radio frequency identification (RFID) ear tag by the time they leave their herd of origin. RFID tags have a written and electronically programmed number that is associated with the animal wearing it and act as a unique identifier. These tags can be read visually or scanned using hand-held or panel readers.

In addition to RFID tags, many producers also use management tags to easily identify cattle within their own herd.

CCIA APPROVED RFID TAGS:



Allflex FDX



Allflex HDX



Destron



Y-Tag



Ketchum



Zee Tags



Management Tags

Section 3: Nutrition

What are Ruminants?

Cattle are a ruminant animal. This means they have the ability to utilize fibrous feeds that are indigestible by simpler-stomached monogastric animals, such as pigs and humans.

Rumination allows the animal to quickly take in food and complete chewing later. The stomach of a ruminant is divided into four-chambers. In order they are: rumen, reticulum, omasum, and abomasum.

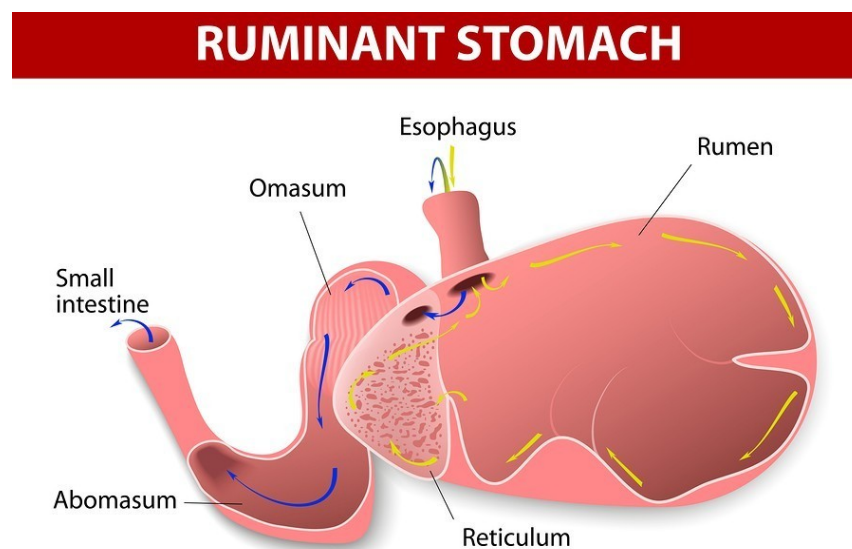


Image Copyright: WOS Inc.

The Rumen

The rumen is the first and largest compartment. It makes up approximately 80 per cent of the stomach. In the rumen, fibrous feeds such as grass, hay, and silage are mixed, fermented, and broken down by the rumen micro-organisms. These micro-organisms break down the fibrous portion of feeds and synthesize nutrients. When the rumen micro-organisms die, they pass out of the rumen and are digested to be used as a nutrient source. This gives cattle and other ruminants the ability to efficiently utilize a wide range of feed.

The Reticulum

From the rumen, the food moves into the reticulum. The main purpose of the reticulum is to send smaller particles of food along the digestion process to the omasum, and to send the larger, coarser material back up to the mouth for more chewing. The reticulum will force cuds, or balls of coarse material, back up to the mouth to be chewed further. The animal will leisurely

chew on its cud before swallowing it again. The cow spends about eight hours per day ruminating or “chewing its cud.” In total, this makes up about one third of its entire life.

The Omasum

The third compartment of the stomach is the omasum. It is made up of many folds that increase the surface area of this compartment so it can absorb moisture and nutrients from the feed.

The Abomasum

The fourth compartment of the stomach is the abomasum, which is very similar to a human stomach. The abomasum contains hydrochloric acid and digestive juices that help to further break down the food. In the newborn calf, milk bypasses the first three stomach compartments via the esophageal groove (see below) and goes directly down the esophagus into the abomasum. The rest of a cow’s digestive system is similar to monogastrics, having a small intestine, large intestine, and anus.

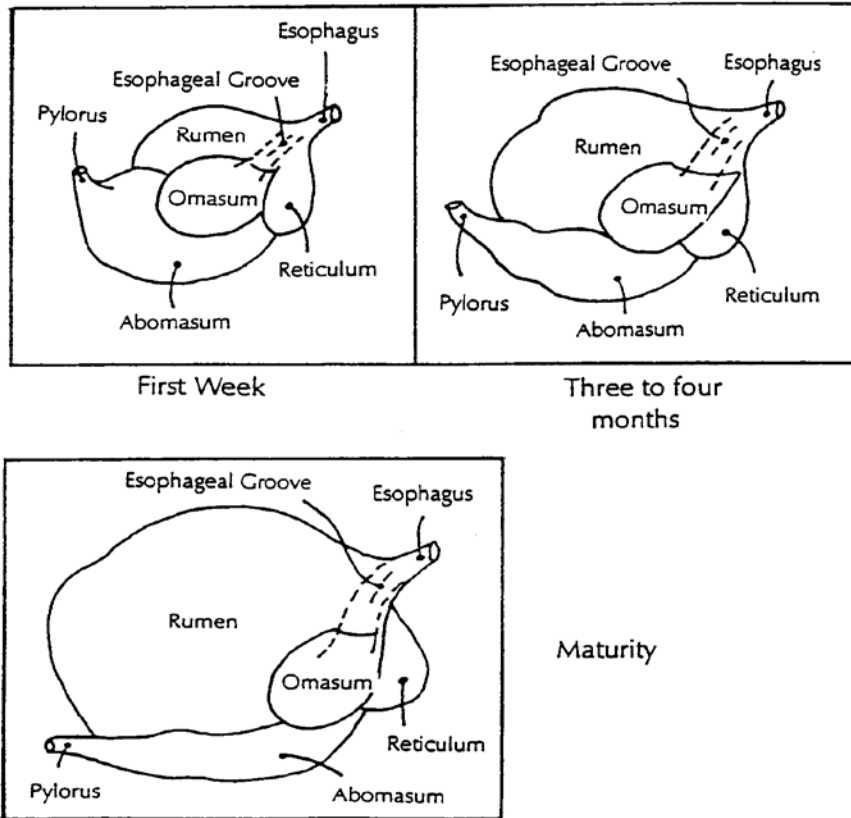
Newborn Calves: Pre-ruminants

A newborn calf has a very different stomach from its mother. In newborn calves, the abomasum is much larger and it is the only compartment that works. Newborn calves have an esophageal groove, which is a tunnel in the digestive system that lets milk go directly into the abomasum and bypasses the rumen and other stomach compartments. The calf’s sucking reflex causes the muscular folds of the rumen and the reticulum to meet, creating the groove. The calf’s rumen needs to be bypassed as it is young and the rumen needs to consume dry feed to develop.

As the calf gets older, a good feeding program will stimulate the growth of the rest of its stomach. Grain stimulates rumen development, which increases the number and variety of rumen microbes. The microbes grow quickly and extract nutrients from the grain the calf consumes.

Percentage of Total Stomach

Development of a cow's stomach



Taking Care of Milk Cows:
Digestion in the Ruminant Animal

	Newborn Calf	Adult Cow
Rumen	25%	80%
Reticulum	25%	6%
Omasum	10%	3%
Abomasum	40%	11%

Colostrum

Colostrum is thick, creamy, yellow and is the first milk the mother produces after the calf is born. Colostrum has antibodies that help the calf fight off germs. It cleans out the digestive tract, has three times more vitamin D than normal milk, and 100 times more vitamin A.

The calf should be fed about two litres of colostrum within the first six hours of life. After this time, the calf's ability to absorb colostrum is substantially reduced. Newborn calves should be monitored to ensure they are nursing as some may require help. You may have to administer colostrum or commercial colostrum substitute to any calf not showing signs of having suckled.

- Colostrum can be poor quality when the cow
- Was dry fewer than three or four weeks
- Was milked before calving or leaked out milk before calving
- Did not have its udder and teats cleaned before milking
- Is new to the herd and has not built up antibodies against diseases in the herd

If a cow has poor quality colostrum, as is sometimes the case in first-calf heifers, its calf should be fed artificial colostrum or colostrum from other mature cows. Colostrum can be frozen and then thawed for newborn calves.

Freezing Colostrum

When freezing colostrum for emergencies, it is best to take it from an older cow as they tend to have more antibodies and a larger amount of colostrum. You should only freeze in small quantities so the colostrum can be frozen and thawed quickly. When thawing colostrum, put it in a container and place the container in a bucket of warm water. The colostrum should be stirred frequently while thawing. Never microwave colostrum, as this can destroy the beneficial antibodies contained within.

After Weaning

A market steer should be fed to reach an appropriate finish. Finish of a market animal is related to the amount of fat covering and muscle development the animal has at the time of slaughter. An animal that has too much fat cover would be considered over finished. An animal that doesn't have enough fat coverage would be considered under finished. To determine appropriate finish of a beef animal, feel half way down the ribs. If the animal is finished well, there should be approximately 1 cm (.30 inches) of fat between the hide of the animal and the bone.

In comparison, a heifer that will be used for breeding needs to be fed to produce growth with a minimal amount of fattening. It is important that breeding heifers do not become too fat as this can result in impaired reproduction, calving difficulty, and reduced milk production. Typically, the average daily gain should be no more than 0.8–1.0 kg/day (1.7–2.2 lbs) to prevent it from becoming too fat. This can be accomplished by feeding a ration with a lower energy content. If the cow is a heavy milker, you may want to feed it some extra grain ration.

Table 1. Nutritional Requirement Guidelines for Beef Cattle - 544 kg (1,200 lbs)

Class	Totally Digestible Nutrients %	Crude Protein %	Calcium %	Phosphorus %
Dry cow, early to mid-gestation	48 - 52	7	.26	.16
Dry cow, late gestation	58	9	.27	.17
Lactating cow	60 - 65	11 - 12	.36	.26
Nutritional requirements vary with body weight and stage of production. All rations should be balanced for energy, protein, vitamins, and minerals.				

Table 2. Nutritional Requirement Guidelines for Growing Beef Cattle

Class	Total Digestible Nutrients %	Crude Protein %	Calcium %	Phosphorus %
Growth 226 kg (550 lbs) body weight	70	13	.49	.24
Finishing 362 kg (800 lbs) body weight	80	11	.42	.22
Nutritional requirements vary with body weight and stage of production. All rations should be balanced for energy, protein, vitamins, and minerals.				

Essential Nutrients

An essential nutrient is one that must be present in the body for the animal to live and function. Cows need access to five essential nutrients:

1. Water
2. Energy

3. Protein
4. Minerals
5. Vitamins.

Water

Often water is not thought of as an important nutrient, but it is necessary for life. When a calf is born, water makes up 75 to 80 per cent of its bodyweight. Water helps the body get rid of waste, transport materials through the body, lubricates joints, and participates in many body processes. Water quality is important for all livestock. An abundant supply of clean, fresh water should always be available for all your animals.



Image Copyright: milkproduction.com

Energy

Energy is provided primarily by carbohydrates and fats. The most common carbohydrate sources for ruminant animals are starch, sugars, and cellulose found in grains and forages. Grains are high in starch while molasses is high in sugars. As a result, both are excellent energy sources. Sources of fat may be the milk from nursing or oils in a mixed-grain ration. Cellulose is the fibrous portion of complex carbohydrates found in grass, hay, and silage.

Monogastrics cannot digest cellulose as efficiently as ruminants can. Cattle digest 60 to 90 per cent of the energy found in grains and high-quality forages. In low-quality forages, such as straw, they only digest 40 to 50 per cent of the energy. Energy resulting from the digestion of feed is primarily used to maintain the basic functions of the animal's body. Any energy fed in excess of maintenance needs can then be used for productive functions such as growth, reproduction, fattening, or milk production.

Protein

Protein is needed by the beef animal for growth, reproduction, and milk production, as well as muscle development and action. Most feeds contain some amount of protein. The best sources of protein are soybean meal, canola meal, corn gluten meal, and fish meal.

Minerals

Minerals are needed in the body to build healthy teeth and bones, as well as other functions, such as the muscular and nervous systems.

Cattle require macrominerals in fairly large amounts. The macrominerals are calcium, phosphorus, magnesium, sulphur, potassium, sodium, and chlorine.

Microminerals such as iodine, cobalt, selenium, iron, zinc, copper, molybdenum, and manganese are required in smaller amounts.

Minerals are found in forages, grains, and mineral supplements. Iodized (red) salt blocks contain sodium, chloride, and iodine. Cobalt iodized (blue) salt blocks contain sodium, chloride, iodine, and cobalt. Trace mineralized blocks contain sodium, chloride, iodine, cobalt, zinc, iron, manganese, copper, and selenium.

Nova Scotia's soils are low in selenium and, therefore, the grains and pasture grown here are low in this trace mineral as well. Calves are typically given a shot of selenium at birth to prevent the deficiency in selenium called white muscle disease.

Major Mineral:	Needed For:
Calcium	Bones, milk production, digestion
Phosphorus	Nervous system
Sodium	Digestion, use of other nutrients
Chlorine	Digestion, use of other nutrients
Sulphur	Digestion

Trace Mineral:	Needed For:
Selenium	Tissue repair, healthy calves
Cobalt	Digestion, use of vitamin B12
Iron	Red blood cells
Copper	Blood, body tissue
Molybdenum	Energy use, growth, iron use
Manganese	Growth, bones, reproduction, nervous system
Iodine	Metabolism - the rate food is used in the body as energy

Vitamins

Vitamins are found in forages and grains, received from sunshine, manufactured in the rumen, and supplied as supplements. Vitamins A, D, E, and K can be stored in the body, and would be

supplied if you fed leafy, green forages. Vitamins B and C can't be stored and are manufactured in the rumen.

- **Vitamin A** - Needed for vision, healthy skin, digestion, and reproduction. This vitamin is often the most deficient.
- **Vitamin B** - These vitamins include niacin, riboflavin, and thiamine.
- **Vitamin C** - Water-soluble vitamin.
- **Vitamin D** - Needed, along with minerals calcium and phosphorus, for healthy bones. It is known as the sunshine vitamin.
- **Vitamin E** - Needed, along with the mineral selenium, for muscle function.
- **Vitamin K** - Needed for proper blood clotting.

A calf gets most of its nutrients from cow's milk. Feeding it excellent quality forage, supplying a free-choice salt block, along with a mineral/vitamin lick, and clean water may be all that is necessary during early calf development. Later, small amounts of supplementary mixed grain ration may be given to the calf. Your local feed agent or veterinarian can advise you as to which mixed ration will be appropriate for your calf at any stage in development. Calves are typically given a shot of vitamins A, D, and E, at birth, to boost immune function.

Creating a Balanced Diet

To create a balanced ration, you need to:

- Know the weight of the cow and stage of production
- Know the amount of forage the cow will consume
- Use concentrated sources of protein, such as roasted beans, soymeal, and corn gluten meal
- Feed the cow's stomach—micro-organisms in a cow's rumen need to be fed for healthy digestion

You can work with a nutrition expert to create a diet plan that meet your cattle's nutritional requirements for every step of its life. However, it is important that you understand what types of feed you can give your cattle to ensure they receive a balanced ration.

Roughages and Forages

Hay, corn silage, haylage, and pasture are all examples of roughages and forages. Cows are ruminants, which allows them to break down hard-to-digest fibre found in plants.

- **Hay** - Hay is a common roughage made from legumes, such as alfalfa, and grasses like timothy grass. Hay must be cut and dried in the sun. After the hay is baled, it must be

stored somewhere dry. Timing is important in harvesting hay. The hay loses feed value as it ages and matures.

- **Haylage** - Haylage is made from hay cut early in the season and stored in a silo. Haylage should be green and smell like clean, sharp vinegar. Haylage is more nutritious than hay as haylage contains leaves, where most plant nutrients are found.
- **Corn silage** - You make corn silage by chopping corncobs and stalks of corn plants then putting them in a silo to ferment. Corn silage has high energy and low protein.

Concentrates

Concentrates are the concentrated source of energy. It's important to make sure cows do not overeat concentrates. You can buy concentrates that are premixed with vitamins and minerals. You can also make your own concentrates and buy mineral mix to add. Some examples are

- **Grains** - Corn, oats, and barley etc.
- **Distillery and brewing byproducts**
- **Oilseed meals** - Soybean, linseed, and canola meal etc.
- **Whole seeds** - Soybean and cotton seed
- **Non-protein nitrogen (NPN)** - Feed-grade urea and anhydrous ammonia

Protein Supplements

High-protein oil seeds (such as soybeans and canola), or byproducts (such as a soybean meal, distiller's grains, and brewer's grains), can add a concentrated source of protein to the ration.

Mineral and Vitamin Supplements

These supplements add salt, minerals, and vitamins to the ration. While most of these nutrients can be found in the other elements of a balanced ration, supplements can boost these levels.

Feeding Terms

The following feeding terms are important to know when building a balanced ration. These terms may appear on feed tags and ration analyses. They also refer to how a balanced ration can be mishandled when it is fed to cattle.

Dry matter intake (DMI) - All the ingredients in a dry state that an animal consumes.

Crude protein (CP) - The total protein content in a food source as determined by its nitrogen content. Crude protein repairs and builds organs, skin, hair, hooves, bones, blood, and milk protein supplements. Rumen micro-organisms consume this type of protein very quickly.

Degradable intake protein (DIP) - The fraction of crude protein is digested and degraded by the microbes in the rumen. Cows get degradable intake protein, or soluble protein, from legumes and some protein supplements.

Undegradable intake protein (UIP) - The amount of protein that is digested in the small intestines and escapes degradation in the rumen. Undegradable intake protein is also known as bypass protein.

Amino acids - These are the building blocks that make up protein.

Neutral detergent fibre (NDF) - Neutral detergent fibre measures most of the structural components in plant cells and represents the bulkiness of feed. Cows need about 28 per cent NDF for proper rumen function. NDF is negatively correlated with dry matter intake; as the NDF in forages increases, the animal will consume less forage.

Acid detergent fibre (ADF) - Acid detergent fibre is the least digestible part of the plant fibre. ADF predicts the amount of energy in feed—the more ADF, the less energy. Cows need a ration of at least 19 per cent ADF for proper digestion.

Effective fibre - You can feed the proper amount of ADF and NDF, but if the forage is ground too finely, the cow won't take in the proper amount. Cows don't chew finely ground forages enough for proper digestion. For the best fibre intake, forages must be coarse.

Non-fibre carbohydrate - Non-fibre carbohydrates, such as sugars and starches, are easy to digest. This means they're a good source of energy. Grains are high in non-fibre carbohydrates.

Body Condition Scoring

Body condition scoring (BCS) is a low-cost method to determine the amount of fat cover on an animal. This easy, hands-on method is much more accurate in determining a cow's physical shape than by just looking at the animal. Looks can be deceiving, even to the trained and experienced eye. The shadows that help you see the body's dips and hollows are hard to see on black cattle. The accuracy of visual evaluation also varies with the season. Prominent rib,

hook and pin bones can be masked by long winter hair coats. Research from the University of Guelph found the correlation between visual scores and ultrasonic back fat measurements was low ($r^2 = 0.14$) in January to March. This means even trained visual evaluators had a hard time accurately predicting the BCS scores of cows during the winter. Cows in later stages of pregnancy may also appear to have more fat cover than they truly do. Overall, a hands-on evaluation of the BCS will give you a much better sense of your cows' fat stores.

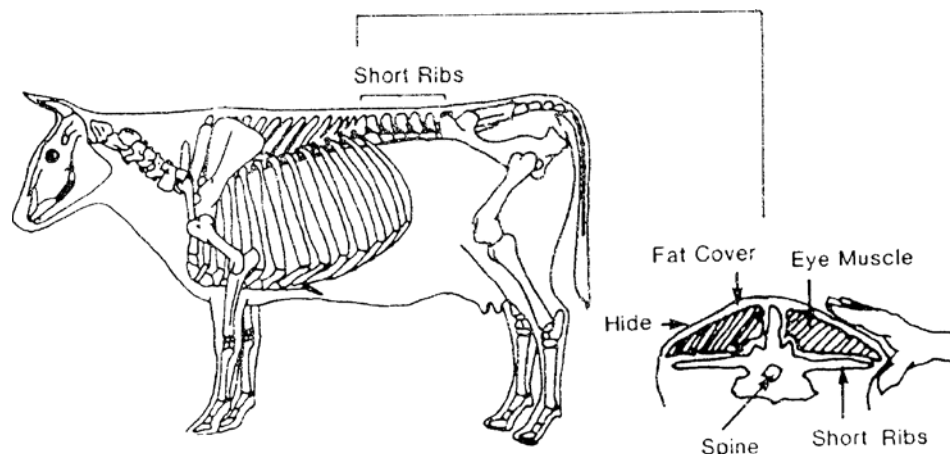
In Canada, BCS is scored from 1 to 5, with 1 being extremely thin and 5 being obese. A score of 2.5 to 3 is ideal.

How to Score a Cow's Body Condition

Feel for fat cover with your hands at:

- The short ribs
- The spine
- The hooks and pins
- Either side of the tail head

An animal in ideal condition will have a thin layer of fat in these areas, so you will need to apply some pressure to feel the bones. An under-conditioned animal's bones will be quite prominent and sharp. In an obese animal, you won't be able to feel any of the individual bones through the thick layer of fat. A link to a video on BCS is provided in the Additional Resources section at the end of this manual.



When to Body Condition Score

One of the best times to determine a BCS is during fall processing or pregnancy checking. Checking during these points is important as reproductive performance in the spring depends on nutritional planning in the fall. It also gives you enough time to add condition on thinner cows before winter begins. The more often you check the BCS throughout the year, the better you'll be able to manage the nutritional needs of your cattle and keep them at a score of 2.5 - 3.0 year-round.

How Body Condition Score Affects Production

Body Condition Score	Pregnancy Rate (%)	Calving Interval (days)	Exhibiting Estrus 60 Days After Calving (%)	Weaning Weight (kg/ lbs)	Calf Death Loss (%)
1.5	43	414	66	170/ 375	8
2	61	381	92	209/ 460	3
2.5	86	364	92	233/ 515	3
3	93	364	100	233/ 515	3
3.5	95	-	100	-	-
4	75	-	-	-	-

Importance of Measuring Body Condition

Having an accurate measure of a cow's body condition is a good indication of how to manage their rations to maximize productivity, especially reproduction.

Reproduction is the most important factor affecting profitability. In terms of profit, it is five times more important than growth rate and ten times more important than carcass quality.

Cows with an ideal BCS rebreed up to 30 days sooner than thin cows, which allows more cows to calve in the first 21-day cycle. This can add up to 19 kg (42 lbs) in calf weaning weight since calves born earlier in the calving season will be heavier at weaning time. Cows in ideal BCS also have pregnancy rates double those of cows in poor condition. Fit cows have healthier calves, fewer calving issues, and have improved colostrum quality as well as milk production.

Culled cattle in good condition also have a higher salvage value. Very thin cows are more likely to experience negative outcomes during transport or to be condemned at the plant. Thin cows reflect poorly on the producer and the industry.

Section 4: Health

Signs of a Healthy Animal

Animals get sick for many reasons. They can become ill from infectious or noninfectious diseases. Infectious diseases are caused by viruses, bacteria, and parasites. Noninfectious diseases are caused by poor diet, stress, heredity, toxicity, tumours, and injury. Care should be taken to prevent both infectious and noninfectious diseases.

- A healthy calf is off to a strong start in life. The health of a calf can be determined by watching for the following:
- Strong appetite (eats and drinks well)
- Activity level
- Shiny and smooth hair
- Normal manure and urine - Manure should be formed and semi-soft
- Normal vital signs

Vital Sign	Ideal Rate	Range
Temperature	38.6° C (101°F)	38.1–39.5° C (100.5–103.1° F)
Respiration rate	30 breaths per minute	10 - 30 breaths per minute
Heart rate	50 beats per minute	40 - 70 beats per minute

Note the range of these vital signs can change based on time of day, activity or excitement level, the weather, and individuality.

Focus: Managing Your Herd's Health

To manage your herd's health properly, you need to have a plan.

A herd health program should cover three areas:

1. Prevention instead of treatment
2. An organized plan for all health-related procedures and exams
3. Record keeping to use in management decisions

Biosecurity

It is important to practice good biosecurity as the potential for disease outbreak can pose serious threats to your cows' overall health and longevity. Biosecurity is a system of best management practices that are put in place to reduce the introduction of disease. Biosecurity implementation could include screening measures for new or returning visitors/animals/equipment and/or creating an area of isolation for new/sick animals.

There are three main sources of health threats to a farm:

1. Physical transfer from visitors
2. Biological transfer from new, sick, or contaminated animals
3. Transfer from equipment, supplies, or machinery

A good farm operator will take several steps to prevent the transmission of contagious diseases, including the following:

Isolation - Prevent close contact between sick animals, newly purchased animals, and animals that have been away at a show.

- Sick animals should be housed in a separate section of the barn, away from all other animals. If an animal dies, immediately remove the dead carcass for disposal and thoroughly disinfect its pen. If possible, leave the pen unoccupied for three to four weeks. Feed and handle sick animals last.
- Newly purchased animals should be kept separate for three to four weeks and watched carefully for signs of disease.
- If you compete in a lot of shows, you might want to keep a small separate area to house frequently shown animals. Look after the animals that stay at home first before you tend to any animals that leave your property.

Handling practice - Always handle sick animals last to prevent the spread of disease. Also handle younger animals before handling older animals as adults are more likely to have developed immunities/tolerances to diseases.

Traffic control - Keep your farm secure from unauthorized visitors. Any visitors should wear clean clothes, sanitize their footwear, or wear foot covers. Limit traffic near your farm and consider sanitizing vehicle tires that have been to other farms.

Sanitation maintenance - Sanitize new equipment and pens that may have been in contact with other animals. Clean off organic matter such as feces and hair. Allow for proper drainage of urine and excessive water that may harbour disease. Remove manure and other debris that

builds up in and around pens. As a post-clean up measure, spread hydrated lime to reduce odour and decompose manure and hay more quickly.

Hygiene - Wash your hands, clothing, and footwear after visiting another farm. Use latex or rubber gloves when handling sick animals.

Control pests - Barn flies, rodents, and parasites can all be methods for spreading disease.

Observation - It is a good practice to observe healthy animals so you can notice any changes that may indicate when an animal is ill. Becoming familiar with disease symptoms ensures a quick response through isolation, treatment, and future prevention.

Vaccinations

Immunity is protection from infectious diseases. Young cattle get immunity from antibodies in colostrum when they are calves; however, this protection wears off by the time they are about two months old. To give their immunity system a boost, you need to vaccinate.

Vaccines are administered subcutaneously (beneath the skin) or intramuscularly (into the muscle). For beef cattle, it is recommended you use the subcutaneous method whenever possible. If a vaccine must be given intramuscularly, inject it into the muscles of the neck. Never inject it in the hip or thigh as this may lead to damage to important cuts of meat. Placing injections in these areas also increases the risk of contamination of the meat if a needle were to break.

The following chart contains some common infectious diseases that farmers vaccinate for. It is always best to consult your local veterinarian to design a vaccination program.

Common Infectious Diseases

	Bovine Virus Diarrhea
Transmitted by:	Body fluids from dam to fetus
Symptoms	Abortions, Malformed and weak calves, diarrhea, fever, drop in milk production, respiratory disease
When to Vaccinate:	Killed vaccine: 7 -8 before breeding, 3 – 4 weeks after first shot, then annually Modified live vaccine: 3-4 weeks before breeding then annually
	Infectious Bovine Rhinotracheitis
Transmitted by:	Saliva, nasal discharge
Symptoms:	Abortion, brain and genital infections , pneumonia, inflamed eyes
When to Vaccinate:	Vaccinate at 6 months of age, (if using a killed vaccine, repeat the shot after 3 - 4 weeks) Vaccinate 7 - 8 weeks before breeding, then annually
	Leptospirosis
Transmitted by:	Infected animals, water, mud, vegetation, urine
Symptoms:	Cattle: Abortions often with retained placentas, drop in milk production; clotted , thick, reddish milk but no signs of udder swelling Calves: Severe illness with jaundice (yellow skin) and reddish to dark brown urine
When to Vaccinate:	All breeding cattle annually
	Black Leg
Transmitted by:	Cattle ingest the bacteria
Symptoms:	High fever, lameness, swelling in the heifer's body and death within 12 to 24 hours
When to Vaccinate:	All heifers under two years of age

Common Calf Diseases

When you are raising calves, you need to know how to keep them healthy, how to treat sick calves, and how to prevent sickness. All owners and handlers should be aware of the signs of diseases.

Diseases can be clinical or subclinical.

- Clinical diseases - cause outward signs that an animal is sick. Calf scours and pneumonia are two common clinical calf diseases.
- Subclinical diseases - show no obvious outward signs that an animal is ill. Parasites are commonly subclinical.

Calf Scours

Calf scours is due to a problem in the calf's digestive tract. Scours can be caused by poor nutrition, feeding calves too much milk, poor quality feed, a change in diet, or unclean feeding equipment. The calf will have thin, watery, and sometimes bloody, manure.

About 75 per cent of all losses occur during the first two weeks of a calf's life. Scours, or calf diarrhea, is the biggest cause of death in calves. Calf scours cost the average farmer \$1,000 per year.

Early Signs of Scours

- Calf drinks more slowly or plays with its milk
- The calf drinks but lies down right afterwards
- The calf does not come to drink
- The calf acts listless when it is normally eager to eat
- Loose manure

The most common type of scours is infectious scours. It is serious, as it requires a lot of labour and money to treat. Also, it is the most likely to result in death.

Here are a few different organisms that cause infectious scours:

- ***E. coli*** - This is the most common cause of scours and calves up to one week old are most susceptible. *E. coli* can quickly kill a calf if not treated.
- **Salmonella** - Calves are infected by contaminated feed and other infectious animals. They are most likely to be infected between one and four weeks of age.
- **Rotavirus** - This virus hits calves between one and two weeks of age. Rotavirus causes mild to moderate scours and the calf usually recovers.

- **Coronavirus** - Compared to the rotavirus, this virus is more likely to kill a calf. It infects calves from two days to three weeks old and causes watery scours, which quickly leads to dehydration.

Treatment

- Separate the sick calf to stop the infection from spreading.
- Replace lost fluids with electrolytes.
- Rotate offering milk and electrolytes to the calf.
- With the help of your vet, figure out the cause and treatment of the scours. Use this knowledge to prevent future outbreaks.

Pneumonia

Pneumonia is a lung infection. If untreated, it can kill an animal in three or four days. Pneumonia is caused by germs from other cows. Calves that are already sick, or did not receive the proper amount of colostrum at birth, are more likely to get pneumonia.

Signs of Pneumonia

- Runny nose
- Hacking cough
- Rapid breathing
- Fever
- Refusing to eat

Treatment

- Keep sick calves in separate stalls that are dry and well ventilated.
- Calves with pneumonia also need antibiotics, so consult your vet.
- Keep track of the calf's temperature to determine if it is getting better or worse.
- Figure out what's causing the pneumonia, especially if several calves are sick. Once you know the cause, you can work to prevent future outbreaks.

Ruminant Health Problems

Acidosis

Acidosis is caused by poor feeding or overfeeding. When a cow eats too much grain (soluble carbohydrates) and not enough hay (fibre), their rumen becomes acidic. Think of it as "cow heartburn." This acid is absorbed by the cow's bloodstream, making its blood acidic and causing laminitis - a hoof disease.

Signs of Acidosis

- Going off feed
- Scours
- Low milk production and low milk fat percent
- Skinny cows
- Foot abscesses
- Chewing wood or bedding (the cows are looking for fibre)

Cows can die from acidosis due to high blood acidity. Also, once a cow has laminitis they will likely never have normal feet again. To cure acidosis, change the feeding program. Focus should be placed on cows near calving as they are most likely to get acidosis.


Displaced Abomasum

One of the problems with having such a complex stomach is that it can get twisted. This is called displaced abomasum (DA). The most common displacement occurs when the abomasum gets trapped on the left side of the cow, between the rumen and the abdominal wall.

A DA happens most often in larger, high-producing dairy cows, usually during the first six weeks of lactation. DAs are most common in cows recovering from health issues, such as retained placentas, milk fever, fat-cow syndrome, ketosis, indigestion, and mastitis. No one really knows what causes DA, but bad feed, too much grain, and sudden changes in ration are factors.

Symptoms of Displaced Abomasum

- Severely reduced appetite
- Reduced and discoloured feces
- Distinct pinging sound when you listen to the left side of the cow's mid-section with a stethoscope or with your ear



ANTIBIOTICS

Antibiotics may be necessary to cure a cow of a bacterial infection. If an animal has received antibiotics, it must go through a withdrawal period before being slaughtered for consumption. If residue levels are detected, the meat or meat product are prohibited from sale.

Hardware

Cows can accidentally consume hardware, such as nails and pieces of wire, which can get caught in their reticulum. This metal causes abscesses and can puncture the side of the stomach, through the stomach wall, and into the heart, which results in death.

Signs of Hardware Disease

- Going off feed
- Fever
- Restlessness
- The cow kicking at its side

To prevent hardware from hurting the cow, it can be given a magnet. The magnet will collect the pieces of metal to prevent punctures. The magnet stays in the cow's stomach for the rest of its life.

Lameness

Lameness is a common health problem that can result in decreased income for the farmer, loss of body weight, lower milk production, and premature culling. A number of factors cause lameness, including the following:

- **Stressful environments** - Slatted floors, slippery housing, and abrasive surfaces, such as stones, stubble, or frozen ground, all put stress on an animal's feet and legs, while warm, wet housing can breed diseases, such as foot rot.
- **Poor nutrition** - Feeding too much high-energy feed, or a sudden change in diet, can lead to acidosis and, eventually, laminitis. Laminitis is a crippling hoof condition, and once a cow gets laminitis, its feet will never develop properly. Lack of calcium, phosphorus, magnesium, zinc, vitamins E and D, as well as an excess of calcium and fluorine, can cause lameness issues.
- **Foot rot** - Foot rot is a contagious infection cows get from a wet, dirty environment. The disease literally rots the cow's foot. To diagnose foot rot, study the cow's hoof. Generally, the foot has infected areas that emit a distinct and unpleasant odour. To treat foot rot, use antibiotic ointments, keep the foot dry and clean, and get rid of dead tissue.

- **Poor foot conformation** - Cattle born with bad feet are more susceptible to lameness. Some common conformation defects are abnormally straight hocks, cow hocks, weak pasterns, flexed pasterns, and overlapping toes.

Lameness Prevention

Besides breeding cows with better foot conformation, here are some management techniques to prevent lameness:

- Follow proper nutrition guidelines.
- Allow cows to stand on well-drained dirt and grass. The grass cleans their feet and the dirt keeps away organisms.
- Groove slippery concrete and smooth rough concrete.
- Trim feet only if needed.
- Install a footbath to remove irritants, harden the hoof, and prevent infections.
- Keep barn dry and well bedded so cows can lie down comfortably and rest, thus allowing their hooves to dry out.

Parasites

Parasites are a living organism that requires a host to survive. Parasites can be internal, living inside the host, or external, living on the outside or hide of the host. Parasites feed off their host, which can result in the host losing weight and becoming more susceptible to other diseases. Often times an animal will appear to be completely normal if the infection of parasites is small. Prevention is the best way to manage parasites.

Examples of Parasites

- **Coccidia** - Calves ingest this parasite by eating infected bedding or manure. This parasite usually infects cattle older than four weeks of age.
- **Cryptosporidium** - This parasite causes scours in two- to three-week-old calves. After four weeks, the calves become immune to the parasite. Infected calves clear up in five to ten days, so be patient.
- **Lice** - These are external parasites. They can live in the hides of cattle.

Parasite Treatment

Treatment depends on the parasite. If the parasite causes scours, the scours must be treated first and manure samples should be checked for coccidiosis and other worms. Drugs to control parasites are available in injectable, pour-on, and feed-added forms. Some calf starters even contain medicine to prevent coccidiosis. The best approach to parasites is prevention, by keeping the calf and feed areas clean. Consult your veterinarian for advice regarding management of parasites.

Section 5: Breeding

Seasonal Schedule

Pre-calving and Calving Season

As a farmer, you should:

- Identify cows with vaginal prolapses for culling
- Watch for abortions
- Prepare for calving by having clean, well-bedded calving areas
- Have electrolytes and antibiotics on hand to treat for scours
- Identify calves, record birth dates and calf weights
- Re-assess nutrient requirements of your herd and adjust as necessary

Breeding Season

- Check calves daily for scours and pneumonia
- Vaccinate your cattle
- Castrate, dehorn, and implant calves
- Evaluate fertility of all breeding bulls (breeding soundness exam) 30–60 days before breeding season:
 - Semen quality
 - Physical examination
 - Libido

Pre-Weaning and Weaning

- Prepare calves for weaning and preconditioning
- Pregnancy test all cows
- Treat for parasites as necessary
- Wean calves and record weaning weights
- Make initial heifer and bull replacement selections
- Evaluate performance of the breeding herd by calculating:
 - Percentage calf crop
 - Weaning weights
 - Death loss percentage
 - Cost per kilogram of calf marketed

Wintering Period

- Take inventory of feed and have it analyzed
- Watch for abortions
- Check cows daily for signs of heat and external parasites
- Work out rations for different classes:
 - Pregnant cows
 - Heifer replacements
 - Bull replacements
 - Breeding bulls
 - Feeder calves

The 21-Day Cycle

Cows can get pregnant only a few days each month. The cycle a cow's body goes through is called the estrus cycle. The estrus cycle is usually 21-days long. At the beginning of the cycle, the cow's brain sends a message to her ovaries to start producing eggs. Once an egg is big enough, it is released into the oviduct. This is called ovulation. Sperm gets to the egg through the vulva. It travels through the vagina, past the cervix, into the uterus, and up to the oviducts where the egg is fertilized.

Cattle can be bred by natural service (with a bull) or by artificial insemination. Once fertilized, the egg travels to the uterus and attaches itself to the uterine wall. Over the next nine months the egg will develop into a calf. If the egg is not fertilized, the wall of the uterus breaks down and the cow begins another estrus cycle.

Signs of Heat

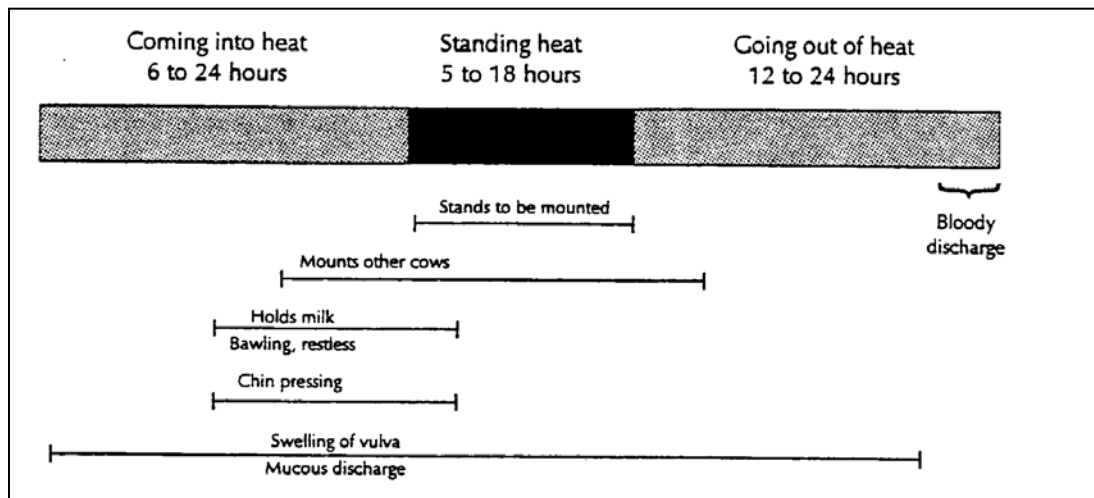
Once the ovary releases the egg, the cow shows signs of heat. These signs of heat are nature's way of saying, "I am ready for breeding." The best sign of heat occurs when a cow stands to be mounted by another cow. This is called a standing heat. Once a cow in standing heat is spotted, it needs to be bred within 12 to 24 hours.

Other Signs of Heat

- Bawling, restless behavior
- Butting
- Chin pressing on other cows
- Swollen, reddened vulva
- Lip curling
- Licking of the vulva

- Withholding milk
- Shortened feeding time
- Increased urination

Recognizing heats is important, as it is a sign of when the cow should be bred. This ensures cows are in calf quickly and no valuable semen is wasted on cows that are not ready to be bred.



Extra Help with Heat Detection

Heat mount detectors - A patch filled with dye can be taped to a cow's rump. If the patch changes colour, it means the cow was mounted and is in standing heat.

Computer transmitters - Computer transmitters work like dye patches. A pressured trigger transmitter is taped onto the cow's rump. When a cow is mounted, the transmitter sends a signal to a receiver. The receiver sends this information to a computer with the cow's name, number of mounts, as well as their time and length.

Heat detector animals - Heifers treated with hormones can detect heats in cows. A chin ball marker is put on the treated animal. When it mounts a cow in heat, the mounted cow is marked.

Pedometers - These devices measure the amount a cow walks and transmits it to a computer. The computer calculates the cow's average amount of activity. During heat, a cow will generally be more active. So, if the cow's activity level is above average, it is in heat.

Reproductive Health

Keeping records on all health- and reproductive-related matters for each cow is essential. This information should include identification, birth date, breeding date, fresh date, heat date, the sex and health of the calf, and any other findings and sex. If twins are born, you should record the sex of each calf and be aware of the chance of freemartinism.

NOTE: Freemartinism is one of the most severe forms of sexual abnormality among cattle. It causes infertility in the female calf born with a male twin.

Cows also need to be examined to determine their reproductive health. These exams include

- A pre-breeding exam at 15 - 45 days after calving for all cows
- An exam for cows bred three or more times
- An exam for cows with abnormal discharge
- An exam for cows that have been in calf for six weeks or more
- An exam for cows showing no heat or irregular heats

Genetics

Each calf is the sum of its parents' genetics. The calf's parents, grandparents, and great-grandparents all contribute parts of a calf's genes. Improving these genes makes cows more productive and profitable.

Genes are the building blocks of all living things. In humans, genes give us our hair colour, eye colour, height, nose, mouth, ears and everything! They are important because they are inherited and passed down to offspring. In cows, farmers want to improve genes that affect size, health, udder, ease of calving, and muscling. Each of these factors improve a cow's money-making ability.

Trait	% Heritability
	Reproductive Efficiency
Calving interval	0
Conception rate	1 - 5
Calf vigour (lower mortality)	1 - 5
Calving ease (direct)	10
Calving ease (maternal)	10
	Productive Efficiency
Milk yield	25
Pre-weaning growth	30
Feed efficiency	40 - 50
Post-weaning growth	50
	Carcass Characteristics
Rib eye (per carcass weight)	25 - 40
Fat thickness (per carcass weight)	25 - 40
Marbling score	40 - 60
Quality grade	35 - 45
Yield grade or lean yield	25 - 50
Lean tenderness or palatability	40 - 70

Crossbreeding

Crossbreeding beef cattle is a great way to combine favourable traits from two or more breeds. This effect is called heterosis, or hybrid vigour, and can increase productivity in the herd by 20 to 25 per cent if done properly.

Crossbreeding systems are categorized by what the offspring will be used for. If you are looking to produce market animals, you would use a terminal cross system. However, if you want to produce market animals and replacement animals, you would use a rotational or composite crossbreeding. Selection criteria is different for each type of system.

When trying to make improvements through straight breeding or crossbreeding, you will note that cows should be selected based on their reproductive efficiency as this is a difficult area to improve through breeding. The greatest improvements can be made using sires that are strong in the areas of weight gain and carcass quality.

Artificial Insemination

Artificial insemination (AI) is the process of introducing sperm into a female's uterus to impregnate the female by means other than sexual intercourse. The advantage to AI is you can breed animals in your herd to bulls that are not readily available or nearby. You can increase genetic diversity and have access to bulls to use for breeding that you might not otherwise be able to use.

Estrus synchronization is a method often used as part of an AI program. It is used to bring cycling heifers and cows into estrus at a pre-determined time for easier planned breeding. It's a reproduction management tool to control estrus and shorten the breeding and calving season.

When deciding to naturally or artificially inseminate cattle, you need to think of the advantages and disadvantages of each method to determine which works best for your operation.

Calving

Typically, beef cattle calve without assistance. However, it is important to monitor your herd so assistance can be given in a timely fashion if it is necessary. Knowing when and how to provide calving assistance is essential to protect your cows and calves. Calving labour is divided into three stages:

Labour - The birth process begins with labour. In stage one, the cow's body works to get ready to calve. This stage lasts for 3 to 72 hours.

Signs of Labour

- The cow stops eating
- Restlessness
- The cow wants to be by itself
- The ligaments around the tail head and vulva relax
- Clear vaginal fluid comes out of vulva

Calving - The second stage of labour begins with the water bag appearing and ends with the expulsion of the calf. The calf enters the birth canal and the cow starts straining to push it out. It can take up to three hours for a heifer to give birth to its first calf. Older cows take about two hours to give birth.

Normally the calf is born on its stomach with its front legs stretched out in front of it. The front feet are born first. Next comes the head, then the chest. After the front half of the calf is out, the rest of it slips out easily.

During this stage, help is required if

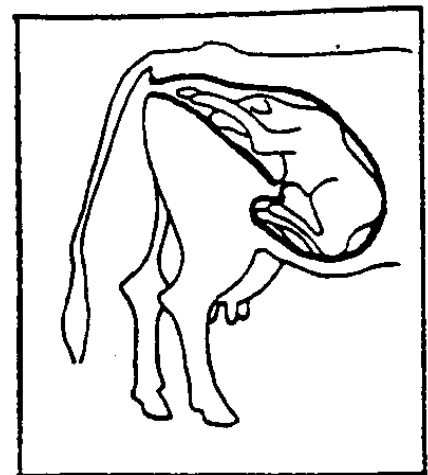
- It last longer than 2 to 3 hours
- The cow keeps straining, but no part of the calf is showing
- Part of the calf other than the front feet appears or can be felt

The placenta - The last stage of calving happens when the cow expels the placenta, called afterbirth. The placenta is the sac that surrounded the calf when it was in its mother's body. Normally, the cow expels the placenta within 12 hours after the calf is born. If it takes longer the vet should be called as the cow could have a retained placenta. This will create health problems for the cow, such as a uterine infection.

Newborn Calf Care

What's next? Make sure the cow and calf are healthy by following these steps:

- Clear the calf's nostrils of any fluid. The mucus in the calf's lungs should drain out and the calf should start breathing.
- Dry the calf off so it does not get cold.
- Dip the calf's navel (bellybutton) into iodine to kill any germs.
- Wash the cow's udder and milk the cow.
- Provide lots of bedding to ensure the cow's udder is clean.
- Monitor the calf to ensure it is suckling and receiving colostrum.
- Give the cow fresh water and forage.
- Make sure the cow can stand up and that it doesn't have an infection or retained placenta.



Normal Position

Problem Births

The normal birth position for a calf is front feet first with the head resting on the front legs; however, calves may try to come out in a number of positions.

- Head first with one, or both, legs bent backwards.
- Head and one leg first, with the other leg crossed over its neck.

- Front feet first with the head twisted backwards.
- Front feet first with the head bent between the front legs.
- Breech, backwards with hind feet first.
- Breech, with rear legs tucked under the calf's body.
- Breech, upside down, feet facing up.
- Hiplock - calf is stuck at the hips.

Repositioning the Calf

If the calf is in the wrong position, it must be repositioned so it comes out feet and head first. Calves can also be delivered backwards with the hind feet first.

- Correct the head position first, then the feet.
- Cup the calf's hooves with your hand so they don't tear or rupture the uterus.
- Reposition the calf between the cow's contractions to avoid hurting the calf or the cow.
- If the calf cannot be repositioned after several minutes, call the vet immediately.

Calves delivering backwards are hard to get out alive. The mother doesn't dilate (the cervix does not open fully) and the umbilical cord, which gives the calf oxygen, breaks sooner. If the calf's head is still inside the mother, the calf smothers. Pull a backwards calf out as quickly as possible.

When to Call the Vet

Always call the vet when:

- You see a lot of blood in the discharge before or after delivery,
- You only feel a tail; this means the calf is in a breech position and twins are a possibility,
- The discharge from the vagina has a foul odour,
- The udder on the cow seems to be getting smaller rather than larger,
- The cow has a uterine torsion, indicated by spiral folds in the vagina,
- A yellow, manure-stained discharge from a cow means the calf is in trouble; deliver it quickly.

Section 6: Business and Production

Marketing

Beef producers can market their animals in many different ways. Cow-calf operators produce weaned calves to sell as either replacement-breeding animals (or for use within their own herd), or as calves purchased for stocker or feeder operations. Operators with purebred cattle will also sell unneeded replacement calves to customers who want to purchase a particular breed for their own herds. Others may feed then finish their cattle for market or sell to a feedlot operator for finishing. All types of operations have numerous outlets for their products. These range from auctions, packing plants or direct sales, to other breeders or consumers.

Farmers may or may not actively participate in marketing. When consumer demand for beef is high, cattle prices will usually be higher as well. This effect will be felt all the way from the cow-calf operation to the feedlot. You should keep an eye open for trends in beef prices. Prices can be affected by many things, including time of year and political issues.

Farmers may work to promote beef on an individual basis; however, most of the marketing of beef occurs at higher levels. It may involve local or provincial beef associations, or national organizations such as the Beef Information Centre (BIC). It may also involve wholesale and retail merchandisers of beef. There is a role for everyone in the marketing of beef.

Traditionally, most feeder cattle are marketed at the public auction. Slaughter cattle may also be sold this way.

Before you ship your cattle to market, you should know

- Costs of selling
- Conditions of sale
- Expected return
- Characteristics of the auction mart (The days most buyers buy cattle; when large producers sell; and so on)

You should deliver the cattle to the sale yard in a timely manner. You can learn more and do some public relations work if you watch your cattle sell. Selling this way exposes your cattle to many potential buyers. The market is often local, and your transportation costs will be low. However, you are at the mercy of the market. Your price is not guaranteed and will be determined by the buyers bidding at the time your cattle are sold.

Many smaller producers arrange the sale of cattle themselves. Word of mouth or local newspaper advertisements can be used to attract potential buyers. Local butchers or slaughter houses accept and prepare the animals for the buyers.

Meat Slaughtering and Processing

Any meat sold in retail stores in Nova Scotia must be slaughtered at a provincially or federally inspected abattoir. Meat slaughter in a provincially inspected abattoir can only be sold within Nova Scotia. In order for Nova Scotia-produced meat to be sold outside of the province, it has to be slaughtered at a federally inspected facility. More than 20 abattoirs are licensed to operate in Nova Scotia and inspection services are provided by the government.

To ensure meat is safe for consumers, all animals, slaughter processes, and carcasses at provincially permitted abattoirs are inspected by trained primary product inspectors appointed under Nova Scotia's Meat Inspection Act and Regulations.

Further processing of meat or meat products is inspected and enforced by Nova Scotia Environment public health inspectors under the Health Protection Act and Food Safety Regulations. Provincial inspection contributes to the general surveillance of key food safety, animal health, and animal welfare issues in provincial livestock and poultry populations.

If you are interested in operating a meat-processing establishment (abattoir, slaughterhouse, meat shop, or retail outlets, including mobile retail truck), you will require a permit from the Nova Scotia Department of Environment.

Note: On-farm slaughter and farm-gate sales are only allowed where consumers do not sell or intend to sell the meat or meat product or use the meat or meat product for other commercial purposes. Any farm gate willing to sell processed meat or meat products through a retail shop on their farm requires a permit from the department and can only sell inspected meat. It is illegal to operate farm gate for commercial purposes without inspection in Nova Scotia. Failure to comply with provincial regulations could result in enforcement action.

For more information or questions about the provincial meat inspection program, contact your local district Nova Scotia Environment office.

<https://novascotia.ca/sns/paal/agric/paal011.asp>

NOTE

For more information on the Meat Inspection Act, or to learn more about obtaining a Meat Slaughtering and Processing Licence, view the links listed under Additional Resources.

Beef Grading in Canada

Beef grading is overseen by the Canadian Beef Grading Agency and is conducted by certified graders after a carcass has been inspected, approved for health and safety standards, and bears a federal or provincial meat inspection legend or stamp. Grading gives the customers a consistent way of selecting beef and the quality of beef is more predictable. The grades all feedlots strive for is Canada A, Canada AA, Canada AAA, and Canada Prime with a lean meat yield of around 60 per cent.

It is important for beef producers to understand the grading system as carcasses with top-quality grades are sold at a premium. Also, the information collected from the grading process can be used to improve production and marketing techniques.

The grader assesses a carcass based on several criteria that influence quality and the lean yield.

Quality - Predicted tenderness, juiciness, customer acceptability, and shelf life are assessed based on maturity (age), sex, conformation (muscling), fat (colour, texture, and cover), and meat (colour, texture, and marbling). Marbling is assessed on the average amount, size, and distribution of fat particles or deposits in the rib eye.

Yield - Carcasses qualifying for Canada Prime, or any of the Canada A grades, are also assessed for an estimation of lean meat yield. This is done by graders using a yield ruler to determine the rib-eye size and fat class between the 12th and 13th ribs.

Each of the characteristics assessed while grading has an influence on quality.

- **Maturity** - Affects tenderness.
- **Sex** - Pronounced masculinity affects meat colour and palatability.
- **Muscling** - Meat yield is influenced by the degree of muscling.
- **Fat** - Colour and texture of fat influence consumer acceptability, whereas fat cover affects yield.
- **Meat** - Marbling affects eating quality for juiciness and tenderness. Colour and texture influence consumer acceptability.

The Quality Grades

Grade	Maturity Age	Muscling	Rib Eye Muscle	Marbling	Fat Colour	Fat Measure
Canada Prime	Youthful	Good to Excellent with some deficiencies	Firm, Bright Red	Slightly Abundant	Firm, White or Amber	2mm or more
Canada A, AA, AAA	Youthful	Good to Excellent with some deficiencies	Firm, Bright Red	A – Trace AA – Slight AAA - Small	Firm, White or Amber	2mm or more
B1	Youthful	Good to Excellent with some deficiencies	Firm, Bright Red	No requirement	Firm, White or Amber	Less than 2mm
B2	Youthful	Deficient to excellent	Bright Red	No requirement	Yellow	No requirement
B3	Youthful	Deficient to excellent	Bright Red	No requirement	White or Amber	No requirement
B4	Youthful	Deficient to excellent	Bright Red	No requirement	No requirement	No requirement

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Cuts of Meat

Consumers are drawn to different cuts of meat for diverse uses. The values associated with each cut vary as a result.

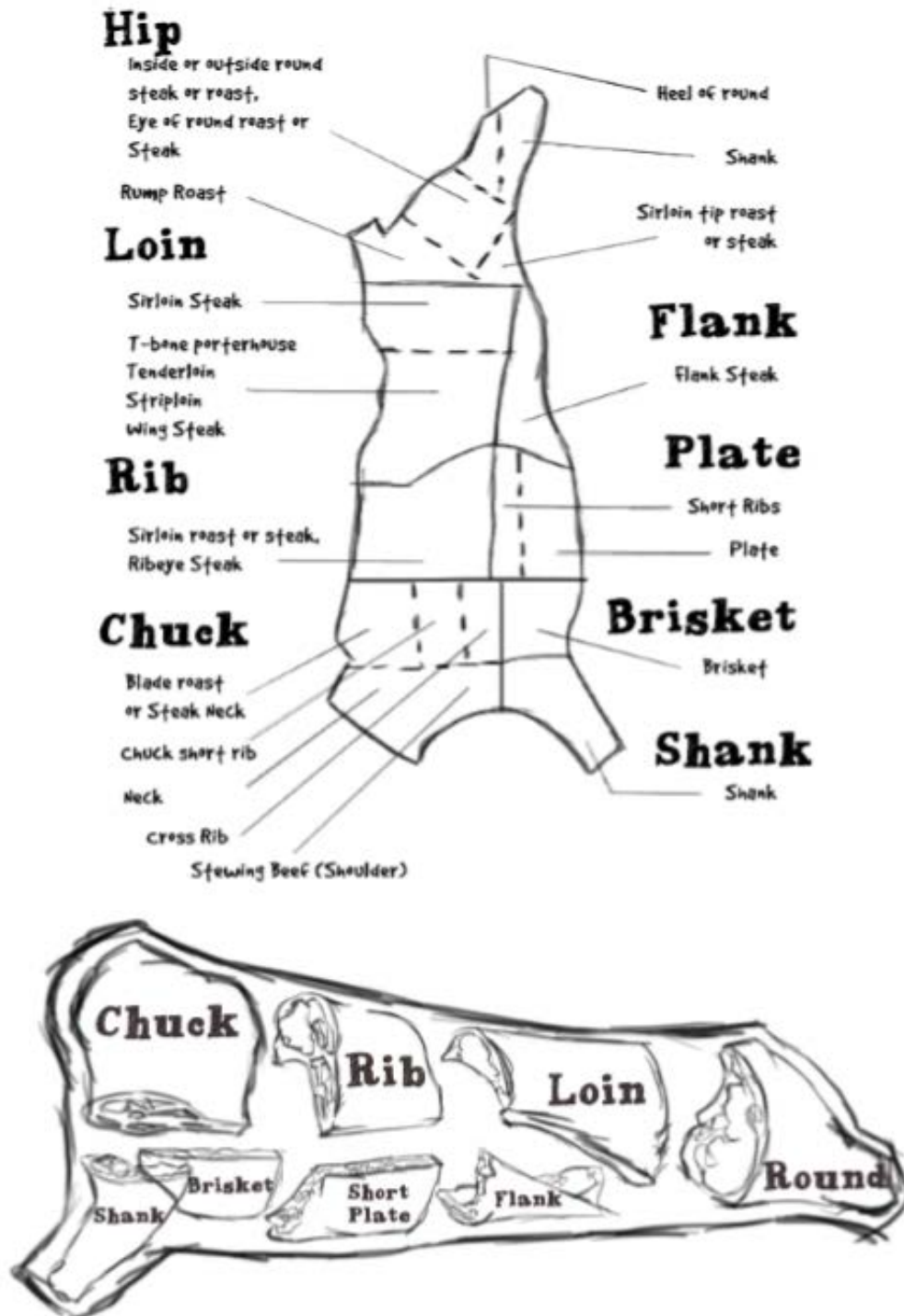


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Record Keeping

Records keep track of a herd's performance, health, daily management, and ancestry. Records of expenses and receipts are important and can help in determining the productivity and profitability of your herd. Be sure to keep your records in a convenient place and keep them up to date. You may wish to include some of the following information in your records.

Types of Records

Pedigrees - This record shows the family tree of each individual animal. It lists the sires, dams, grand sires, grand dams, and great-grand sires and dams. It also includes the colour and senior weight of each animal. Pedigrees are important because they can establish that your animal is purebred and show ancestry, so you can avoid accidentally inbreeding.

Herd records - This lists the sex, sire, dam, date of birth, weight, and the date the animal leaves your farm for every individual animal. Comments, such as buyers' names or show winnings, can be added and help keep track of each animal.

Breeding record - Each breeding is recorded here. It will help you keep track of heat dates and help you decide which animals are productive and worth breeding.

Show record - A show record includes the dates and places of shows entered plus information on classes and awards received.

Health records - Health records should include any symptoms or possible signs of disease and the date they were observed in each animal. If the animal receives any medication, the amount and the date must be recorded. Health records can help keep track of the withdrawal period for medication that must be adhered to before an animal can go to market.

Feeding records - These records should include the type and amount of feed given to each animal. The record can also track the overall feed costs of your operation. Feeding records can also help you to design and implement feeding programs according to the life stage of your animals.



NOTE

For examples of record templates, see the appendix at the end of this manual.

Additional Resources

- Annual Crops for Greenfeed and Grazing:
<https://www.saskatchewan.ca/business/agriculture-natural-resources-and-industry/agribusiness-farmers-and-ranchers/livestock/pastures-grazing-hay-silage/annual-crops-for-greenfeed-and-grazing>
- Body Condition Scoring: <http://www.beefresearch.ca/research/body-condition-scoring.cfm>
- Canadian Cattlemen's Association:
www.cattle.ca/
- Crossbreeding for Commercial Beef Production:
http://www.nbcec.org/producers/sire_selection/chapter5.pdf
- <http://www.cattle.ca/cca-resources/production-practices/verified-beef-production/>
- Guide for Beginning Farmers in Nova Scotia:
<https://novascotia.ca/thinkfarm/documents/beginning-farmers-guide.pdf>
- Introduction to Livestock: <http://nsnewfarmer.ca/home/livestock/>
- Livestock Fencing Guidelines:
<https://novascotia.ca/thinkfarm/documents/fencing-guidelines-2013.pdf>
- Livestock Transport in Canada: http://www.inspection.gc.ca/DAM/DAM-animals-animaux/WORKAREA/DAM-animals-animaux/text-texte/livestock_transport_pdf_1528296360187_eng.pdf
- Manure Management Guidelines:
https://novascotia.ca/thinkfarm/documents/manureguide_2006lowres.pdf
- Meat Inspection Act: <http://laws-lois.justice.gc.ca/eng/acts/M-3.2/page-1.html#h-1>
- Meat Slaughtering and Processing Licence:
<https://novascotia.ca/sns/paal/agric/paal011.asp>
- National Farm Animal Care Council Code of Practice for the Care and Handling of Beef Cattle: <http://www.nfacc.ca/beef-cattle-code#section2>

Additional Resources (Continued)

- National Farm Animal Care Council Transportation:
<http://www.nfacc.ca/codes-of-practice/transportation>
- Nova Scotia Premises Identification Program:
<https://novascotia.ca/agri/programs-and-services/industry-protection/#pid>
- On-Farm Livestock Mortality Management:
<http://www.nsfa-fane.ca/efp/wp-content/uploads/2018/08/On-farm-Livestock-Mortality-Management-NSDA.pdf>
- Perennia – Grass-fed Beef Series:
<http://www.perennia.ca/portfolio-items/beef/?portfolioCats=129>

References

- 4-H Alberta. *Beef*. Government of Alberta, 2015. Leader Guide. <http://4h.ab.ca/downloads/documents/BeefLeaderGuide2015.pdf>. Accessed July 17, 2018.
- 4-H Nova Scotia. *Beef Project*. 2004. 4-H Nova Scotia Leader Resource Guide.
- Beef Cattle Research Council. *Body Conditioning Scoring*. <http://www.beefresearch.ca/research/body-condition-scoring.cfm>. Accessed 2018.
- British Columbia 4-H. *B.C. 4-H Beef Member Manual*. 1996. <https://www.southmalahat4h.ca/beefandswine/upload/docs/404%20Beef%20Member%20Manual%201996.pdf>. Accessed July 5, 2018.
- Forage Beef. *Stocking Rate, Animal Units and Stock Density*. 3 September 2003. [http://www1.foragebeef.ca/\\$foragebeef/frgebeef.nsf/all/frg44](http://www1.foragebeef.ca/$foragebeef/frgebeef.nsf/all/frg44). Accessed 2018.
- Handley, J.; Hamilton, T.; and Miller, S. *Crossbreeding Systems for Beef Production Ontario*
- Ministry of Agriculture, Food and Rural Affairs, February 2001. <http://www.omafra.gov.on.ca/english/livestock/beef/facts/01-011.htm>. Accessed 2018.
- Kinder, C.; and Mavencamp, D. *Judging Beef Cattle and Oral Reasons 101*. University of Idaho, 2015. <http://www.cals.uidaho.edu/edcomm/pdf/PNW/PNW669.pdf>. Accessed July 13, 2018.
- National Farm Animal Care Council. <http://www.nfacc.ca/>. Accessed 2018.
- Nova Scotia Department of Agriculture. *Nova Scotia Premises Identification (PID) Program Industry Protection*, 2013. <https://novascotia.ca/agri/programs-and-services/industry-protection/#pid>. Accessed July 23, 2018.
- Ontario Ministry of Agriculture, Food and Rural Affairs. *Pasture Production Publication 19*. 2015.

References (Continued)

- Parish, J.; Rivera, D.; and Boland, H. *Understanding the Ruminant Animal's Digestive System*. *The Beef Site*, 22 August 2002. <http://www.thebeefsite.com/articles/2095/understanding-the-ruminant-animals-digestive-system/>. Accessed 2018.
 - Perennia. *Biosecurity for Small Scale Livestock Production*. 2016. PDF. <http://www.perennia.ca/wp-content/uploads/2018/04/biosecurity-for-small-scale-livestock-production.pdf>. Accessed July 5, 2018.
 - Sanson, D.W.; and Hixon, D.L. *Dry Matter Intake for Beef Cattle*. Extension Beef Cattle Resource Committee. <http://www.iowabeefcenter.org/bch/DryMatterIntake.pdf>. Accessed 2018.
 - Sooksom, R. *Guide for Beginning Farmers in Nova Scotia*, Second Edition. Thinkfarm. 2012. <https://www.novascotia.ca/agri/documents/thinkfarm/beginnin-farmers-guide.pdf>. Accessed December, 05, 2018.
 - Sooksom, R. *Meat Inspection Resource Kit for Nova Scotia Farmers*. Thinkfarm. July 2010. <https://novascotia.ca/thinkfarm/documents/fsheets/32-meat-inspection.pdf>. Accessed August 21, 2018
- Wild Mountain Farm. 100% Grass-Fed Beef. 2018. <https://wild-mountain-farm.myshopify.com/collections/grass-fed-beef>. Accessed December 5, 2018.

Appendix A: Traceability in Nova Scotia

The Canadian Food Inspection Agency is proposing changes that will affect cattle, sheep, goats, pigs, bison, and deer. Currently cattle, sheep, and pigs require tags, and only pigs require movements to be reported. Moving forward, all listed species will require both tags and their movements to be reported.

Traceability has three major components:

1. **Animal Identification**—All animals will be required to be identified with individual animal ID tags. Most of these tags can be purchased at local feed stores or online directly from the Canadian Cattle Identification agency <http://canadaid.com/>
2. **Premises Identification**—All sites where livestock are housed or assembled will require a Nova Scotia premises ID number (PID) issued to them.

Any livestock producer in Nova Scotia can apply for a PID at no charge. This is a one-time application and the issued number stays with the farm property regardless of changes in ownership, species, or animals etc. The same number is used when ordering tags and reporting movements for all animals regardless of species.

A PID can be used in trace back of animals for emergency measure such as food recalls or animal disease outbreaks. Producers can apply for a PID at www.novascotia.ca/agri/pid/, by calling 902-890-3377, or by emailing NSPID@novascotia.ca.

3. **Animal Movements**—All movements of regulated species between premises need to be reported to the responsible administrator for that species:
 - Canadian Cattle Identification Agency for cattle, sheep, goats, bison, or deer (<https://www.canadaid.ca>)
 - PigTrace for hogs (<http://pigtrace.ca>)

The following information needs to be reported:

- Premises ID of departure and arrival sites
- Time and date
- Individual animal ID number
- Licence plate of livestock trailer

No reporting will be necessary for movements within a farm unit including

- Onsite pastures (pastures that are part of your farm unit)
- Other barn locations (heifer barns or other locations where animals are kept)
- Off-site pastures owned or leased (property where you are pasturing your animals only, not comingling with other producer's animals)

Appendix B: Biosecurity



Biosecurity for Small Scale Livestock Production

Biosecurity is the protection of people, animals, and the environment from infectious disease, pests, and other biological threats. It refers to the proactive measures taken to exclude threats from farms that are disease free, and preventing spread of pathogens to other herds or flocks if/when a disease does occur. The ultimate goal of a good biosecurity plan is to implement easily attainable protocols that reduce problems to inexpensive and manageable occasions. The following are the key components of any biosecurity plan.

1. **Fences:** Good fences keep livestock in and wildlife out. Inspect boundary fences regularly and repair as needed. Stray stock may spread disease and feral animals introduce new pathogens to your farm.
2. **Housing, Equipment, and Yard Maintenance:**
 - Pens should be completely emptied, cleaned, and disinfected at least annually.
 - All equipment that comes into direct contact with livestock or poultry should be cleaned and disinfected periodically, including feeders and waterers.
 - If sharing equipment with other farms, be sure to disinfect the equipment before using on your farm. Use your best judgement and weigh the risks carefully.
 - Prevent pests and rodents by:
 - Keeping area around pens free of debris
 - Cutting the grass short around pens and enclosures
 - Keeping feed in tightly closed containers and cleaning up spilled feed
 - Using traps and bait as necessary
 - Standing water should be drained.
3. **Introducing New Stock:**
 - Don't bring new stock to your property if they appear unhealthy.
 - Avoid purchasing stock from markets and auctions.
 - Obtain a health certificate if possible.

For organic production, a robust biosecurity program can prevent the need for antibiotics and parasiticides, and can reduce the potential of GMO contamination or loss of certification.

- Birds, eggs, and livestock should be sourced from farms with a solid herd or flock health program.

4. **Quarantine:**

- Have a quarantine area available for animals new to the farm and for sick or injured animals.
- This should be a separate area or building to prevent bird-to-bird or animal-to-animal contact.
- Three weeks will allow time for a proper assessment of health, condition, and recuperation from transport or illness.
- Observe animals or birds for any abnormal behaviour and signs/symptoms of disease. Presence of unusual behaviour or symptoms calls for veterinary inspection or tests.

5. **Water and Feed:**

- Water should be tested at source to ensure its suitability for livestock production at least annually.
- Design and position water bowls, troughs, and waterers to prevent fecal contamination.
- Feed or ingredients should be purchased from sources that verify its safe origin.
- Keep feed pest-free and dry, cover feed bins and feed systems to reduce the chance of contamination.

6. **Work Flow:**

- Farm owners and workers should have separate clothing and footwear for working around various animal species. These should be kept at the barn entrance.
- Use hand sanitizer or wash hands with soap and warm water before entering and after leaving livestock areas.
- Work with the youngest and most susceptible animals first.

7. **Manure:**

- Manure should be removed from the production area regularly.
- Farms, even hobby farms and small stables, should have a manure management plan that includes collection, storage, moving, and disposing of manure to minimize chance of spreading disease.
- Tools and equipment used for manure handling should not be used for feed or bedding.

8. Herd or Flock Health:

- Contact your herd health veterinarian when livestock appear sick, mortalities are high, or production drops off without apparent reason. Low numbers of mortality should be examined by a vet if the cause of death is unknown.
- Mortality should be disposed of in a timely manner to prevent contamination of the farm environment, reduce risk of spreading disease to other livestock and humans, and prevent attraction of pests.
- When animals are stressed from parasites, weather extremes, etc., natural treatments may be less effective. Monitor carefully and resort to other options as necessary. As well, remember that sick animals benefit from remedial care.
- Vaccinate as required (keeping the necessary records).
- Pay attention to parasites. Fecal egg counts are useful in determining if treatment is necessary.
- Keep records of treatments and veterinary care.

9. Visitors/WWOOFers/Contractors:

- Discourage unannounced visitors.
- All visitors must follow biosecurity protocol.
- Designate a parking area for visitors.
- Visitors should be accompanied by farm staff.
- A visitor log is recommended.
- Post “Biosecurity” and “No Entry without Permission” signs on entrance doors.
- Keep extra footwear and outerwear (coveralls, smocks, etc.) for visitors.

Biosecurity is not limited to large-scale farms. Regardless of size or production philosophy, all farms, even hobby farms, have a responsibility to prevent an outbreak or spread of animal (or plant) disease or pests. Stay on top of industry association news. Be aware of local conditions or issues as they arise. **If there is a serious disease outbreak don't be the last to know!**

There are national biosecurity standards for most livestock commodities.

These guidelines are a good place to start when developing a biosecurity plan for your farm.

<http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/eng/1299868055616/1320534707863>

**For more information, contact:
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Perennia**

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Appendix C: Record Keeping

Herd Record							
Name	Tattoo	Sex	Sire: Dam:	DOB	Colour	Date Sold	Comments

Inventory Record							
Animal ID (Name/ #)	Registration #/Tattoo	Description Breed, colour, marking, etc.	DOB	Sex	Ownership Information	Purchase Price	Value
					<input type="radio"/> Raised <input type="radio"/> Purchased Date if purchased		
					<input type="radio"/> Raised <input type="radio"/> Purchased Date if purchased		
					<input type="radio"/> Raised <input type="radio"/> Purchased Date if purchased		

Breeding Record						
Dam	Sire	Date Bred	Date Birthed	No. Born Alive	# Dead at Birth	Comments

Show Record						
Name of Show	Location	Date of Show	Back #	Classes Entered	Number in Class	Comments

Health Record								
Name/ #	Breed	Sex	Age	Illness/ Symptoms	Treatment	Date Treated	Cost of Treatment	Recovered from illness/ successful treatment

Death Record					
Name/#	Breed	Sex	Age	Date of Death	Cause

Feed Record						
Type of Feed	Description	Cost of Feed (\$)	Amount fed per day (kg)	Protein (%CP)	Energy (TDN)	Dry Matter (%)

Appendix D: Activities for a 4-H meeting

Each chapter in this manual can serve as information and act as a guide to help you plan a 4-H meeting. This manual is meant to act as a starting point for providing you with knowledge to teach your members. As a leader, you are encouraged to tailor your meetings to your groups' interests and abilities.

The table below outlines a typical 4-H meeting and gives suggestions for the length of time.

Welcome, call to order, and pledge		10 min
Roll call		5 min
Parliamentary procedure	Minutes and business	10 min
Topic information discussion	Use the manual as a guide to present information on the meeting's topic.	20 min
Activity	Time to apply the newly learned information. See the list of suggested activities below.	30 min
Handle the animals	If possible, members may use this time to practice handling their animals.	20 min
Wrap up and adjournment		10 min

The following tables have different topic suggestions, information to discuss, as well as some possible activities based on each section of this manual.

Ideally, one or two topics should be selected to discuss during each meeting. Try to select topics from different sections for each meeting so members are exposed to a wide variety of knowledge.

As a leader, feel free to be creative and use a variety of activities to help your members learn. There are many worksheets available on various websites for members to fill out. You can also invite experts and guest speakers to come in to talk to your members, or you can arrange day trips to visit new locations.

Section 1: Selecting an Animal

Topic	Information	Activity
Parts of the animal	Show members a labeled diagram of the animal. For younger or newer members, begin with basic parts of the body. For older or more experienced members, you can discuss more advanced topics such as skeletal or muscular structure.	Have members label the parts of the animal. This can be done by using a worksheet or by having members take turns placing labels on an actual animal.
Animal breeds	Teach your members about different breeds. Possible information to include is <ul style="list-style-type: none"> • Distinct breed characteristics • Differences among the breeds • History of a breed 	Some suggested activities: <ul style="list-style-type: none"> • Have members match a picture of the animal to its breed. • Have members research and present the ideal characteristics of their chosen breed.
Choosing an animal	Discuss particular features a member might want to look for in an animal. Make sure to include information on correct conformation and conformation faults.	Have members practice judging. The members should place the animals and give reasons for their placings using the correct judging format.
Purchasing stock	Outline your members' options for where they might purchase an animal. Discuss the pros and cons of purchasing from a private sale, a large breeding operation, an auction or breeding their own.	Organize a trip for the members to visit a breeding operation or an auction.

Section 2: Care and Management

Topic	Information	Activity
Housing	Discuss with your members the different options for housing their animals. Make sure to include information on the National Farm Animal Care Council Code of Practice.	Have members design their own farm using whatever materials they like, such as modeling clay, popsicle sticks, paper etc. Have members present their farms and discuss their farms with the group.
Handling	Inform members about proper animal handling and demonstrate how to properly handle the animal. This activity meeting can include information on animal behaviour, proper handling techniques, and safety tips.	Have members practice handling an animal while you observe.
Grooming	Teach members how to properly groom their animals. You can discuss basic grooming techniques as well as how to groom an animal for show.	Have members assemble a grooming kit and take turns grooming an animal. They could bathe, clip/shear, trim nails/hooves etc.
Identification	Discuss the importance of proper identification and tagging/tattooing animals.	Have members observe an animal being tagged/tattooed.

Section 3: Nutrition

Topic	Information	Activity
Digestive system	Teach your members about their animal's digestive system.	Have members label an image of the animal's digestive system and include brief descriptions on the functions of each part.
Essential nutrients	Inform your members about what the essential nutrients are and why they are important to their animal's diet.	Have members complete a worksheet where they match essential nutrients to their function.
Classes of feed	Discuss the different types of feed available for the members to feed their animals. Describe each feed and its pros/cons.	Have an animal nutritionist, feed salesperson, veterinarian etc. come in and give a talk on animal nutrition.
Feeding programs	Teach your members about their animal's nutritional requirements for their different developmental and life stages.	Instruct members to design a feed program for the different stages of their animal's life. Compare and contrast how a newborn is fed compared to the diet of a mature animal.
Body condition scoring	Inform members how to score an animal's body condition, when to score, how often, and why. Include some basic information on how a member could adjust the animal's diet to raise or lower a body condition score.	Have members practice palpating and scoring the body condition of an animal. Provide images of animals in different conditions so members have a visual.

Section 4: Health

Topic	Information	Activity
Recognizing a healthy animal	Teach members how to recognize a healthy animal and what normal vital signs are.	Have members practice taking an animal's vitals.
Biosecurity	Inform members on the importance of biosecurity.	Have members discuss proper biosecurity practices and ways they can implement them into their own program.
Common diseases	Discuss some common diseases, their cause, prevention, and treatment.	Have a veterinarian in, or visit a vet clinic, to talk about common diseases and what members can do about them.
Parasites/vaccinations	Inform your members about the importance of routine vaccinations as well as deworming.	Have your members design a deworming and vaccination schedule. If members are older and more experienced, they may want to learn how to properly administer vaccines.

Section 5: Breeding

Topic	Information	Activity
Reproductive cycle	Teach members about the animal's reproductive cycle.	Have members label diagrams of the animal's reproductive system.
Signs of heat and breeding	Inform your members about the signs of an animal in heat. Proper breeding practices, as well as natural vs artificial insemination, may also be discussed.	<p>Have members record some signs of an animal in heat. Then, have members discuss the advantages/disadvantages of natural service or artificial insemination.</p> <p>Also, you could arrange to have the members observe animals being checked for pregnancy.</p>
Giving birth	Discuss the stages of labour and some signs of issues with the birthing process.	Have members fill out a timeline on the stages of labour with a description of each stage.
After-birth care	Teach your members about what to do following the birth of an animal. Care for the newborn as well as the mother should be discussed.	Have members create an after-birth care kit complete with towels, disposable gloves, buckets etc.

Section 6: Business and Production

Topic	Information	Activity
Marketing	Discuss with members the importance of marketing and some marketing ideas/tips.	Have members research potential markets for products from their animals. Alternatively, you could organize a trip to a beef farm, specialty meat market, farmers market etc.
Record keeping	Talk to members about why records are kept, how to keep them, and what members should keep track of.	Have members fill out a record booklet throughout the year. You may use the record templates provided in this manual or use your own.