Calf Nutrition Basics

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
- Always ensure calves have access to clean water

Anatomy

- A calf stomach has 4 compartments: reticulum, rumen, abomasum and omasum (Figure 1).
- In the first week of life the 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 folds become less prominent and the esophageal groove disappears.
- As the calf eats grain (*3 or 4 months*) the rumen begins to grow and develop physically. During this time microbes begin to inhabit the rumen, digesting the feed and allowing it to develop and grow.

Figure 1: Development of the calf stomach compartments from birth to 3 or 4 months of age.

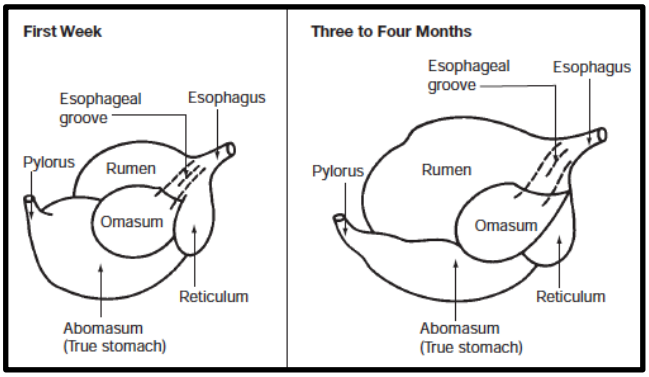

Figure 2: Milk consumed by calf goes directly to abomasum because of the esophageal groove.

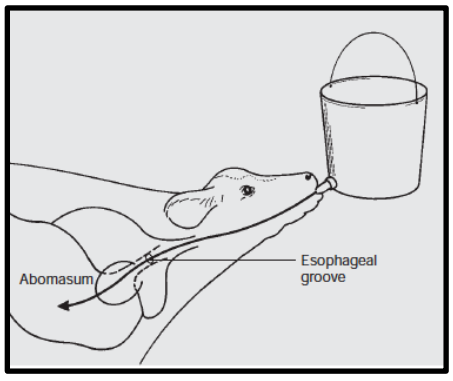

Figure 3: Feeding grain results in microbes producing butyric and propionic acid, which leads to rumen papillae formed by 21 days.

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 (4-6 quarts)) 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 is 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 decrease 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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