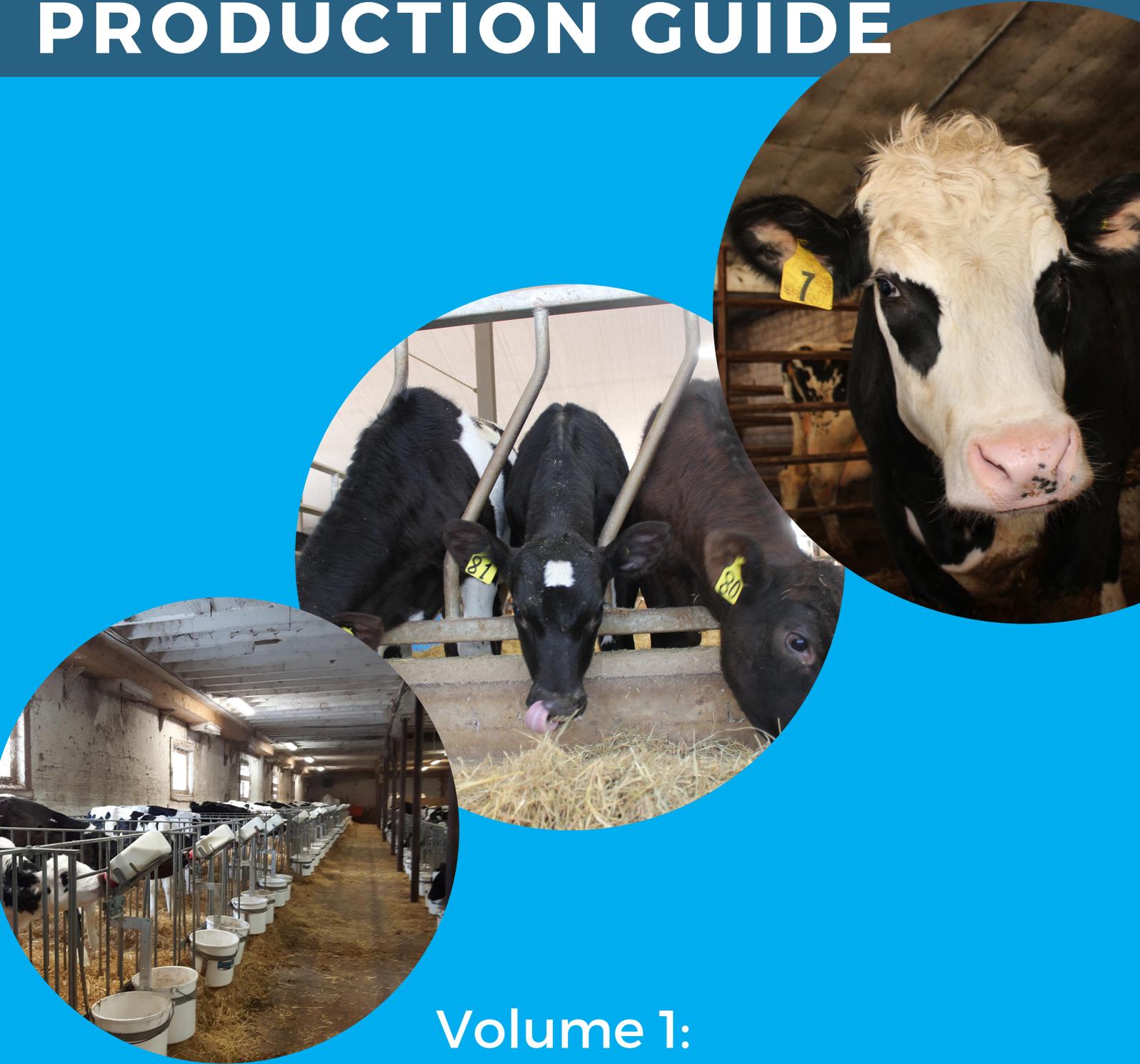


BEEF ON DAIRY: A MARITIME DAIRY-BEEF PRODUCTION GUIDE



Volume 1: From Breeder to 500lb Feeder



**MARITIME
BEEF
COUNCIL**

V.1
Spring 2020

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INTRODUCTION

Approximately half of all bovines in the Atlantic Provinces belong to a dairy herd.[1] The dairy industry creates a co-product with each calf produced which is not destined to be a replacement dairy cow. Currently, a majority of these calves are being moved into the veal industry. The veal market has been challenged in recent years, and regulation changes have shifted logistics of moving young calves.

The Maritime Beef Strategy has identified capacity for an additional 10-15,000 head/year growth in the finished beef category, including these surplus calves from the dairy industry. The dairy herd has the strength of genetic consistency which brings an opportunity of bringing a consistent product to the market when managed properly. Improving the quality of these cattle can bring economic benefits to everyone involved in the beef supply chain.

For many dairy herds, incorporating better beef sires into the herd's breeding plan goes hand in hand with the use of new technologies such as sexed semen and genomics to precision select the replacement female pool. These tools are now widely used, enabling dairy farmers to breed heifer replacements from their highest genetic merit animals, while using high Estimated Progeny Difference (EPD) beef sires on the rest to produce beef-cross calves of greater economic value.

For calf rearers, growers and finishers, it is important to source cattle with quality beef genetics in order to maximize growth rates and carcass quality.

Breeding is not the only critical area for cattle in the dairy beef supply chain. Calves that have received adequate colostrum and are healthy will achieve greater growth rates and require less veterinary intervention.

Adequate nutrition and housing throughout all stages of life are important to produce cattle that meet market specification.

This document supplies producers with important information needed to achieve better returns, whether they are dairy farmers wanting to grow and finish their own calves, or beef producers purchasing dairy-bred calves.

While the Maritime Beef Council seeks to ensure that the information contained is accurate within this document at the time of release, no warranty is given in respect thereof. We expect more research and development to ensure regional accuracy and will consider this a Version 1 that will be modified as required.

Any inquiries related to this document should be sent to:
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-Amy Higgins
Industry Coordinator- Maritime Beef Council



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[1] Statistics Canada. Table 32-10-0130-01 Number of cattle, by class and farm type (x 1,000)

BREEDING STRATEGIES

Breeding Beef on Dairy

"In dairy breeding, the sole genetic focus is on replacement females and the traits that will make her an elite producer, long lived, and a trouble-free cow. In the beef industry, genetic selection has had to focus on both maternal (replacement) and carcass (terminal) traits. Weaning weights, yearling weights, ribeye area, and marbling are examples of terminal traits used for breeding to increase carcass merit and efficiency in market animals. If dairy producers want to capitalize on the dairy beef market, they will need to begin familiarizing themselves with these traits as well." – Amanda Cauffman (Extension Agriculture Educator, Grant County) & Ryan Sterry (Extension Agriculture Agent, St. Croix County)

Breeding Potential:

Dairy and beef industries have similar systems for evaluating the breeding potential of sires. One important thing to note is that beef EPD's can NOT at this time be compared between breeds without utilizing that year's "Across Breed EPD" Adjustment Factor. This complication is further compounded because the breeds use different genetic evaluations which provides some variation in indices or data points. Another difference between dairy proofs and EPD's is the amount of data points to drive accuracy in the data set. The Angus breed has the largest amount of registrations (in 2017 60,338 for Angus, 22,989 for Simmental, 13,323 for Hereford and 4,411 for Limousin) but is a shadow compared to Holstein Canada's 286,005 registrations in 2017. Reliability of an EBV is something the dairy world likely hasn't had to look at in a while so you may have to retrain to consider it, and in Beef

EPD's it is known as Accuracy. Genomically Enhanced EPD's are becoming more and more common - but the beef industry is a few years behind the Dairy industry in fully utilizing those tools.

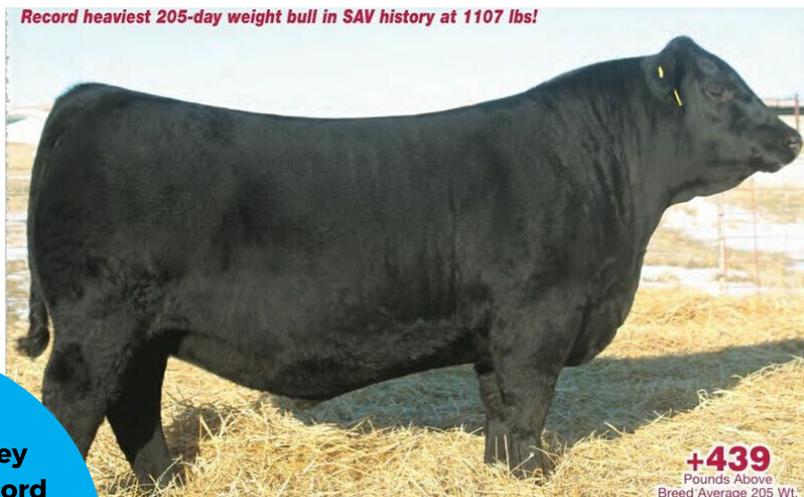


Image:

<https://www.drovers.com/article/angus-bull-smashes-world-record-price-selling-151-million>

Schaff Angus Valley set a new world record price for a bull after selling SAV America 8018 for \$1.51 million. Schaff Angus Valley in 2019.

FACTORS IMPORTANT TO THE DAIRY:



FACTORS IMPORTANT TO THE FEEDER:

Frame Score	6.3 and under when breeding Holsteins. Consider your cow herd type! Feeders are looking for a compact frame with capacity
Ribeye Area	The larger the better (REA is also an indicator of muscle expression)
Performance	This relates to "days on feed"- (higher performance = less days on feed)
Homozygous Polled	so that you don't have to deal with de-horning or horned discounts
Coat Colour *	When the hide is stripped off, the hide colour doesn't matter- so if you are feeding them from start to finish this is less of a concern- but if you are selling to feedlots- then there may be a negative bias towards dairy type spots.
Feed Efficiency	Converts feed to pounds- economically relevant trait. note- any bulls sold through the Maritime Beef Test Station have a feed efficiency value for those who may use a walking bull

*Info on Coat Colour Genetics: https://aces.nmsu.edu/pubs/_b/B211/welcome.html

SIRE SELECTION for the HOLSTEIN DAIRY HERD

****these assumptions may change as the market develops****

ASSUMPTION #1: All dairy-beef crossbreds will be a “terminal cross” (replacement females out of a dairy-beef cross are not encouraged). Veal strategies will differ.

ASSUMPTION #2: Polled, Homozygous Black Hided, Frame Score Under 6.3, Large Rib Eye Area

NOTE - ALL purebred registered Angus will be Homozygous Polled. Hereford, Limousin, Simmentals all have horned and polled traits and will be noted as Heterozygous or Homozygous in the semen listing. Angus may have solid red or black traits and they are expressed in the same dominant (black)/recessive (red) relationship as Holsteins (Red in an Angus prefix denotes coat colour). Limousin and Simmental do not require any standard prefixes to do with coat colour - but are usually labelled clearly “homozygous black” in the major semen company listings.



Beef Breed EPD's can ONLY be compared with each other breeds using an Across Breed EPD Factor. This factor has been developed to help those who might be looking to compare apples to apples between breeds when selecting sires.

<http://beefimprovement.org>



Estimated Progeny Differences (EPD's) are often presented on charts OR instead of needing to know the exact averages of every different breed, perhaps consider looking at the Performance rating. The percentile rank listed with the EPD makes it easier to identify the high performers without knowing each breed's average. 1% means the animal performs in the top 1 percentile. The "lower" the percentile rank means more more desirable the animal performs for that trait.

Lower the percentile rank means the more desirable.

HOW TO DECODE AN EPD - It is important to know what you are looking at because the breed associations have different genetic evaluations and all of the AI companies express the data a little bit differently. The following are the ones that are consistent. It is rare that a bull will hit top marks on all aspects, so use the headings in blue as higher importance factors.

- **Calving Ease - CE** - Calving Ease is one to consider the breed when dealing in a cross situation. There are differences within breeds. For example, a mature Holstein cow may have no trouble putting out a "lower calving ease" Angus whereas it may be more of a consideration in a Holstein heifer.
- **Birth Weight - BW** - The same consideration in terms of realizing there are significant breed differences.
- **Weaning Weight - WW** - larger the better. In the top 50th percentile.
- **Yearling Weight - YW** - larger the better. In the top 50th percentile.
- **Carcass Weight - CW** - Higher the better- but generally speaking the higher carcass weight bulls may have higher frame scores therefore some balance might be struck.
- **Marbling - MARB or IMF** - Top 50th percentile. *there may be a tradeoff for larger ribeye. Holsteins will generally carry a decent marbling trait so focus on improving ribeye area.
- **Rib Eye Area - REA** - Top 30th percentile.
- **Rump Fat - FAT** - Top 50th percentile.

No Need to worry about Maternal/replacement values such as Scrotal Circumference SC, Docility DOC, or Milk MILK. There are LOTS of new traits and values being tracked.

Each Breed or Semen Company HAS DIFFERENT \$\$ Value indexes. TERMINAL Indexes should be the ones of interest such as Semex and ST Genetics: Beef Value (\$B) and index that combines progeny performance and carcass value. GENEX has a similar Dollar Feedlot (\$F) index, etc. They combine some of the economically relevant traits as listed above into one index to aid in narrowing the field.

Feed Efficiency - is an economically relevant trait. Some Canadian beef associations are working on a Residual Feed Intake EPD- There is limited data flowing through the system to support an accurate number at this time. The American Angus Association has a rADG (residual Average Daily Gain which is a feed efficiency metric) that you may see in some bull EPD's.

How to Read an EPD



FORTALEZA
0200AN10353 SPRING HILL FORTALEZA 43



CONNEALY CONSENSUS
K C F BENNETT FORTRESS
THOMAS PATRICIA 9705
CONNEALY BLACK GRANITE
SPRING HILL RITA 108 25-BG
SPRING HILL RITA 25 OF TRUST

• High performance bull with herd improving carcass traits

Frame Score

REG.#	BORN	FRAME	BW	WW	YW	SCROTAL
19052796	2018/08/24	5.7 yrl	76 lbs	632 lbs	1210 lbs	-- cm yrl
2078384	43	-- mat	Ratio 102	Ratio 100	Ratio 100	-- cm mat

Calving Ease

	CED	BW	WW	YW	RADG	DMI	YH	SC	DOC	CLAW	ANGLE	HP	CEM	MILK	MKH	MW	MH	\$EN
EPD	0	2.5	83	149	0.32	1.48	1.1	0.42	12	0.62	0.64	10.2	7	31		109	1.1	-45
ACC	0.37	0.52	0.43	0.38	0.33	0.33	0.44	0.40	0.35	0.27	0.27	0.25	0.31	0.32		0.38	0.40	
RANK %	90	80	1	1	2	95	3	75	70	90	95	65	70	15		3	2	95

AAA-S20	CW	MARB	RE	FAT	\$M	\$C	\$F	\$G	\$B
EPD	69	0.6	0.69	-0.057	35	263	116	59	176
ACC	0.40	0.37	0.37	0.33					
RANK %	2	40	30	1	95	2	3	20	4

Accuracy = Reliability.
Closer the number is to 1.00 the more accurate the EPD.

1st Percentile Rank = Highest Performing

**1 - Weaning Weight
2 - Yearling Weight
3 - Rib Eye Area**

EARLY CALF HEALTH & COLOSTRUM MANAGEMENT

Early Calf Health Best Management Practices

Thanks to: Dr. Werner Debertin, Dr. Frank Schenkels & the Milk 2020 Group

Essentially, new-born bull calves should be treated exactly the same way as new-born heifer replacements to maximize survivability when these calves leave the farm. Doing so will help ensure the success of Dairy-Beef Value chain. Please consult with your attending veterinarian for a vaccination protocol specific to your farm and supply chain. Feel free to utilize the following as a start for that discussion.

Prepare heifers/cows:

- Timely administration of appropriate vaccines before calving (i.e. Scour Vaccines to boost colostrum)
- Provide high quality dry cow/heifer nutrition
- Provide clean, dry, well bedded calving area pen (clean out maternity area between calvings or as often as possible)
- Minimize environmental stressors at calving

The Newborn Calf - At Birth:

- Rub vigorously with straw the thorax (rib-cage)
- Ensure airways are clear (place calf in recovery position-both legs tucked underneath which allows the lungs to expand with the least amount of pressure)
- Pour cold water into the ears
- Disinfect the navel with 7% tincture of iodine or Chlorhexidine 0.5% as soon as possible after birth. Examine the calf's navel for swelling and reaction to pain (signs of infection)
- Consider pain control for calves that have had a difficult birth

Preventing diseases in young calves starts by decreasing the pathogen load a calf may consume in the first hours of life. Successful health outcomes for calves is highly dependent on the adequate consumption of high-quality colostrum in the first few hours of life. See next page for Colostrum Protocol.

Early calf health is increased by adequate nutrition:

- Vital for well functioning immune system
 - Selenium (most current dairy dry cow programs would have sufficient selenium that this would not be an issue - work with your nutritionist and veterinarian)
- Offer calves a minimum total daily intake of 20% of body weight in whole milk (or equivalent nutrient delivery via milk replacer) until weaning (e.g. approximately eight liters per day for Holstein calves)
- Introduce concentrates early
- Clean water should always be available

Vaccinations are key to reducing the incidence of pneumonia *work with your veterinarian*:

- A viral intranasal vaccine at birth and again in 6 to 8 weeks of age (or 2 weeks before high pneumonia incidence)
- Modified Live Vaccine at 6 months and 12 months of age (might be able to go earlier if disease pressures are higher)

There may be specific protocols that your target market may require.

COLOSTRUM MANAGEMENT BEST MANAGEMENT PRACTICES

Thanks to: Milk 2020 and Dr.'s Katy Proudfoot & Dave Renaud for updates from recent literature numbers.

1. Prevent Bacterial Contamination

- collect mastitis/blood free colostrum from cows negative for Bovine Leukosis and Johnes disease for use within herd. NOTE- evidence suggests that calves born from Leukosis positive dams are better off receiving colostrum from their dam than a negative cow
- clean udder/teats thoroughly
- wash/disinfect feeding equipment meticulously (use soap (degreased) and disinfectant)
- feed colostrum within 1-2 hours of calf's birth
- refrigerate unused colostrum at 1-1.5°C (33-35°F) in 1-2L clean containers

2. Maximize Absorption

- Collect colostrum within 2 hours of calving
- First feeding of 4L per 45kg of body weight within 1-2 hours of birth
- Second feeding of 2L per 45kg body weight within 6-12 hours of birth
- Use esophageal feeding tube for non-suckling calves but not on the second feeding if they don't want to drink (don't overload the abomasum/rumen with tubing). Tube Feeding should only be used by trained personnel.

3. Emergency Supply

- Keep frozen at -20 to -21°C (-5°F) for up to 12 months
- Thaw in warm water, < 50°C : (not too hot) to calf's body temperature of 38-39°C (100-102°F)

COMMERCIAL COLOSTRUM REPLACERS:

- Contain a minimum of 50g/L of IgG and at least 18% fat
- Made from bovine sources, CFIA Approved
- Follow colostrum manufacturer's guidelines
- Generally two bags for total replacement, one bag for supplementing dam's colostrum

4. Monitoring Program

- Evaluate colostrum IgG levels by utilizing a Brix refractometer: Quality Colostrum will have a value of $\geq 22\%$
- Culture samples of colostrum: Total Bacterial Count of $<100,000/\text{mL}$ & Coliform count of $<10,000/\text{mL}$
- Evaluate calves' serum Total Protein levels at 2-5 days of age: For adequate passive immunity, $\geq 90\%$ of calves tested, at the herd level must have serum IgG levels of $\geq 10\text{g/L}$, or serum Total Protein levels of $>5.2\text{g/dL}$ of serum Brix values of $\geq 8.5\%$ (Personnel Communication, Dec 13, 2016- Dr. Manuel F Chamorro, DVM, PhD, DACVIM-LA, Kansas State University.)

NOTE- some of this information was sourced from and used with the permission of the Saskatoon Colostrum Company and Maritime Quality Milk. For a more complete discussion of colostrum, please see <http://www.saskatooncolostrum.com>



STARTING WITH QUALITY CALVES

SELECTING QUALITY CALVES

There are many considerations when buying in calves that you have not raised yourself. There is a certain level of trust that gets established between the farm of origin (in this case the dairy farm) and the rearer (or place where the calf will be raised). This section outlines some critical areas to touch on to make a more informed decision on the risk of purchasing a calf, and alternatively ways that the dairy can add value.

Lifetime productivity of a calf relies on it getting a good start in the early hours and days following birth. Calves for beef production need colostrum in the same way that dairy replacement heifer calves do. Their management in the first few days of life will have a big impact on lifetime performance.

Compared to calves that receive sufficient colostrum, those that do not have been shown to:

- Have higher levels of mortality
- Need more antibiotic treatments pre-weaning
- Have reduced liveweight gain
- Reach slaughter weight later

Dairy farmers should aim to produce calves that:

- Have received adequate colostrum at birth
- Do not have diarrhea
- Grow well - at least 50kg at two weeks old, 45kg if native breed
- Are healthy with a dry navel
- Are alert and bright-eyed
- Show reasonable conformation

Remember the three Q's of Colostrum:

Quantity - 4 litres within two hours of birth, followed by a second feeding of 2L within six to twelve hours of birth

Quality - contains at least 50g/litre of immunoglobulin IgG. This can be measured using a BRIX refractometer

Quickly - 1st feeding within 2 hours of birth. Absorption of immunoglobulins progressively declines after birth

SEE PAGE 9 for Full Colostrum Best Management Practices



Rearers should also focus on these areas when buying calves and be prepared to pay more for the right calves, which will perform better throughout their lives.

Where possible rearers should ask the dairy farmer about:

- The management of newborn beef calves. Is colostrum intake a priority?
- The sires used to produce beef calves. In particular the breed and bull identification so that checks can be made on genetic merit. There are sometimes opportunities for the rearer to give feedback on what is working from a breeding potential perspective (depending on the relationship).
- The type of dairy cows in the herd, to understand the dam's influence on frame size and conformation.
- The health status of the herd, eg BVD, Johnes, IBR, etc. to understand the health risks associated with the calves.

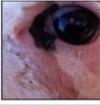
Avoid buying calves that have:

- Diarrhea (diarrhea on arrival is linked to higher mortality rates).
- Discharge from their mouth, nose or eyes.
- A wet or thickened navel.
- Trouble breathing.
- A listless appearance or dull coat* .

Age Verification (entered in Canadian Livestock Traceability Systems) – more on page 25

A tool that you could utilize throughout calfhood is incorporating the Calf Health Scoring Matrix or some iteration that works for your farm. You could score the calves individually or as groups and it is a simple observational tool where you want to see low scores and where higher scores may be indicative of issues down the road.

Bovine respiratory disease scoring system for pre-weaned dairy calves^{1,2}

Clinical sign	Score if normal	Score if abnormal (any severity) ³
Eye discharge	0 	2  Or  Or 
Nasal discharge	0 	4  Or  Or 
Ear droop or Head tilt	0 	5  Or  Or 
Cough	0 No cough	2 Spontaneous cough
Breathing	0 Normal	2 Rapid or difficult breathing
Temperature	0 < 102.5° F	2 ≥ 102.5° F

Add scores for all clinical signs, if total score is ≥ 5, calf may be positive for bovine respiratory disease

1. Love WJ, Lehenbauer TW, Kass PH, Van Eenennaam AL, Aly SS. (2014) Development of a novel clinical scoring system for on-farm diagnosis of bovine respiratory disease in pre-weaned dairy calves. *PeerJ* 2:e838. <https://doi.org/10.7554/peerj.838>
2. Aly SS, Love WJ, Williams DR, Lehenbauer TW, Van Eenennaam AL, Drake C, Kass PH, Farver TB. (2014) Agreement between bovine respiratory disease scoring systems for pre-weaned dairy calves. *Animal Health Research Reviews* 15: 2 Pages 148-150 <http://journals.cambridge.org/hyg.2014.15.661132>
3. Any abnormality including, but not limited to, the examples shown in the above pictures.

<https://sites.udel.edu/canr-animalscience/2018/10/09/simple-calf-respiratory-scoring-system/>

Check out a video that Veal Ontario did on quality calves. Many similarities in choosing quality at this stage that will be destined for either the veal or dairy-beef supply chain.
<https://youtu.be/BvgAQRlSCpc>

Health Planning

A Vet-Client-Patient-Relationship is a required element in each of the codes and is essential in planning your own on-farm protocols.

A proactive approach to managing calf health should include a vaccination program and steps to minimize buying-in disease and the spread of health problems, should they arise.

Where treatments are required, being able to identify problems early is vital to improve the success rate of treatment and minimise the quantity of medicines used.

For cattle that graze, parasite control is important. Consider both internal and external parasites, such as lice and mites. Further information on parasite control in cattle can be found at www.beefresearch.ca

BIOSECURITY

MANAGING RISK

Minimize bringing in disease by:

- Source calves from a high health status dairy herd. If you do not know - ask questions
- Source calves that have had good colostrum intake during the first hours of life
- Check calf before purchase for signs of ill health

Minimize spreading disease on farm by:

- Have dedicated sheds for calves away from other livestock
- Run an 'all in-all out' rearing system so that calves of different ages are not mixed together or share the same air space
- Wash feeding equipment and disinfect housing regularly. Keep calves well bedded with good ventilation but no draughts

Minimize bringing disease in from outside sources:

- Be aware of cross contamination from other farms by way of instruments, boots, clothing or other equipment.

Minimize buying-in disease and the spread of healthy problems, should they arise.



How many people step foot on your farm?

And what could they bring with them?



DEHORNING

Removing horns by disbudding or dehorning is a common management practice in order to:

- Reduce the risk of injury and bruising to other cattle
- Improve farm safety for farmers and animal handlers
- Prevent financial losses due to trimming damaged carcasses
- Minimize space required for feeding and transit

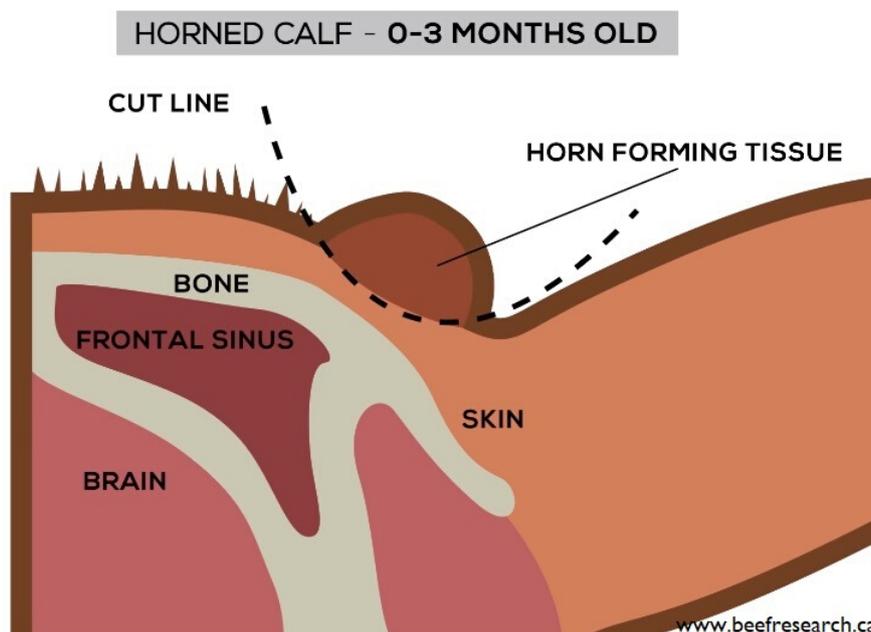
Links to the Code's can be found on the Resource Page

REQUIREMENTS in the Beef, Dairy & Veal Codes:

- Disbudding refers to removal of the horn bud prior to three weeks of age. Removal of the horn after this age is referred to as dehorning. Disbudding is recommended over dehorning because it is less invasive. Disbud/dehorn calves as early as practically possible, while horn development is still at the horn bud stage (typically 2-3 months).
- Dehorning must be performed only by competent personnel using proper, well-maintained tools and accepted techniques.
- Seek guidance from your veterinarian on the availability and advisability of pain control for disbudding or dehorning beef cattle. (Note - the Dairy & Veal Codes requires pain control when dehorning or disbudding and bleeding control must be used when dehorning.)
- Use pain control, in consultation with your veterinarian to mitigate pain associated with dehorning calves after horn bud attachment.

**Using Homozygous polled bulls in the breeding program where practical will eliminate the need for disbudding or dehorning

**<http://www.beefresearch.ca/research-topic.cfm/dehorning-69>



CASTRATION

Castration is the removal or inactivation of the testicles of a male animal. Castration is a common management tool in the industry for many reasons, including to:

- Stop the production of male hormones
- Prevent unplanned mating
- Decrease aggression to enhance on-farm safety for handlers and animals
- Obtain price premiums and/or avoid price discounts from feedlots and meat packers
- Produce meat with a consistent quality acceptable to consumers (i.e. higher grade, better marbling)
- Decrease costs of managing bulls (i.e. “stronger” facilities)

REQUIREMENTS in the Beef Code:

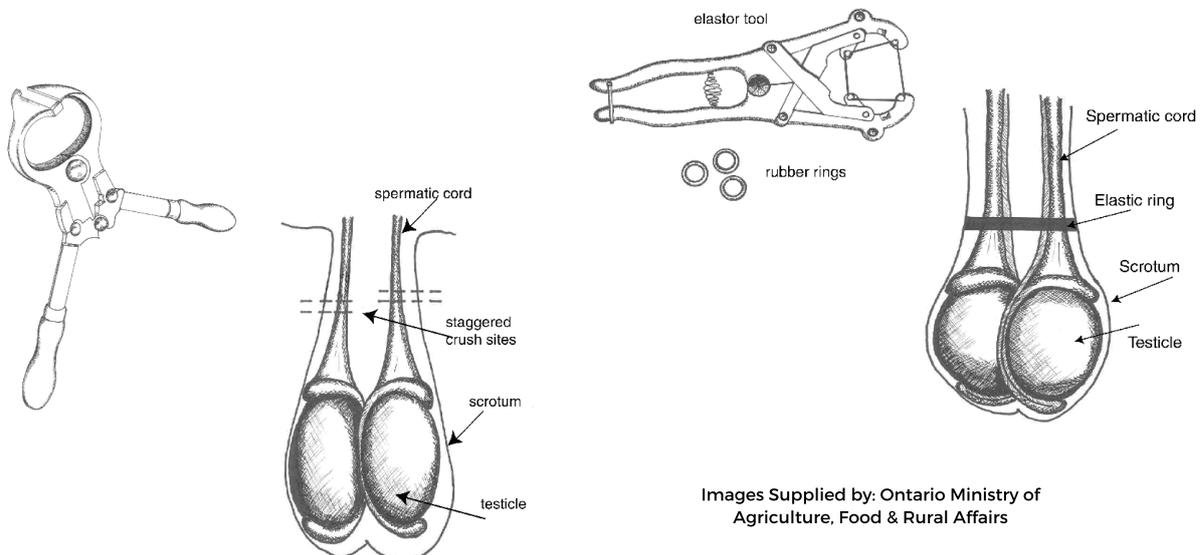
- Castration must be performed by competent personnel using proper, clean, well-maintained instruments and accepted techniques.
- Seek guidance from your veterinarian on the optimum method and timing of castration, as well as the availability and advisability of pain control for castrating beef cattle.
- Castrate calves as young as practically possible.
- Use pain control, in consultation with your veterinarian, when castrating bulls older than six months of age.

RECOMMENDED PRACTICES (Additional Recommendations can be found in the Beef Code)

- Monitor calves after castration. Check calves frequently to ensure that they are drinking and/or eating, and that there are no signs of infection and/or abnormal bleeding
- Identify and record improperly castrated cattle or those with undescended testicles for appropriate further management
- Ensure that tetanus vaccinations are current when applying bands to castrate bulls over 180kg (400lbs)

Additional Resources

- <http://www.beefresearch.ca/blog/can-we-reduce-castration-pain-in-week-old-calves/>



Images Supplied by: Ontario Ministry of Agriculture, Food & Rural Affairs

FEEDING

CALFHOOD - Birth to Weaning (~8 weeks)

TARGET GROWTH: 0.8kg/day

"Holsteins need to be on a higher energy feed from the start in order to round them out."
-Vernon Campbell- start to finish of dairy-beef, PEI

Diet Recommendation	Straight Holsteins	Dairy-Beef Crossbred	Straight British Beef
Colostrum	4L in 2hr/+2L in 12hr	4L in 2hr/+2L in 12hr	4L in 2hr/+2L in 12hr
Quality milk replacer	Feed at label rates	Feed at label rates	Nursing
Water	4L/kg concentrate	4L/kg concentrate	Free choice
Protein, %	20-22	20-22	Nursing
Fat, %	20	20	Nursing
Starter, DM basis			
Diet Energy, MJ ME/kg DM	12.7	12.7	Nursing + grazing
Protein, %	18	18	Nursing + grazing
Calcium, %	0.70	0.70	Nursing + grazing
Phosphorus, %	0.45	0.45	Nursing + grazing
Potassium, %	0.65	0.65	Nursing + grazing
Selenium, mg/kg	0.3	0.3	Nursing + grazing
Salt ¹	0.35	0.35	Free choice access
Vitamins	ADE	ADE	Nursing + grazing

¹ The salt source should also provide trace minerals, according to a formulation designed to complement feeds in your region.



YOUNG CALF - 100-225 kg, target 1 kg/day growth

Diet Recommendation	Straight Holsteins	Dairy-Beef Crossbred	Straight British Beef
			Creep Feed
DM Intake, kg/100 kg LW	2.5-3	2.5-3	1-1.5
Diet Energy ¹ , MJ ME/kg DM	11.9	11.5	10.9
Crude Protein, %	15	15	15
Fat, %	5	4	4
Calcium, %	0.60	0.60	0.60
Phosphorus, %	0.40	0.40	0.40
Potassium, %	0.65	0.65	0.65
Magnesium, %	0.10	0.10	0.10
Salt ² , %	0.25	0.25	0.25
Vitamins	ADE	ADE	ADE

¹ Diet energy recommendations are based on the premise that the animal is in a thermoneutral environment and not expending energy due to shivering or panting.

² The salt source should also provide trace minerals, according to a formulation designed to complement feeds in your region.



**TARGET
GROWTH:
1.0 kg/day**

How Feeding Effects Grading At Slaughter Example

The heifer on the left was a replacement that got pulled from the replacement pen and put in dairy-beef program on the same farm. She is the same age as the other 2 heifers to her right who have been raised on the “beef” feeding program (with some beef genetics in their background).



This highlights the importance of different rations for different end uses. The left heifer will take a lot of time and energy to fill out that frame and those on the right are well on their way to getting some rounded muscle expression and turning into a high quality product.
(Andrew McCurdy, Bidalosy Farms, NS)



Left is a dairy-type beef carcass (akin to what the “left” heifer on the above photo may create) while the carcasses on the right are more traditional beef types. Note the length of muscle and bone.

CHANGE MANAGEMENT

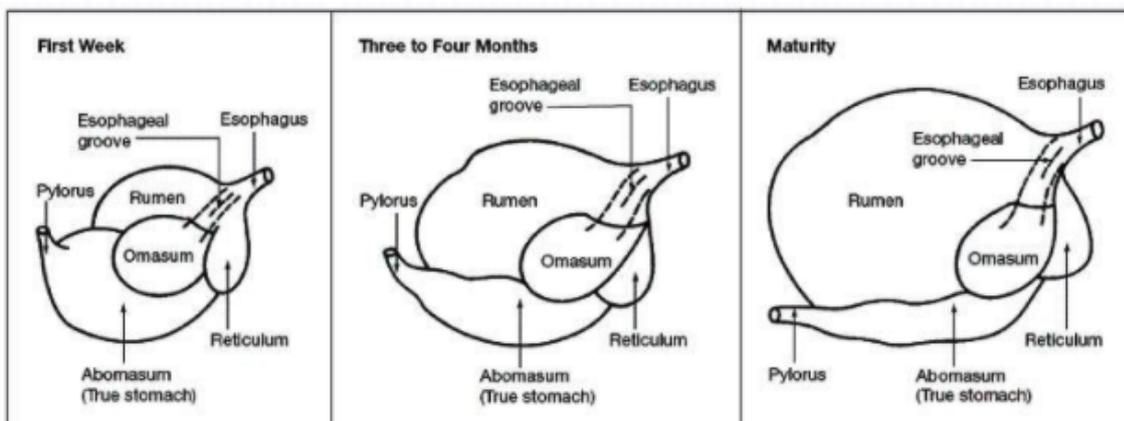
Anytime the life of a beef animal changes significantly is known as a transition (same as in dairy). This usually occurs when moving between farms, or changing rations (i.e. weaning). If not managed well, transitions can lead to a reduced growth rate or even loss (depending on the level of stress) as they adapt to their new environment and/or their rumens adjust to the new feeding program. Planning is vital to mitigate any setbacks.

The newborn calf is a monogastric (single stomach) animal, only using its abomasum for digestion in the first few weeks of life.

Development of a healthy rumen is a vital step in the calf rearing process. It is driven by a number of factors related to the nutritional management of the calf in its early life.

Calf Starter Feeds

Starter feeds are designed to promote rumen development. Digestion of feeds rich in starch play an important role in rumen development.



Calves should be managed to encourage intake of starter feeds as soon as possible. These feeds help transition the calf from a diet based on milk, to one based solely on forages and concentrates. A good calf starter feed should contain 20-22% CP and a minimum of 12.7 MJ ME/kg DM. To achieve maximum intake, feed should be fresh and free from dust/mould and offered in clean troughs.

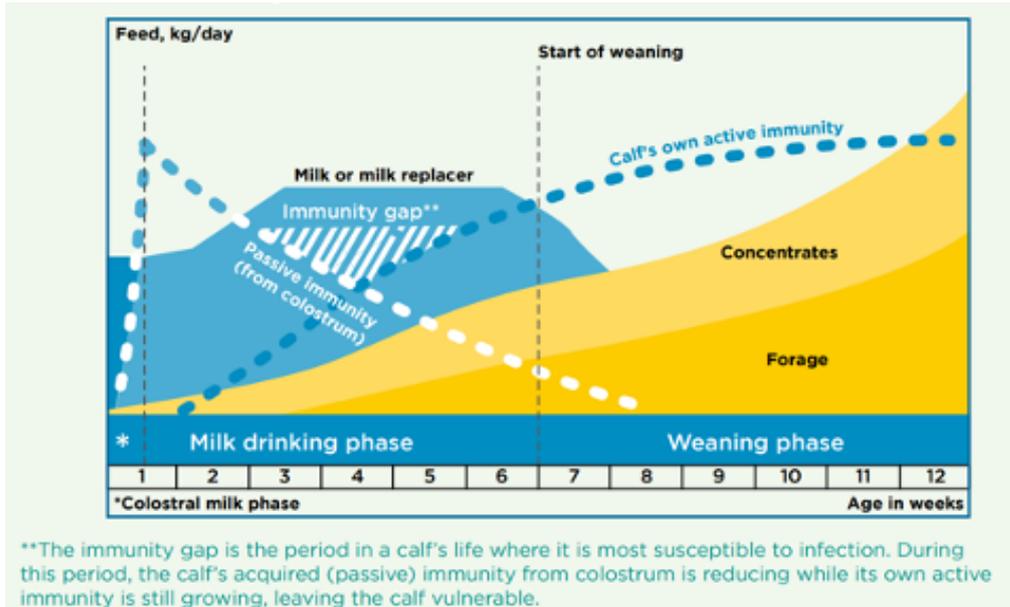
Fresh straw or coarse hay should also be supplied. It is important to limit intake of good quality hay or other forages before weaning, as this can reduce starter intake and lead to calves becoming pot-bellied.

Do not forget about the "forgotten essential nutrient": Access to clean water at all times.

WEANING

Good management at weaning is important for maintaining good growth rates and minimizing disease. A group of calves can be considered ready to wean when they are routinely consuming 1-1.5kg/head of high-quality starter feed a day (approximately 8 weeks old). Weaning can be approached a few different ways, but a gradual process over 7-14 days is best.

Post-weaning calves should be fed straw/coarse hay as the forage component in the ration and transitioned slowly to silage when they are around five to six months of age.



**The immunity gap is the period in a calf's life where it is most susceptible to infection. During this period, the calf's acquired (passive) immunity from colostrum is reducing while its own active immunity is still growing, leaving the calf vulnerable.

*Chart- <https://www.teagasc.ie/media/website/animals/beef/dairy-beef/Segment-002-of-Section7-Routine-calf-management-practices.pdf>

Growth Targets

>0.8kg/day from birth to weaning

>1 kg/day from weaning to 225kg/550lbs

Any new rations should be introduced gradually. Two weeks is a general rule to utilize when changing a ration. Increasing amounts of the new ration is supplied each day while the amount of the previous ration is reduced at the same time.

The length of the changeover period depends on the extent of the difference between the rations. Where large amounts of concentrates are being introduced, the time period should be extended to make the change slowly. If feeding from a trough, the ration should be fed in two meals per day of no more than 2kg per feed, then three meals per day, increasing amounts until the cattle do not clean up all the feed. Then they can be fed from ad-lib hoppers.

Monitor the Cattle

One of the most important ways to assess a ration is to watch the cattle eating it. The majority of cattle not eating or drinking should be ruminating. Also look at the consistency of the manure to check that it is not too runny, nor too dry.

As well as thinking about the transition to a different ration, it is important to minimize stress associated with transport to a new farm, mixing with new cattle and being in different housing.



Avoid layering stress events onto the calves. Disbudding/castration during weaning may cause setbacks in gain

Make sure feed and water are easily available to cattle as soon as they arrive, along with a clean lying area

Give animals a chance to settle and adjust to the new housing and ration before mixing into new groups

Minimising the difference in liveweight within a pen will help reduce competition, as will avoiding high stocking rates

Housing BASICS:

- Provide Animal Comfort- Adequate Space (feed, water, rest)
- Hygiene & Humidity- Dry Bedding (clean, dry hair coat)
- Excellent Ventilation & Temperature Considerations

Recommended Air Exchange Rates:

- Cold Weather for calves less than 56.7kg (125lbs) at least .28m³/min/calf (10ft³/min/calf)
- Cold Weather for unweaned calves greater than 56.7kg/125lbs) - at least .34m³/min/calf (12ft³/min/calf)
- Warm Weather- all unweaned calves 5m³/min/calf (177ft³/min/calf)- for weaned beef animals- maintain indoor air quality and ventilation at all times (ammonia levels <25ppm)

***Cobwebs and visible condensation are an indicator of poor ventilation in young stock areas.

REMODELLING DAIRY BARNs - Considerations of design

- Use Milk House for heated warm space
- Office
- Remove Gutter Cleaner
- Protect Water Lines from Freezing
- Access for Feeding
- Access for Manure Removal
- Ventilation Design



IDEAS ARE ENDLESS:

- Remodelled Machinery
- Shed for Feeders/Fat Cattle
- Remodelled Yard Pens
- Remodelled Bunker Silo Storage
- Remodelled Dairy Ties Stall or Free Stalls

OTHER CONSIDERATIONS:

- Weight Scales Easily Accessible
- An appropriate cattle handling design for your purposes (bud box, alley and tub system)
- Integration with Data Management systems (technology like a RFID Reader)
- Automatic Feeders (if nursery stage)
- Positive or Negative Pressure Ventilation Systems

Some information taken from presentation given by Bill Halfman: Remodeling “Retired” Dairy Facilities for Raising Beef Cattle which was prepared by David W. Kammel BSE- UW-Madison. The Atlantic Feedlot School (Dairy-Beef), April 2019.

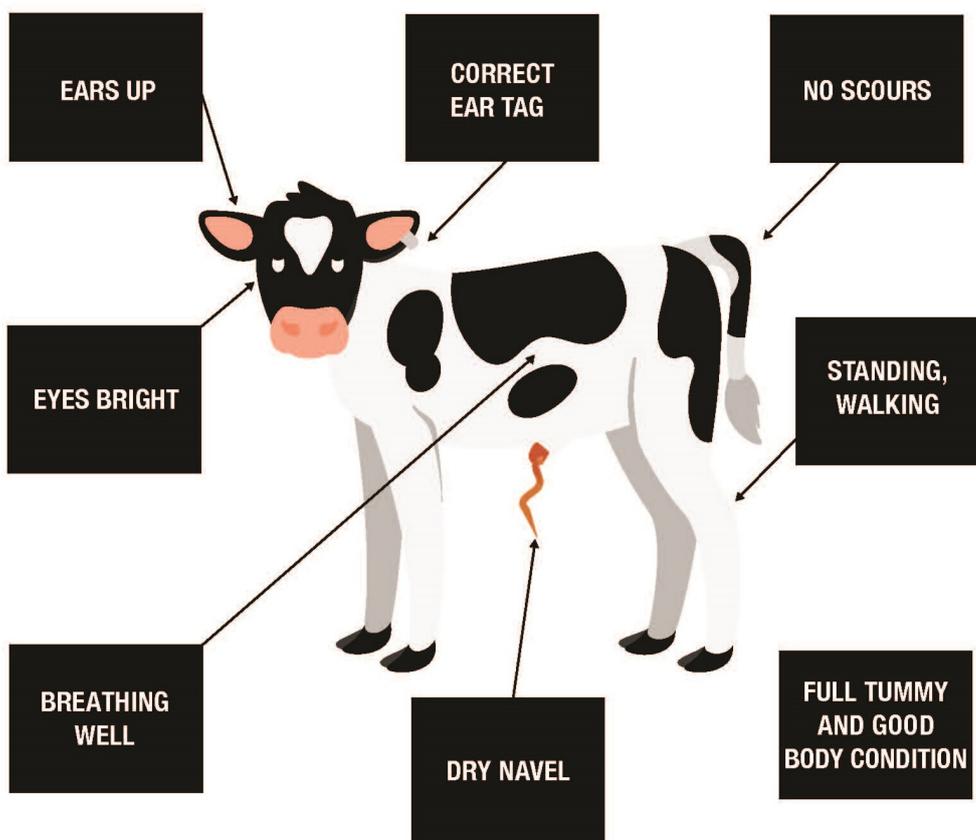


TRANSPORTATION

MAKE SURE YOUR CALF IS FIT FOR TRANSPORT



CHECK THESE 8 BEFORE YOU LEAVE THE GATE



NOTE

- Calves may be transported for up to 12 hours as long as dehydration, starvation and exhaustion are prevented. Once 12 hours is reached, they must be provided with feed, water and rest.
- Calves 8 days and under may only be transported once and are prohibited from going to assembly centres.

FOR MORE INFORMATION
ABOUT HUMANE TRANSPORT
AND ANIMAL WELFARE, VISIT
[INSPECTION.GC.CA/HUMANE](https://inspection.gc.ca/humane)

CRIA P1 039E-20 Catalogue No.: A104-163/2020E-PDF ISBN: 978-0-960-33704-4 Aussi disponible en français



Canadian Food
Inspection Agency

Agence canadienne
d'inspection des aliments

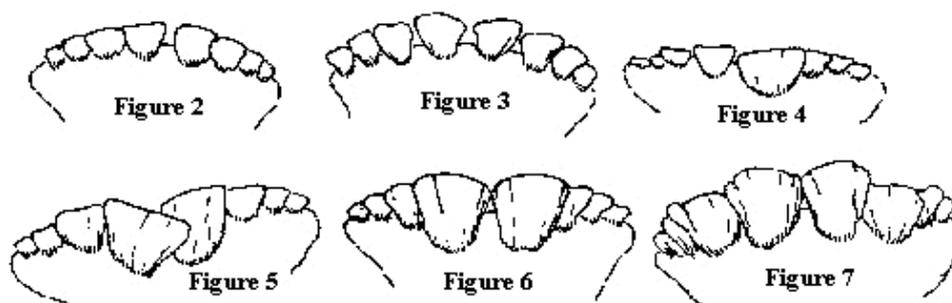
Canada

AGE VERIFICATION

AVOIDANCE of OTM's at the Packer

"Over-Thirty- Month" refers to an animal who at slaughter is classified as "over thirty months of age". Canada's current BSE trade status means that all SRM of Over Thirty Months needs to be removed and disposed of within regulation. This is obviously an added cost to the industry as the packer passes that discount along to the shipper.

The way an animal is determined to be OTM is by dentition. If there is a "birth certificate" that will over-ride a dentition determination (up to the 4th molar eruption). Dairy animals tend to "spring teeth" sooner than straight beef animals so the plant may see a 22 month old animal classified as OTM and discounts. The discount is 20 cents/lb at Atlantic Beef Products for an OTM animal. If that 22 month animal had a birth certificate (i.e. www.canadaid.ca CLTS) that accompanied it to the plant, then the discount would not be taken and the animal would be processed regularly.



In Figure 4, a permanent central (I 1) incisor has erupted; temporary incisors may or may not be present when the permanent incisor erupts. The permanent incisors usually erupt at an angle (Figure 5) and straighten into a definite pattern with growth. In Figure 5, both central (I 1) incisors have erupted; they may or may not be in a straight line with the inside corners touching. The central incisors, in Figure 6, are in place, they have straightened and the inside corners are in line. Animals with eruption of one or more central incisors are considered to be 18 - 24 months of age. When one or both middle (I 2) incisors erupt the animal is considered to be 24 - 30 months of age (Figure 7). (https://www.fsis.usda.gov/OFO/TSC/bse_information.htm)

How to Avoid Unnecessary OTM's in the System: AGE VERIFICATION

Ensure all cattle that leave your farm have the appropriate Tag/Indicator in their ear. This number can trace through the supply chain and can be used to create a birth certificate when the calves are Age Verified on their farm of origin. You can age verify groups or individuals depending on your management practices. It is not required, but the buyer of calves may request it and if you are shipping your own animals it is prudent to have the information.

Age Verifying Groups:

You date all calves to the date of the oldest in the group so the tighter the grouping the better.



****Tags may get lost and need to be replaced- make sure the information gets updated in CLTS if a replacement tag is issued so that the data traces properly****

Managing Data to Drive Decisions

What data points are important to your operation and your customers?

Performance Records- regularly monitoring weight gain

Health Records- Calf Scoring all incoming loads

Manage Individually or in Groups depending on your needs

What Could Data Tell You?

What Sires have calves with higher genetic potential (and alternatively, those to stay away from).

What management changes have to performance?

Which source farms have high health status and which may be higher risk.

If there are certain protocols that deliver favourable results.

There are many different data management systems available depending on your needs.

3 TIPS FROM PEI CALF REARER, RANDY DRENTH, TAMERIX FARMS

1. Milk Kitchen

- a. Make sure all feeding equipment is CLEAN and sanitary. Rinsing with water does not constitute clean. Milk film still develops and grows bacteria. (this one is super important in my opinion)
- b. Make sure milk is fed consistently i.e. measured properly, proper temp, etc.

2. Calf Environment

- a. Proper ventilation is critical
- b. Bedding type and amount
- c. Manage ammonia levels in calf environment

3. Protocols

- a. Work with vet to establish receiving protocols, vaccinations, treatments, etc.

RESOURCES AVAILABLE

- **Atlantic Beef School: Dairy/Beef Feedlot School & Nursery School (under development):** email maritimebeefcouncil@gmail.com or see www.maritimebeef.ca for upcoming dates.
- **AutoFeeders:** <https://dairy-cattle.extension.org/automated-milk-feeding-systems-for-dairy-calves/>
- **Beef Improvement:** www.beefimprovement.org
- **Canadian Beef Research Council:** <https://www.beefresearch.ca/blog/epds/>
- **Canadian Cattle Identification Agency/Canadian Livestock Traceability System:** <https://www.canadaid.ca/>
- **Maritime Beef Council:** www.maritimebeef.ca
- **National Biosecurity Standards and Biosecurity Principles:** <https://www.inspection.gc.ca/animal-health/terrestrial-animals/biosecurity/standards-and-principles/eng/1344707905203/1344707981478>
- **NATIONAL FARM ANIMAL CODE OF PRACTICE**
 - **Beef Code:** <https://www.nfacc.ca/codes-of-practice/beef-cattle>
 - **Dairy Code *:** <https://www.nfacc.ca/codes-of-practice/dairy-cattle>
 - **Transportation Code*:** <https://www.nfacc.ca/codes-of-practice/transportation>
 - **Veal Code:** <https://www.nfacc.ca/veal-cattle-code-of-practice>
- **Saskatchewan Colostrum Company Ltd:** <https://sccl.com/english/colostrum-kids-calves-lambs/>
- **Transportation Regulations (CFIA):** <https://www.inspection.gc.ca/animal-health/humane-transport/eng/1300460032193/1300460096845>
- **University of Guelph:** <https://www.youtube.com/watch?v=BvgAQrISCpc&t=1>
- **Using Dentition to Age Cattle:** <https://www.gov.mb.ca/agriculture/livestock/production/beef/using-dentition-to-age-cattle.html>
- **Veal Farmers of Ontario:** www.calfcare.ca
- **Verified Beef Production Plus:** www.verifiedbeef.ca
- **Weaning Process:** <https://www.teagasc.ie/media/website/animals/beef/dairy-beef/Segment-002-of-Section7-Routine-calf-management-practices.pdf>

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