

Calf Nutrition Basics

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Disclaimer: The following material presents general guidelines; each farm should develop their own Standard Operating Procedures.

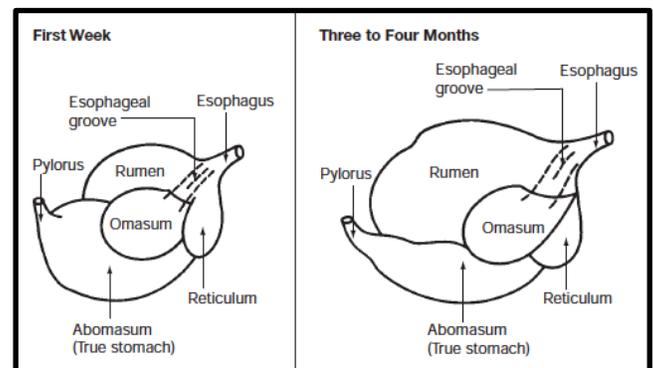
Summary

- Need to focus on growing the healthy calf and rumen development
- Wean when the calf is eating about 2 lbs of grain per day
- Feed free choice forage as calves get up to 5-6 lbs of grain per day

Anatomy

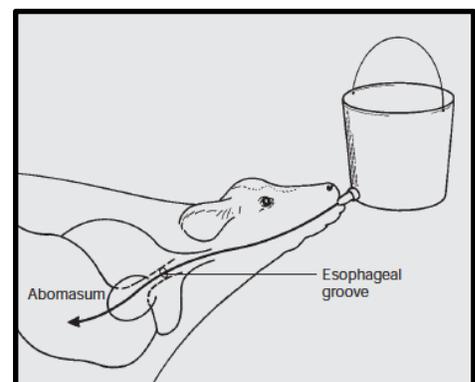
- A calf stomach has 4 compartments: reticulum, rumen, abomasum and omasum (Figure 1).
- In the first week of life digestive system is underdeveloped.
- At first (*birth – 2 weeks*) the abomasum is the “stomach” that digests nutrients.
- In a young calf, milk or milk replacer flow directly to the abomasum for digestion (Figure 2.) because of muscular folds and the esophageal groove.
- Digestion occurs through “enzymes.”
- As the calf ages and the rumen grows and develops, these fold become less prominent and the esophageal groove disappears.

Development of the calf stomach compartments from birth to 3 or 4 months of age.



Milk consumed by calf goes directly to abomasum because of the esophageal groove.

- As the calf eats grain (*3 or 4 months*) the stomach and the compartment enclosed in it grow and develop physically. During this time microbes begin to inhabit the rumen, digesting the feed and allowing it to develop and grow.



Spurred by feeding grain that results in microbes producing butyric and propionic acid rumen papillae are formed with suitable level found by 21 days.



Nutrition.

- Calves require nutrients for growth and development.
- Maintenance and development are basic functions that keep animal alive.
- Growth is accumulation of new body tissues.
- Calves should receive 8 – 10 % of its body weight as milk every day so a 100 pound calf should receive 8-10 pounds (1-1.5 gallons of milk) of milk or milk replacer each day. A gallon of milk is a little more than 8 pounds.
- Calves should be fed at least twice a day.

Energy.

- Measured in calories.
- Calves can digest the sugar (lactose) and fat which is found in milk.
- By 14-21 d calves can digest fat
- As the calf matures it can digest starch in starter feeds.

Protein.

- At birth, calves have very few digestive enzymes.
- After birth calf can digest protein in milk, by 14 d calves can digest non-milk proteins.
- After 4 weeks of age microbes in the rumen may digest some feed.

Environment on Energy and Protein Needs.

- Calves use energy to maintain body temperature
- Hot: pant and sweat to cool off, will drop intake
- Cold: shiver to increase heat production
- Both heat and cold temperatures increase the maintenance requirements of calves and additional milk or milk replacer is needed.
- If bedded with straw less energy is needed due to straws ability to hold heat and absorb the cold temperatures.

Minerals.

- Milk and milk replacers supply minerals needed (including calcium, phosphorus, magnesium, iron) during the first few weeks of life.

Vitamins.

- Calves require many of the same vitamins as monogastrics, including vitamin K and the water-soluble B vitamins: thiamine, riboflavin, niacin, choline, biotin, pyridoxine, folic acid, B12, and pantothenic acid.
- These vitamins can be found in milk and milk replacer.

Water.

- Water needs to be provided free choice to all calves, including those being fed a liquid diet.
- Early life water intake is at least 1 kg /and increases with age





- By 20 days of age, water intake increases dramatically and in parallel with reductions in feeding of milk replacer and increasing starter intake.
- Calves require four times more water than feed (dry matter) or a water to feed intake ratio of 4:1 (kg basis).

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