



## The Importance Of Water In The Neonatal Calf

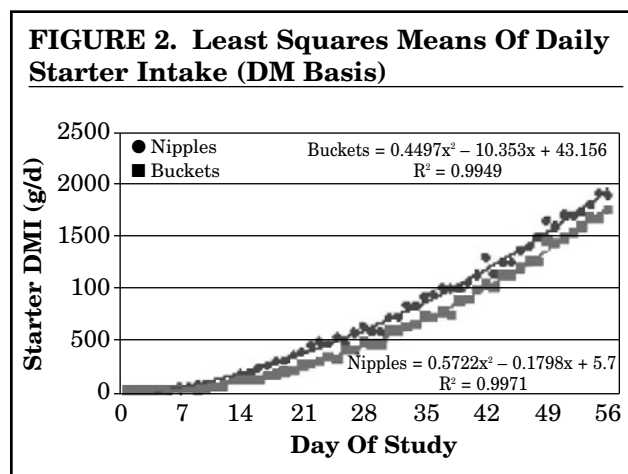
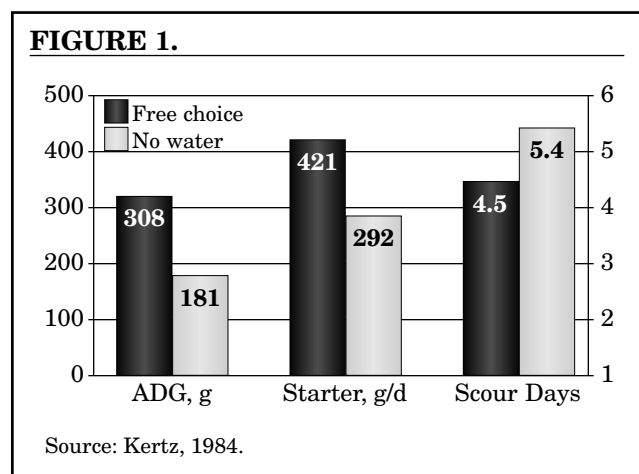
If we were to place a financial value on all “nutrients” needed for survivability, air would be extremely expensive. Next to air, water would be a close second. Water is required for all body functions, including respiration, perspiration, growth, digestion, waste elimination, lubrication, toxin dilution, reproduction, and a host of other important functions. Water is the major component of the body, making up greater than 70% of the total composition of young calves. Younger, leaner animals have a higher water content than older animals. Of this water, less than 35% is in the gastrointestinal tract. Muscle is made up of nearly 90% water. Therefore, if an animal is to grow, ample clean, fresh water must be made available at all times. In newborn calves, this means having access to water beginning on day three at the latest.

In newborn calves, water plays an important role in rumen function and development. Because of the esophageal groove in young calves, which closes in response to nervous stimulation, milk or milk replacer passes the rumen and enters into the abomasum. This groove closure takes place regardless of whether a calf is fed using a bottle or

drinking from a bucket. Other water, considered “free water” is necessary for the rumen. Free water has been shown to increase body weight gain, starter intake, and reduce scour scores (Figure 1 Quigley, Calf Notes #4 2001).

Another study (Quigley, Calf Notes #77, 2001) looking at methods of feeding water found that calves fed from buckets consumed more water during the first five weeks of the study compared to calves fed from nipples. However, during the last three weeks of the study, calves fed water from nipples consumed more water. Regardless of how the water was fed, water intake was predictable and highly correlated with starter intake (Figure 2). In this study, both groups were ready to be weaned by 42 days, with calves fed water from buckets ready about 5 or 6 days earlier.

Ambient temperature also plays a role in water intake. During hot days, calves will consume significantly higher amounts of water. During the winter months, calves will consume much less water and thus take longer to be ready to wean. Consideration should be given to feed warm water during the cold months. As temperatures decrease,



(continued)

nutrient requirements of the calf increase, making it necessary to supply the calf with more total calories. Encouraging starter intake by providing warm water is one economical way to help accomplish this increase in energy requirement.

The role that water plays in rumen development is significant. The rumen must develop the ability to ferment the starter feed and forages that are consumed, and a calf cannot be successfully weaned until the rumen development has occurred. When feeds are fermented, they produce volatile fatty acids. These acids cause significant changes in the size and motility of the rumen (Quigley Calf Notes # 27 2001). Before this fermentation can begin, bacteria must be present. Bacteria are “swimmers”; in other words they must live in a water environment. If water is limited, then bacteria cannot grow, and rumen development is compromised. If water is offered free choice at an early age, bacteria growth is usually not a concern.

The bacteria that develop depend upon the products ingested. Calves fed mostly hay develop different flora from those fed mostly grain (Heinrichs, 2005). Studies have shown that calves

fed diets consisting of grain and milk replacer have a more developed rumen at 8 weeks of age than calves fed hay and milk replacer. This indicates that the epithelial layer of the rumen is developed primarily from the production of volatile fatty acids that occur due to the fermentable carbohydrates in the grain. Therefore, the primary factor in determining rumen development is starter intake, and this development is more of a chemical process than it is physical.

Another important factor in rumen development is its ability to take ingredients that have entered and move them to the abomasum or to regurgitate them through muscular contractions. As dry feed intake increases, rumen contractions begin. By three weeks of age these contractions are usually measurable.

In conclusion, water is a vital and very inexpensive ingredient that is necessary for the neonatal calf to make the transition from a liquid milk diet to a diet consisting of dry grains and forages. At Vigortone, we are continuing to conduct research trials to better help you make good management decisions that will allow you to raise quality replacement heifers.

## **References**

Quigley, Jim. Calf Notes #4, 27, 77. [www.CalfNotes.com](http://www.CalfNotes.com)

Heinrichs, A. J. 2005. Rumen development in the Dairy Calf. *Advances in Dairy Technology*. 17:179-187