

Feed management from birth to weaning

The primary concern in rearing the newborn calf is to ensure it remains healthy. Feeding management is directed more at addressing nutrient requirements and encouraging rumen development, rather than to achieve a particular rate of gain. Minimising stress through improved hygiene, and providing clean, dry, well-ventilated shelter to maintain health and wellbeing in adverse weather are of greater importance than the method of rearing. Problems occur when calves are continually reared in the same area. Over time this becomes heavily contaminated by faecal matter leading to high populations of pathogenic bacteria, coccidia and parasites.

Colostrum

The newborn calf must receive a good feed (3-4 L) of colostrum within 6 hours of birth. This provides the calf with maternal antibodies to help it resist disease organisms in its environment. These antibodies can only be absorbed from colostrum, through the stomach (abomasal) wall into the calf's bloodstream in the first 12-18 hours following birth. Calves can be taken off their dams after 24 hours and hand reared with milk, concentrate and forage to weaning.

Rumen development

The feeding program is aimed at rapidly developing a fully functioning ruminant digestive system (Figure 1). Growth rate is a secondary consideration at this age.

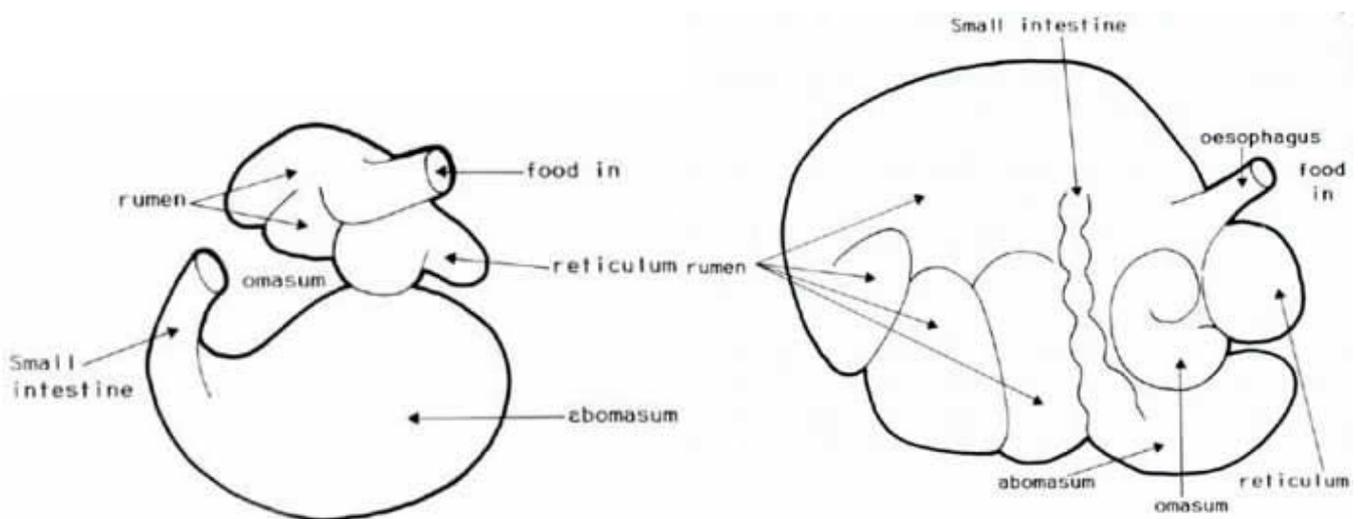


Figure 1. Relative size of each stomach compartment for a newborn calf and mature cow.

Milk

The newborn calf is dependent on milk for nutrition and growth. Initially only the hind stomach - the abomasum is functional in young calves. Milk bypasses the undeveloped rumen going directly to the abomasum via the oesophageal groove. If this mechanism fails (e.g. over feeding) and milk gets directly into the rumen it ferments and the calf scours.

Feeding method

Calves can be fed milk individually using buckets or teats; groups can be fed using calfeterias or they may be reared by multiple suckling with nurse cows. Whatever the feeding method, good hygiene, feeding practices, management and shelter are essential to prevent digestive upsets (scours) and disease. Calves can be fed milk once daily from about one week old. Large breed calves require 4-5 L of milk a day, smaller calves can be fed less. Warm milk or milk replacer is preferred. Do not dilute milk with water. Milk replacers fed once daily can be fed a little more concentrated to encourage intake of solid feeds but free access to clean fresh water is essential.

- Milk replacers fed to young calves must be based on milk, (not milk substitutes such as soybean protein) as the pre-ruminant calf (under three weeks) cannot digest non-animal protein.
- Excess heat treatment in the manufacture of milk replacer powders will reduce their nutritional value. Spray dried powders are preferred to roller dried.
- Clean fresh water is essential for growth and health of the calf and must always be available.
- Solid feeds such as cereal grains and forage are necessary for rumen development allowing the calf to be weaned onto pasture and concentrate. Concentrates and good quality forage/hay should be fed ad libitum to weaning.

Concentrate and roughage

While long roughages 'stretch' the rumen, digestible dietary carbohydrate - starch (grain), sugars and hemi-cellulose (forage) - is necessary for development of the rumen papillae (rumen wall) essential for rumen function and absorption of nutrients. Coarsely cracked cereal grain (maize, barley, wheat or sorghum), maize silage or pellets are used with digestible forage (pasture, hay, straw, silage) to increase digestible energy supplied to the rumen. Home-milled grain is used effectively, but young calves initially can require some encouragement to eat it. Proprietary calf pellets, though more expensive tend to be eaten more readily.

While digestible forage is important for growth and development, very high protein forages (>20% CP) should be avoided for young calves. Low quality (low digestibility) roughages are of limited value and mouldy hay should not be fed.

Intake of concentrate is a useful indicator of whether the rearing management is achieving the goal of rumen development. The calf needs a balance of concentrate and fibre (roughage). Some calves can develop a taste for pellets - possibly more likely if roughage is restricted, less digestible or of poor quality. Low fibre intakes may result in metabolic upsets and scouring or bloat in older calves as rumen function increases.

To minimise these risks, concentrate intakes pre-weaning should not exceed 2 kg per calf a day and may need to be restricted. Calves can be better managed and their feed intakes controlled if animals in a group are of similar size, age and vigour to reduce competition.

Salt can be beneficial if natural levels in water and feed are low. Deficiency is more common on red basaltic soils and kikuyu farms and calf bloating may be a problem. Mineral supplements including salt (mix at 1% in grain) have been beneficial.

Extra protein in concentrates nutritionally is not necessary when the calf is fed 4-5 L milk per day and feeding added protein is money wasted. Additional protein supplementation may be beneficial for older calves if early weaning with reduced milk feeding is practised. To minimise any intake problems post-weaning, protein supplements can also be added to concentrates to educate the calf and avoid any palatability problems. Too high protein in diets as well as increasing costs, can increase risk of digestive upset and scouring.

Urea is toxic at this stage and should not be fed to pre-ruminant calves.

Whole cottonseed is not advised for pre-ruminant calves as there is some potential risk with gossypol toxicity and/or laxative effects due to its high oil content. Gossypol is a plant toxin which can be detoxified by digestion in the rumen. Although cotton varieties have been bred for a low-gossypol content, it is safer to avoid potential problems by not feeding cotton seed before weaning and limiting the amounts fed after weaning. Other high oil content concentrates could cause problems and care is required.

Weaning

Weaning at 8-10 weeks of age is normally practised. A target live weight of 60-70 kg at weaning (8 weeks), achieved with milk, plus ad libitum concentrates (cracked grain or pellets) and digestible roughages (pasture, hay or straw) will ensure minimal post-weaning setback.

Early weaning

Early weaning (5 to <8 weeks) may be adopted to reduce the milk feeding period and labour required for calf rearing. This will require a specific feeding program using low levels of milk and high-energy, high-

protein concentrates, preferably pelleted, plus digestible lower protein roughages (barley straw, hay, pasture) to stimulate rumen development. Milk or milk replacer is reduced from about 3 weeks of age to encourage the calf to consume and maximise intake of dry feeds pre and post-weaning.

Scours

Diligent management is essential to ensure animal health is maintained. Digestive upsets leading to scours are the main cause of mortalities in young calves.

Problems can be minimised by:

- ensuring calves receive adequate colostrum within 6 hours of birth. Maternal antibodies absorbed from colostrum give the newborn calf some resistance to disease organisms in their environment
- feeding the correct amount of milk, not too much or too little due to competition with other (or older) calves
- recognising and treating scouring animals early
- maintaining hygiene and cleanliness of feeding utensils and the environment
- providing shelter to protect the calf from cold or wet conditions
- rotating rearing pens continually to prevent disease; dirt yards or small paddocks can become heavily contaminated

Observing calves at feeding to identify scouring animals as soon as possible for remedial treatment will prevent dehydration and secondary disease leading to chronic ill-thrift and mortality. Separate sick animals to avoid cross infection. Most scour incidents can be treated simply by use of electrolyte replacers fed several times per day to prevent dehydration. Milk may be reduced or omitted for 1-2 feeds but fresh water, concentrates and forage must be provided. If scouring has been prolonged calves can be fed 1 or 2 raw eggs per day to supply essential nutrients. Antibiotics should not be used to treat scours resulting from over feeding or digestive upset. Blood scours (coccidiosis) require veterinary treatment and management changes to improve hygiene.

Source: Queensland Department of Agriculture, Fisheries and Forestry; 2009