

Introduction

The goal of a grain-fed veal farmer is to achieve the desired finish on veal cattle at the right weight and age. Ideally, market-ready grain-fed veal cattle should weigh between 295 to 320 kg (650 to 705 lbs.) at 28 to 32 weeks (seven to eight months) of age. To achieve this goal, it is critical to have the right feed rations and ratios.

Veal is defined as cattle of any dairy breed or dairy crossbreed dressing no more than 190 kg (419 lbs.). This converts to a live weight of roughly 349 kg (769 lbs.), which is reached at approximately eight months of age. Producers are strongly encouraged to target a dress weight of 180 kg (397 lbs.) to maintain some flexibility within the system to manage veal carcass weights.

- Average daily gain (ADG) should be 1.2 kg (2.6 lbs.) or better. Targeting daily gains above 1.5 kg (3.3 lbs.) may require additional nutrient requirements.

Grain-fed veal cattle are fed a balanced ration based of grain (usually clean, whole-shelled corn) and pellets made of protein, vitamins, and minerals. A small amount of fibre should be offered daily to maintain rumen health. Cattle should also have continuous access to their feed, to encourage slower eating and stimulate chewing. Ensure there is adequate bunk space for each animal.

Calf dehydration

Diarrhea is the single greatest cause of death in unweaned calves in Ontario, resulting from loss of fluids and complications from dehydration. Calves experiencing fluid loss from diarrhea will become dehydrated and develop varying degrees of metabolic acidosis, as their blood reaches a critically low pH.

Young calves have about five to 10 per cent more body fluid than adult animals. Calves are 75 per cent water by body weight and can lose close to 20 per cent body weight per day with diarrhea.

To maintain normal cellular functions, the average water intake rate is 40 to 60 millilitres of fluid per kilogram of body weight daily. The average 45 kg (100 lbs.) calf requires approximately 4.5 litres of water daily.

Calves subjected to heat stress or scours will require an additional 20 to 30 per cent daily water intake for maintenance of bodily functions.

Causes

The causes of diarrhea are often multifactorial, but predominantly come from exposure to pathogens like various bacteria, viruses, protozoa, or parasites in the calf housing area or contaminated feeding equipment.

Nutritional scours can be a result of either feeding too much or too little at one meal or caused by milk that is not properly mixed or digested.

You cannot differentiate whether diarrhea is nutritional or infectious based on its appearance.

Signs

When evaluating calves for signs of dehydration the following are common indicators. Calves will have one or all these symptoms. It is important to pay close attention to the youngest calves as they do not have the body reserves to combat dehydration. It is highly recommended before each feeding that calves are evaluated to assess dehydration.

Loose manure (may or may not have blood)	Attitude (dull or depressed)
Lethargy	Loss of appetite
Lack of suckle reflex	Weight loss
Reluctance to stand (does the calf need encouragement to get up or drink?)	Fast or very slow pulse
Sunken eyes	Cold ears and/or cold legs
Dry mouth and nose	Gum condition, sticky/tacky, light pink-pale

For more information on assessing dehydration levels in calves, including when to offer oral electrolytes and when to administer intravenous fluids or call your veterinarian, find the **Calf dehydration assessment chart** (<https://bit.ly/CombatDehydration>) on calfcare.ca.

Feeding

The best way to feed calves experiencing diarrhea is to offer alternate feedings of milk or milk replacer, and electrolytes. It may be necessary to reduce the size of each feeding, and offer smaller feedings with a nipple more often, to improve digestion.

When feedings are restricted for sick calves, the energy and protein required to fight disease is not available. Many calves will starve as they continually lose nutrients through diarrhea without calories being replaced.

Do not administer milk or milk replacer to calves via an esophageal feeder. This milk will enter the rumen causing further issues.

Do not add electrolytes to whole milk or milk replacer. This will increase the sodium content and increase osmolality.

Electrolytes

Navigating different oral electrolyte options, and when to offer them, can get a bit confusing. They are not created equally—each one boasts different benefits.

When a calf goes into metabolic acidosis due to dehydration, electrolytes must be given to raise blood pH.

To hydrate the calf, offer an electrolyte with a sodium concentration between 90 and 130 mmol/L to facilitate water absorption. Electrolytes that are too low in sodium will not adequately restore hydration in the calf, and those with high levels may run the risk of sodium toxicity if free choice water is not available.

Always mix electrolytes according to label directions to keep the correct ratio.

To calculate the quantity of electrolytes to offer, multiply the weight of the calf by the per cent dehydration (which can be found on the **Calf dehydration assessment chart** (<https://bit.ly/CombatDehydration>) on calfcare.ca), and then divide by two to get the litres of liquid needed. For example, if a 100 lb. calf is eight per cent dehydrated (100×0.08) you would divide eight by two and that would equal four. That would be the number of litres needed per day in addition to normal milk feeding to correct the dehydration. $(100 \times 0.08) = 8/2 = 4$ litres.

During hot temperatures, these amounts would be increased significantly. Healthy calves under heat stress will drink between six and 12 litres of water daily just to maintain hydration.

Administer oral electrolytes (either by bottle or tube) and alternate milk feedings in the same amount.

Osmolality

When a calf has diarrhea, fluid is pulled from the calf's blood stream into the intestine causing dehydration. The pH balance is disrupted with the losses of sodium and other minerals through the manure.

Osmosis is a process by which molecules pass through a semipermeable membrane, this is important for absorption of minerals and nutrients, as well as for gastrointestinal health.

Osmolality is defined as the concentration of a solution expressed as the total number of solute particles per kilogram. For milk replacer or electrolytes, it would be the total concentration of sugars, such as lactose and minerals like sodium and magnesium.

The ideal osmolality of milk replacer is close to whole milk 300 mOsm/kg. This is optimal for the absorption and digestion of nutrients by calves. If the osmolality of the milk replacer is >500 mOsm/kg then the lactose content, the main contributor to the osmolality value, is too high. High levels of minerals and lactose tend to increase osmolality.

If osmosis is affected in the calf this could lead to a slowing of the emptying of the abomasum, leading to diarrhea in a mild case and abomasal bloat or even death in severe cases.

Damage to the lining of the gut caused by severe diarrhea also impairs the calf's ability to absorb nutrients and leads to a "leaky gut". This leads to harmful pathogens leaking from the gut and entering the blood stream causing a host of issues.

Conclusion

Fluid therapy is critical when a calf has diarrhea. Restricting milk intake with diarrhea is **not** recommended. Milk or milk replacer will not make diarrhea worse (if the milk is of good quality). Early detection is key, and prevention is always the best way to avoid challenges. To quote Albert Einstein, "intellectuals solve problems, geniuses prevent them".

For more information:

Combating dehydration: <https://bit.ly/CombatDehydration>

Offering scouring calves the right electrolyte, the right way to ensure success: <https://bit.ly/RightElectrolyte>

Managing diarrhea outbreaks in young calves: <https://bit.ly/DiarrheaCalves>

As part of your research into starting a grain-fed veal farm, you are encouraged to talk to experienced veal producers, visit their farms (while following strict biosecurity protocols), and attend industry events and meetings. No two veal farms are the same and a lot of valuable information will be learned from each visit and event.

Find VFO website producer resources here: <https://bit.ly/VFOProducerResources>

Find the *Code of Practice for the Care and Handling of Veal Cattle* here: <http://bit.ly/theVealCode>

Find Ontario Ministry of Agriculture, Food and Rural Affairs veal resources here: <https://bit.ly/OMAFRAVealBusiness>

References available upon request.

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Twitter: [@OntarioVeal](https://twitter.com/OntarioVeal)

[@CalfCareCorner](https://twitter.com/CalfCareCorner)

Facebook: [@CalfCareCorner](https://www.facebook.com/CalfCareCorner)

[@Finishing grain-fed veal in Ontario](https://www.facebook.com/FinishingGrainFedVeal)

[@Marketing of male dairy calves in Ontario](https://www.facebook.com/MarketingOfMaleDairyCalves)

YouTube: [Calf Care Corner](https://www.youtube.com/CalfCareCorner)

[OntarioVeal](https://www.youtube.com/OntarioVeal)

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