

Calving Ease

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Are Your Weaned Calves Rumen Ready?

- **Rumen review – the fermentation center for a ruminant.**
- **Changing from a pig to a ruminant – strong rumen wall muscles, well grown-out papillae.**
- **Tips for encouraging early rumen readiness:**
 1. **Know what is “normal” grain intake.**
 2. **Keep the grain dry.**
 3. **Keep the grain fresh, especially avoid moldy grain.**
 4. **For the youngest calves begin with only enough grain to cover the bottom of the pail.**
- **Hunger is a great incentive to eat more grain – cut back on the milk near weaning.**

The Rumen Review

Recall that dairy animals have a four compartment stomach (rumen, reticulum, omasum and abomasum). In an adult the rumen is the largest compartment. That is where most of the fermentation takes place. The slurry there contains billions of protozoa, fungi and bacteria. Both concentrates and forages are broken down to yield volatile fatty acids (VFA's) and microbial protein. The former, VFA's, are absorbed through the rumen wall and used as energy. The latter, protein, supports further rumen microbial growth and much passes into the intestines for digestion.

Changing from a Pig to a Ruminant

At birth our dairy calves are essentially a pig, a monogastric. Milk, via the esophageal groove, is shunted into the fourth compartment (abomasum) where it is digested much like what would happen with a pig.

Water and solid feed (includes bedding, calf grain, likely many bacteria) start out in the rumen (the first compartment). The rumen in the young calf has both an outer layer – mostly muscle tissue – and an inner surface (scientists refer to this as the epithelium). This muscular layer is what contracts and forces the rumen contents to mix. Over time the inside surface will change from a smooth surface to one that looks a bit like a shag rug – lots of tiny fingers that serve to increase the surface area available to absorb VFA's (called papillae).

The majority of dairy farms wean from milk to solid feeds around seven to nine weeks of age. This short development period from birth to weaning places a high priority on the rapid maturation of the inner lining of the rumen. Both forages and grains contribute to this maturity. Forages like grass and hay stimulate muscle growth and contribute a small amount of the VFA (butyrate) that stimulates papillae development. Calf starter grains ferment to release larger amounts of butyrate leading to rapid papillae growth. The advantage for grain compared to hay for developing papillae can be seen in these Penn State pictures – click [HERE](#)

Productive rumen fermentation depends on concentrates and fiber (microbiologists call this substrate), a supply of bacteria, fungi and protozoa, and water. The calf maintains the correct temperature and we hope her saliva helps maintain a positive working pH. For young calves we have to be careful to supply water. Recall that the milk does not go into the rumen. Water for fermentation has to be provided separately from milk feeding.

Practice Tips for Encouraging Early Rumen Readiness

Know what is “normal” for grain consumption. The ease of teasing calves to consume calf starter grain will be related to the level of milk feeding. Expect differences among calves based on their level of milk consumed. Calves fed milk/milk replacer at low levels (for example, 4 quarts daily) are hungry much of the day. Many of them by seven to ten days may begin eating small amounts of grain. In contrast, calves that are stepped up in milk volume with the goal of eight to ten quarts daily by two weeks of age often eat little grain until twenty-one to twenty-eight days.

For all calves try to keep the calf starter grain dry. In calf barns with individual pens consider if it is practical to reduce water slopping into the grain. One way is to separate the water and grain pails. Another way is to provide a divider or barrier between the pails. Click [HERE](#) for pictures by Dr. Al Kertz showing alternatives.

Keep the grain “fresh.” Regardless of the housing for calves there is the temptation to “load up” our grain feeders or grain pails. On one hand, we may reason that the grain might just as well sit in a calf pail as in our large grain bin (or pallets of bags). On the other hand, grain in a pail accumulates saliva and trash, pellets break down increasing the fines content and with the increased exposure to air the fats have a tendency to turn rancid. All of these changes reduce palatability at a time when we are trying to maximize the attractiveness of the grain.

For the youngest calves begin with just enough grain to cover the bottom of the pail. With my own calves I always measured this as “a handful.” My housing made it easy to dump these pails daily and toss in a handful of fresh grain. In other housing situations it may be practical to only change this grain two or three times a week. As soon as grain started to disappear I started adding more – since most calves about the same age had the same consumption pattern I could pretty well make these grain feeding changes by groups.

Hunger is a great incentive to eat more grain – cut back on the milk.

Even calves consuming ten and twelve quarts of whole milk daily will eat grain – in small amounts eventually. They just grow enough that milk alone does not provide enough dry matter to satisfy their hunger. However, we usually are not willing to wait to wean calves until they are twelve or fourteen weeks old.

How do we jump-start the grain consumption? Let them be a little hungry! Whether in group or individual housing we need to come up with some practical way to cut back on the nutrients from milk/milk replacer. Regardless of how this is done the goal is to direct their attention to the grain. Many folks have some kind of “step-down” protocol that withdraws some of the milk.

My preference is to make the step-down large enough so that the calves perceive themselves as hungry. For a three-time-a-day program, drop one of the feedings. For a twice-a-day program drop one of the feedings. For an automatic feeder, abruptly drop one-third of the milk allocation. My calves topped out at eight quarts of 15% solids milk and to encourage grain intake at five weeks I dropped one of two milk feedings. Within a week most of these calves were consuming four pounds (about four quarts) of grain daily. I always liked to feed a handful of alfalfa hay in the grain bucket daily the last week the calves were in my hutches, too.

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Remember to search for “Calves with Sam” blog for profit tips for calf rearing.