

CALF REARING – THE OLD, THE NEW AND WHAT WORKS

Dr B.W.Schouten
B.V.Sc, Snells Beach, Warkworth

So what are the “musts” of good calf rearing?

Most of these factors are already well known but in times of financial stress these principles are often quickly forgotten or compromised.

The important point to remember is that calf rearing does not start in the calf barn but with a healthy herd and good staff.

It is the owner’s responsibility to ensure that calves and staff are well cared for and stress free. “Stress is a Stimulant - Distress is a Disaster”.

So what are the musts of good calf rearing?

- Must rear a good quality heifer replacement
- Must “dispose” of surplus calves in a good husbandry like manner
- Must have good facilities for calves and staff
- Must have quality staff who are valued
- Must have good disease prevention strategy
- Must have a healthy herd
- Must have good cooperation with the milking staff and owner.

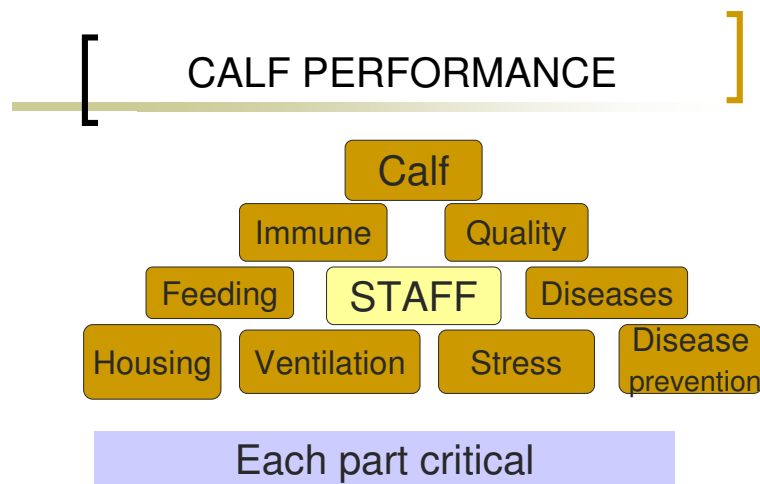


Figure 1. All parts are critical in good calf rearing

It costs about \$1,200 to rear a heifer to her first lactation – so every endeavour must be made to be as cost effective as possible. However, good savings can be made by maximising the use of non-saleable milk, reducing stress and disease and by stimulating early rumenal development with quality concentrates and grass.

The value of colostrum

Colostrum is the most valuable nutrient for the newborn calf. It contains high energy levels, growth promoters, vitamins and those vital immunoglobulins so necessary for the transfer of a passive immunity from disease.

The effect of low immunoglobulin on illness and survival are well documented world wide and show similar results. A good New Zealand example is the results published by Dr Paul Muir at Poukawa - see Table 1. In this table a Gamma Glutamyl Transferase (GGT) level above 200 International Units (IU) is considered to give a good immune status. On farm A only 10% of calves were low whereas on farm H nearly 44% of calves are severely compromised. This had a huge affect on the health and survival of that calf.

Table 1. Effect of the calf source colostrum levels

**EFFECT OF THE CALF SOURCE
COLOSTRUM LEVELS --DEATHS AND SICKNESS**

FARM	%<200	% DEATHS	%SCOURS	% NAVEL INFECTION
A	10	3.7	42.5	5.2
H	44.4	12.0	52.0	13.0

POUKAWA- Dr Paul Muir 2008

In order to avoid this, the timing of that first feed of colostrum is also critical for the viability and health of that calf.

In Figure 2 the immunoglobulin level is shown as mg/ml. For comparison 10 mg/ml is equivalent to 200 IU of GGT.

The figure shows that after 8 hours colostrum can no longer be absorbed into the blood stream. Any colostrum after this time still remains a valuable nutrient but can now only give protection on the surface of the gut.

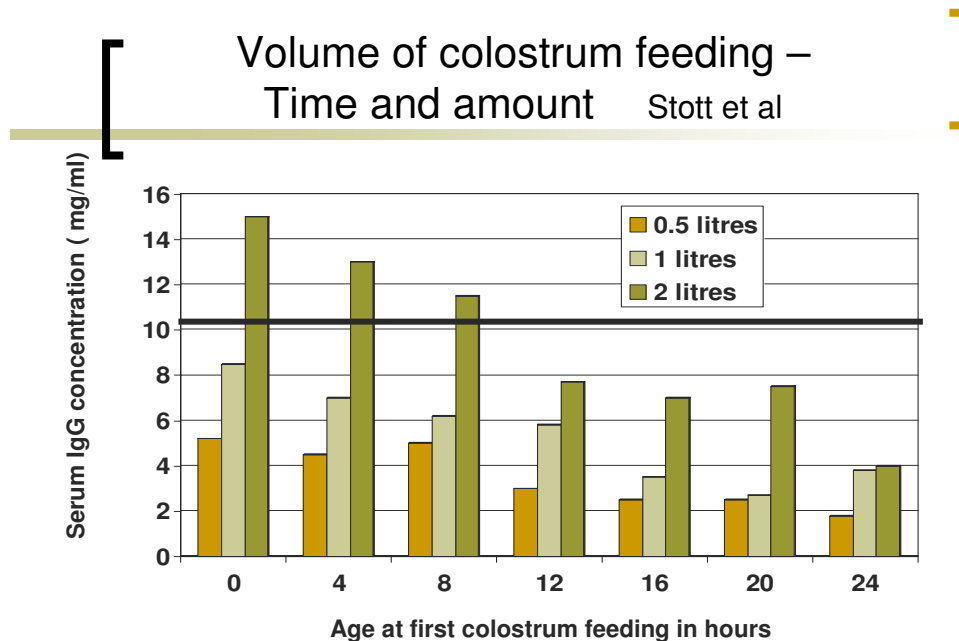


Figure 2. Volume of colostrum feeding

So in order to ensure good colostrum intake, calves should be collected from the calving paddock *twice a day*. It means a change in the organisation of collected calves but it is well worth it. It reduces the stress and exposure of the calves and makes the first feeding of colostrum so much easier.

Care of colostrum

First day colostrum “Colostrum Gold” should be collected and stored in a clean drum.

NB: First day Colostrum with blood in it or with “clotty mastitis” milk need not be discarded as these will still be high in colostrum antibodies and will do the calf no harm.

Surplus colostrum is best stored in small multiple drums (of not more than 5000 litres) in a cool spot and stirred twice daily. Multiple drums may be needed on big farms.

Storing all the colostrum in one drum is dangerous. If things go wrong large volumes of valuable milk will be lost.

A colostrum keeper can be added to maintain the sterility of the product or each drum can be seeded with a sachet of Ezy-yoo. This culture can be transferred from drum to drum as the season goes on.

Don't forget to taste the milk daily to ensure that the milk is ok. Remember if you can't drink it neither will your calves.

Non saleable milk

The use of non saleable milk for herd replacement calves is still controversial. The fear that heifers would calve with mastitis or blind quarters has been researched throughout the 1970-1980s but results are unclear. Even calves fed milk inoculated with *Staphylococcus aureus* showed no greater incidence of mastitis at calving than controls (Barlo et al 1982). Similarly the growth rates and the incidence of scours of calves fed mastitic milk before and after antibiotic treatments were similar to those fed saleable milk. However the feeding of antibiotic milk could come under increasing scrutiny for its potential to foster the survival of resistant bacterial species. It is not good practice, but to date nothing to the contrary has been proved.

As a general rule antibiotic milk should only be feed to calves over 3 weeks of age or discarded.

Transport of the calves from the paddock to the barn

The question always is how many calves can be carried on a trailer? Even short distances in an overcrowded or dirty trailer can have a devastating affect on the joints and navel cord, leading to Joint Ill, Navel infection, or Septic Arthritis. The damage done can be significant and often irreversible. The incidence of navel infection can be as high as 25% (see Table 1) and the future of any replacement calf with this infection is in serious doubt. Remember that this is the damage that *you* can do within the first hour of handling that valuable calf.

So take care and give the calves at least 1sq metre of space in the trailer. The bedding should be soft (shavings, straw) and at least 100mm deep. Replace the bedding daily or spray with a good virucidal spray (Virkon).

In large trailers divide into small compartments holding no more than 10 calves/pen - 5 is ideal. Treat navels with iodine before and after transport.

The treatment of diarrhoea

The causes of diarrhoea may be due to nutritional factors or infectious agents.

Nutritional factors include cold milk feeding, changes in the volume or the diet and environmental stress.

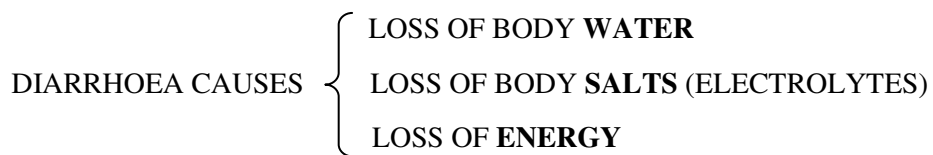
Infectious agents include Rotavirus, Cryptosporidium, Corona virus, Salmonella, Bovine Viral Diarrhoea (BVD) and Coccidiosis.

Identifying the cause of the scours by colour, consistency or odour of the faeces is not possible. The best way to diagnose the cause is by the use of a clinical thermometer and laboratory testing.

The value of a clinical thermometer as a clinical tool is often overlooked. As a general rule calves with nutritional diarrhoea will have a normal temperature (38-39.5⁰ C). Calves affected with a viral or bacterial infection will always show a fever above 39.5-42⁰ C. The thermometer is also useful in monitoring the success of the treatments.

The effects of diarrhoea

Irrespective of the cause of diarrhoea, the net effect on the calf is the same.



All of these elements are vital and will determine the fate of that calf. It is a fact that in most cases of fatal diarrhoea the calf succumbs to the dehydration and the loss of electrolytes and energy and not to the direct effect of the infectious agent.

The only practical way to treat scours from any cause is by the use of good quality hypertonic oral electrolytes – for best advice consult with your vet.

The key to the success of treatment is to ensure that adequate fluid volumes are given in small multiple feeds during the day. Leaving a calfeteria of adlib electrolytes (2-4 litres per calf) in a pen of scouring calves overnight will hasten recovery. As a guide Table 2 shows that some 6-10 litres of fluids are required per day.

Table 2. Fluid replacement for the diarrhoeic calf

Degree of dehydration (%)	Amount of fluid needed to restore body water (L/d)	Maintenance water requirement ^a (L/d)	Total fluid therapy required	
			Litres/day	
2	1.0	4.0	5.0	
4	1.8	4.0	5.8	
6	2.7	4.0	6.7	
8	3.6	4.0	7.6	
10	4.5	4.0	8.5	

A suggested treatment regime is presented in the Figure 3 where M means Milk and E means Electrolytes.

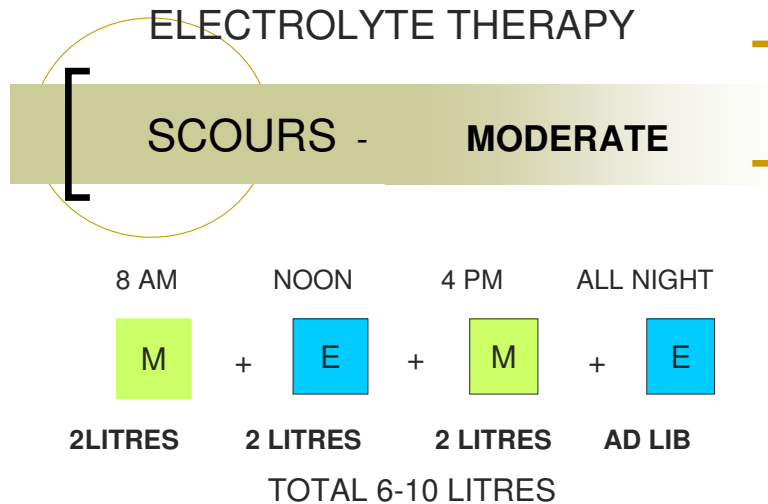


Figure 3. Electrolyte Therapy

Viral Diseases – prevention and treatments

The majority of infectious agents include Rotavirus, Corona virus and BVD virus. These are most often found as mixed viral infections, or in tandem with Cryptosporidium or Salmonella species.

The predominant virus isolated is Rotavirus. In fact if Rotavirus is absent clinical disease seldom occurs. Bovine Viral Diarrhoea (BVD) is often the immune depressing factor in an outbreak of Cryptosporidium. In my experience control BVD and Rotavirus and Crypto will disappear.

A commercial Rotavirus vaccine has been available in NZ since 2000, and clinical results have been excellent especially in large herds where stress is greater, and where the cause of calf scours is viral, and movements have been great. The success of the vaccine programme is totally dependent on calves receiving a good colostrum transfer within 12 hours of birth. This is pivotal. The vaccine will not work if husbandry factors like the timing of the vaccination and the timing of colostrum intake is not carefully carried out. The presence of the virus antibody in the stored colostrum will continue to neutralise the virus in the bowel. The partial vaccination of the herd (early or late calvers only) is not effective and doomed to failure.

Where BVD virus or Salmonella infections are endemic in the herd a proper vaccination program suited to your conditions would be wise-consult with your vet. Other “on farm” practices useful in the control of viral diseases are:

- Calf barn well away from the cow shed and feeding pads
- Control rodents, birds and dogs
- Good effluent disposal with no contact with cows faeces and effluent sprayed paddocks
- No access to drains or swamps

- Keep dairy staff, bobby calf trucks and staff out of the calf barn
- A proper spray program of the barn, feeding utensils and the trailer with a good quality, safe virucidal spray (Virkon) twice a week

In reality the biggest spreader of disease in the barn is the rearer, so complete control is never possible nor necessary. Where large numbers are reared and the facilities become stressed, good disinfection from the start is necessary to minimise the disease challenge especially in the late calves.

Milk additives to prevent scours and to promote gut health

A large number of products are now available to prevent scours and promote gut health and growth rates. The actual benefits of these products are hard to quantify, but clearly they do modify and protect the gut health in periods of stress and disease.

The commonest milk additives are:

- Probiotics and Prebiotics - Probiotics promote gut health by flooding the gut with useful bacteria, so preventing harmful bacteria from colonising the bowel. Prebiotics on the other hand are large polysaccharides that are indigestible to the host but a good nutrient to the bacteria already present in the gut, thus allowing these useful bacteria to survive and multiply. Products on the market that can do this are—Yoghurts, Biostart, ProCalf and Yeastsac
- Rennet - to enhance curdling
- Sodium Bentonite - a clay that modifies gut motility and absorbs excess fluids and microbial toxins. Products in this group include - Trubond and Rumenite
- Biopect is an apple based pectin that has a similar action
- Antibiotics – there is never a role for antibiotics to be added to milk to prevent disease
- Vitamins and Minerals. Colostrum is high in vitamins and minerals. Cow's milk is low in these vital ingredients and so the addition of extra vitamins and minerals may increase gut health.

Housing requirements

Housing should be *dry and draught free*. Barns should be open on one side and divided into group pens holding no more than 20 calves (10 is ideal). Calves should be placed in their allocated pens and stay there for the entire indoor rearing period. There should be enough barn space to be able to house at least 50% of the calves born on the farm.

Best practice is to have multiple barns, so that young calves can be isolated from older or sick calves. Each calf should be placed in a clean group pen that has not been previously used by other calves.

It is unfortunately true that calf barns are often a low priority on farms and when new conversions are built. In my opinion this is totally short sighted as pressures on the calf and rearer are equally as great as these of the cow and the milkers.

Ruminal development

The aim is to convert the calf from a milk fed neonate to a functional ruminant as quickly as possible. The early milk feeding period is the most vulnerable period for the calf from both a nutritional and disease challenge point of view. However it takes time to develop a fully functional rumen. This is best achieved by offering a high quality protein and carbohydrate cereal concentrate plus some fibre. The commercial calf meals are of good value and contain high quality cereal proteins, carbohydrates, molasses, rumenal buffers, vitamins and minerals and a coccidiostat. I do not recommend the use of home brew mixes of raw grains as these are likely to increase the risk of bloat, acidosis, rumenal ulceration and laminitis. The few cents saved by substituting with an inferior product is fraught with danger and will result in lower liveweight gains. From a cost point of view 1kg of a commercial meal costs \$1.00 and contains 12 MJ of energy. This equates to 4 litres of milk which costs 4 x 56c or \$2.25.

Calves can be weaned off milk when they are consuming 1 kg of a concentrate and this usually occurs at about 70 kg liveweight. But meal feeding must be continued at the rate of 1-2 Kg /day until at least 100 kg of weight.

In summary

The old, the new and what works can be summarised by the following bullet points:

- The herd should as best as possible be disease free from Rotavirus, BVD and possible Salmonella – consult with your vet
- Calves should be collected from the calving paddock twice a day and housed in small group pens of 10/pen
- Give at least 4 litres of colostrum “gold” within the first 24 hours
- Prevent scours with good hygiene and feeding practices
- If scours occur treat early and vigorously with 6 -10 litres of fluids (milk and electrolytes) per day
- The use of some nutritional preventative products is well worthwhile and cost effective
- A high quality commercial meal is the ideal way to stimulate early rumenal development and good target weight to weaning
- Good quality staff is the pivotal point. These staff should have good facilities and equipment, not be required to lift more than 20 kg, well motivated and well paid.

It is false economy to try to cut calf rearing costs in times of poor milk returns. The few dollars “saved” are small and seldom worth it, remember this is your best genetic asset and the future herd.

The Key: Calf rearing starts at birth, not 24 hours later.