

Section 4

The importance of Water and Fibre



Introduction

Water is often the most overlooked aspect of calf-rearing. Water consumption is important for the development of the rumen and to allow for timely weaning of calves off milk.

Ruminants require quality fibre in the diet to maximise production and maintain health by sustaining a stable environment within the rumen. If the calves you are rearing are to achieve maximum milk or beef production from pasture, then the importance of setting the rumen up for life with quality fibre early cannot be overemphasised.

- ① Why is early 'free water' consumption important?
- ② When should water be offered and how much?
- ③ Keeping water fresh and clean.
- ④ Why is fibre important?
- ⑤ When should fibre be introduced?
- ⑥ How important is fibre quality?
- ⑦ What type of fibre should be fed?
- ⑧ Turning calves out to grass.

The importance of Water and Fibre

① Why is early 'free water' consumption important?

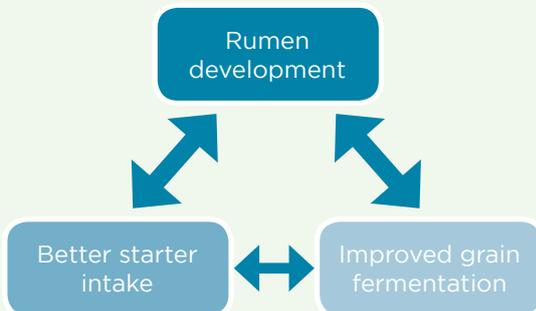
'Free water' is pure water that is consumed by the calf. This water goes directly into the rumen and creates the ideal environment for fermentation by rumen bacteria. It is this fermentation of grains that leads to the development of the rumen.

The water that is in milk or milk replacer does not contribute to this 'free water' requirement as milk bypasses the rumen and goes directly into the abomasum, the largest compartment of the young calf's stomach.



'Free water' should be constantly available.

Early water consumption is important for the following reasons;



KEY FACTS:

Research has shown that calves that have free access to water eat more starter concentrates and have enhanced rumen development.

- Calves offered water eat 31-60% more dry feed.
- Calves gain 38% more weight from birth to four weeks of age (each extra litre of water leads to a 56g increase in weight gain per day).
- Calves achieve 31% higher ADG from 0-10 weeks of age.
- Calves offered free-choice water have fewer scour days.

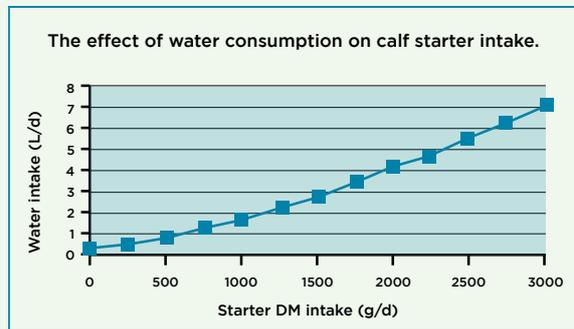


Figure 1. The correlation between water and starter concentrate intake. Source: J. Quigley, 2001.

② When should water be offered and how much?

From 3-4 days of age, fresh water should be offered to all calves. However, ideally water should be made available to calves from birth. Water should be available *ad lib*.

KEY POINT:

Calves need to drink five litres of water in addition to their milk feed for each one kg of dry feed they consume.

③ Keeping water fresh and clean.

- Separate buckets - Feed buckets should be separated from water buckets to prevent grain from getting into the water and vice versa. Separation improves both starter and water consumption.
- Routine cleaning - Frequent rinsing of water buckets increases daily bodyweight gain.
- Water quality issues (elevated mineral levels or microbial contaminants) are a good reason to regularly test the water given to calves. As a minimum, the water should be tested annually for minerals, nitrates, total dissolved solids and pH, as well as contaminants such as bacteria.



Water and concentrates should be rigorously separated.

KEY POINT:



There are two important factors which encourage water consumption:

- **Quality** – water should be high-quality and kept fresh.
- **Quantity** – adequate water should be offered to promote healthy growth and rumen development.

④ Why is fibre important?

In a calf's diet, fibre promotes the growth of the muscular layer of the rumen and helps maintain the health of the rumen lining through its abrasive effect (preventing papillae clumping together).

⑤ When should fibre be introduced?

The initial solid feed should contain 10-20% roughage in the dry matter. Offering chopped forage of 3-4cm in length is ideal.

The ideal time for hay or straw to be introduced depends on the type of starter concentrates that you are feeding. In particular, if fine ground pelleted rations are fed, additional roughage will be necessary to aid the development of the rumen.

In general, fibre/roughage may be introduced by day three and should be available to all calves by two weeks of age.

It is important to not over-feed fibre. Too high an intake of hay in young calves decreases the intake of starter concentrates, leading to the development of 'hay bellies'. In this situation, the rumen is stuffed with hay which cannot be properly digested and rumen development is delayed.

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Hay and straw work equally well as a source of fibre.

⑥ How important is fibre quality?

Fibre quality is very important for calf performance. Poor quality fibre creates a fill effect, especially if long stemmed, and is indigestible to a young calf. Poor quality fibre decreases the calf's appetite and limits concentrate intake due to the delay in passage out of the rumen.

Fibre should be fresh to minimise rejection. If the fibre source is heavily contaminated it should be discarded.

⑦ What type of fibre should be fed?

Studies have shown that providing pre-weaning calves with a chopped forage source separately to starter concentrate, such as oat or ryegrass hay, triticale silage and barley straw, improves their average daily gain, final bodyweight at weaning and their starter intake compared to calves not receiving forage and those receiving alfalfa hay.

Table 2. Effect of different forage sources on performance and feeding behaviour of Holstein calves.

	Control	Alfalfa hay	Ryegrass hay	Oat hay	Barley straw	Triticale silage	Corn silage
ADG (kg/d)	0.72	0.76	0.84	0.93	0.88	0.88	0.82
Final BW (kg)	84.5	86.4	91.6	96.1	93.2	93.6	89.8
Starter intake (kg of DM/d)	0.88	0.76	0.99	1.14	1.06	1.17	0.98

Source: Castells *et al.*, 2012. Journal of Dairy Science.

The source of fibre roughage that is fed should, if possible, be different from the bedding. For example, if straw is used as both bedding and feed, calves may eat contaminated bedding and consume pathogenic organisms at the same time.

Calves tend to prefer hay over straw, however both improve rumen function. Calves prefer long versus chopped hay, whereas they show no significant preference between long versus chopped straw.

KEY POINT:



The most influential factor promoting solid consumption is the ease with which it can be eaten by calves. Differences in particle size may contribute to the range in performance and intakes observed in calves receiving different forage sources.

8 Turning calves out to grass.

Calves should be put out to grass when they are strong enough and when the weather has settled and become milder (i.e. there is less chance of very cold, wet days). Continue to feed concentrates for at least one month after turnout. The amount fed will depend on the age/weight of calves at turnout and the quality and quantity of the grass available. Generally about 1kg per calf per day is adequate.

With the exception of the first week or so after

turnout in spring, the autumn born calf does not require any concentrate feeding at pasture.

If grass management is poor, both spring and autumn calves will require continuous feeding at grass if performance is to be maintained at an acceptable level.

Calves are selective grazers, so maintaining a high quality grazing sward is important to maximise performance. Operating a leader-follower system will help to maintain calf performance and intestinal health.



Calves are choosy grazers so a high quality sward is essential.

The leader-follower system.

In this system farmers allow the younger animals onto a paddock, strip or block before the adults. This allows the younger animals to get the best quality grass while helping them to avoid picking up intestinal parasites.

