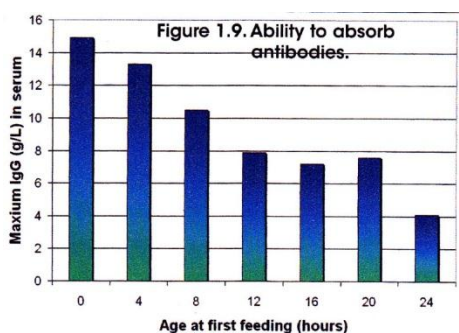




CALF NUTRITION

Surviving and Thriving

Surviving depends totally on timely colostrum intake and quality, and thriving is all about rumen development.



Surviving: The graph tells a powerful story of the calf's capacity to absorb antibodies from colostrum. The two dominating factors are time from birth to administration, and colostrum quality (IgG content). Unlike human infants, calves receive no immunity during gestation, so administration of colostrum is their lifeline, and impacts whole of life productivity. (Graph used with permission: Hoards Dairyman)

In Australian calving management, being present to administer colostrums in the first hour after birth is not very practical, however, the graph does give us some grace to still be effective in protecting the new born calf from almost certain death. Relying on the calf suckling the dam is "Russian Roulette". Many calves take some time to stand after birth, and there is also a significant risk of bacterial contamination of teats, E. coli especially.

Ensuring we administer colostrum that does have the desired quality is essential. Colostrometers are available from Genetics Aust for around \$60. The milk ketosis test strips I mentioned in last month's article are also available from Genetics Aust.

There are a number of factors effecting colostrum quality. Cows producing large volumes of colostrum at first milking often have low IgG content due to dilution. Mature cows that have had vaccinations and lifetime exposure to various diseases produce the best IgG levels. The cow needs a minimum of 4 weeks dry for antibodies to be concentrated in colostrum. Springer cow nutrition has a major role also. Protein content of the lead feed grain mix has major impacts on IgG content, as this immune transfer is via proteins.

Thriving: Calves are born monogastric, single stomached. For thriving calves we need to do all we can to assist the conversion from monogastric to ruminant status. Milk is essential nutrition for an infant monogastrics, however, milk alone will not provide sufficient nutrient for normal growth rates of a calf. Developing the rumen to digest far more nutrient dense solid feeds is a high priority. There is considerable science to support a very simple way to

achieve this. A diet of milk alone does very little to develop rumen papillae, the absorption sites of nutrient.

Hay and milk does little more in maturing papillae. Only grain will accelerate this vital development. Without mature rumen papillae a weaned calf will starve. Only grain produces the Volatile Fatty Acid profile from digestion of starch in cereal grain to stimulate maturity of papillae. How much grain a calf consumes daily will indicate stage of papillae maturity and signal her capacity to be weaned. An intake of 2 kgs of grain will herald rumen maturity.

The photos below of three calf rumens illustrate well this variation and capacity to be weaned. All three photos are of calf rumens at six weeks of age and from varying diets as indicated. Both the 'Milk Only' and the 'Hay/Milk' rumens could not support nutritional needs of the calves from solid feeds if weaned. Severe malnutrition would result. Only the well developed rumen papillae of the 'Grain/Milk' rumen has the capacity to support good nutritional requirements for thriving growth rates.



Calf Rumen Milk Only



Calf Rumen Hay/Milk



Calf Rumen Grain/Milk

(Calf rumen photos supplied and used with permission: Penn State University)

Water is an essential nutrient. Daily water requirement is greater than any other nutrient. At one month of age a calf needs between 5 to 8 lts/day. At two months, 6 to 8 lts. At three months, 8 to 11 lts daily. We all know about livestock's need for fresh clean water; but reality all too often does not match our knowledge, which many water troughs will testify too. As above, grain intake determines papillae development and hence time from birth to weaning, but water determines grain intake by a factor of 4 to 1: that is, 4 lts of water intake to achieve 1 kg of grain intake. This water volume does not include water content of milk being fed.

Rapid conversion of a calf from monogastric to ruminant status has obvious economic impacts. Feeding grain and pasture/silage/hay is cheaper in both feed cost and labour. Solid feeds are also far greater in nutrient density (energy/protein) than milk and will facilitate more rapid growth. Assuming a calf is growing, or more accurately, developing because she is gaining weight can be deceiving. Weighing calves does not tell where the weight gain is; it must be accompanied by height and wither measurement if assessing true body growth and development of bone and tissue, as opposed to just fat deposition. Long periods on milk tend 'growth' toward fat deposition, not bone/tissue development.