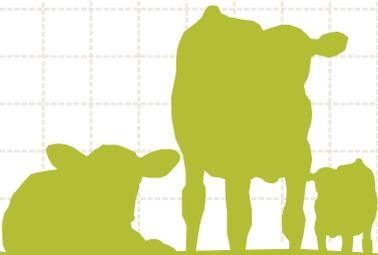




Calf Rearing Guide





Dr. Rob Derrick, Nutritionist

**Nutrition advice?
Listen to the experts.**



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Goals for calf rearing

How calves are reared will set the tone for the lifetime productivity of the animal. Well-reared calves will be an asset to the herd.

Whether rearing calves for heifer replacements or beef animals, goals are similar:

- To develop the rumen of the calf (which is immature at birth), so that when it is weaned it can get nutrients from eating high fibre feeds such as grass.
- To produce quality replacement heifers that become high producing cows and will last over time in the herd.
- To grow beef animals to target weights faster and in better condition so they achieve slaughter dates earlier, or on time, at better weights.
- To do both in a way that is cost effective.



Achieving growth targets

Achieving set growth targets is important as growth rates impact on the reproductive and lifetime production performance of cows. There is increasing evidence that increasing average daily gain pre-weaning is correlated to milk production in the first lactation.

Calves not reaching growth targets will be on the back foot and will not perform as well as those reaching target — with the consequences being heifers possibly not getting into calf, or heifers performing poorly in their first and subsequent lactations due to pending growth requirements, inability to compete with cows in the herd and/or poor mammary cell development. Growing calves consistently and continuing to reach growth targets is the most efficient way to put on weight and is also the best way to ensure you are growing calves that are well grown in regards to muscle and skeletal development. Having periods of no growth followed by periods of catch up growth is inefficient and catch up growth can often be fatty deposits rather than lean muscular growth.

Successful calf rearing is not just about reaching weight targets. The protein and fat composition of the diet can influence the composition of the growth, as protein supports muscle and skeletal development whilst a high fat diet is more likely to encourage fat deposition.

Keeping track of calf weights is important as it provides an indication of how successful the overall calf system is and if goals are being achieved. There are several ways of doing this. Weigh scales are the gold standard, with other options being measuring wither height with measuring sticks or using girth tape. Wither height sticks are becoming increasingly popular with calf rearers as they are quick and easy to use but still give accurate measurements, as wither height is strongly correlated with calf weight.

Ask your local NRM Nutrition Specialist for more information on sourcing and using a calf wither measuring device.

Any measurement device used must be calibrated regularly in order to check for accuracy.

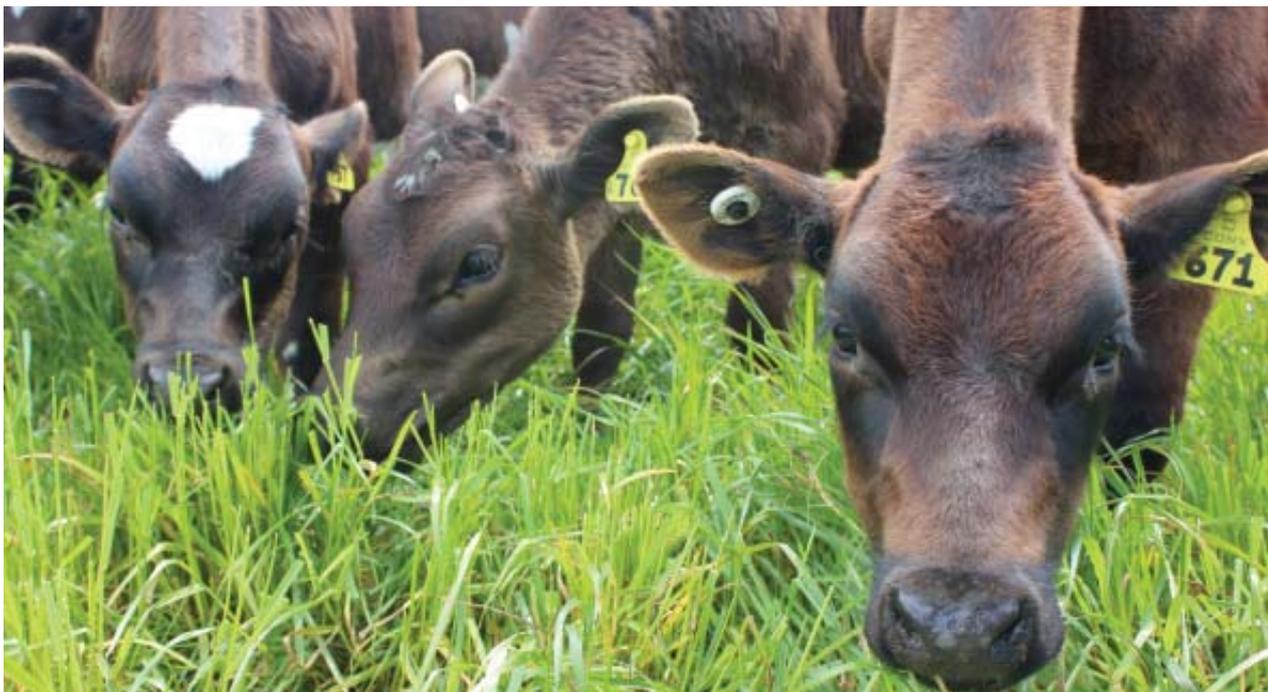
Targets for heifers (% of mature body weight)

Puberty	40-50%
Service/Breeding	50-60%
Calving 24 months	85%

The Kiwi challenge

Calves in New Zealand tend to face more challenges than the average calf in other countries due to many factors.

- The tight calving pattern of the New Zealand dairy herd and large herd sizes means that a high number of calves are reared in a short period of time, which can put pressure on both the calves and staff.
- Calves are often reared in groups, compared to overseas calf rearing methods, which can have calves in individual pens. Group housing can increase the risk of disease spreading and can put more stress on the smaller calves in a pen. Calves may also be removed from the main calf sheds earlier than preferred due to limited spacing.
- Cows in New Zealand calve outside in often variable spring weather, which means that calves can be born into a wet, cold, muddy environment and initial colostrum intake can be depressed by these environmental factors.
- Cows in New Zealand are often wintered on crops that may not be well balanced in terms of energy, protein, trace elements and minerals, which can impact on nutrition to the foetus in late pregnancy, colostrum quality post-calving, and ease and speed of calving.
- The New Zealand herd has a significant portion of Jersey genetics, which produce lighter calves with poorer cold tolerance than black and white calves.



Calf selection

Selection of calves for rearing is important as it determines how successful the calf operation will be. It is best to avoid calves that are hindered from the start, as these calves will tend to be the poor-doers and will lag behind their age group.

Top tips for calf selection

- Buy from a reputable farmer if purchasing calves in and try and buy from as few sources as possible.
 - Ensure calves have been fed sufficient colostrum of the right quality soon after birth. If you are unsure if calves have received adequate colostrum, there are tests available to check the levels of immunoglobulins in the blood — contact your local veterinarian for more details. If you have excessive calf health issues every year, it may be a good idea to look into this — particularly if you are purchasing the calves at 4 days old and have no control over the colostrum intake in those important first few days of life.
 - Check that no navels are infected — check for swollen navels.
 - Ensure calves are strong and bright — ears should be alert and not droopy, eyes should not be sunken (this indicates dehydration).
 - Ensure calves are not lame or sick.
 - Try and stay away from rearing calves from twins or an induced birth.
 - For heifer rearers, early born calves may not be the best animals genetically as later calving cows tend to be the higher producing animals. Rather than rearing the first born calves, it may be more beneficial to select calves throughout the calving period.
 - If buying calves in, ideally buy calves from farmers who take active steps to minimise disease threats such as rotavirus.
-

Following these guidelines will mean that sick and unhealthy calves are avoided from the start. These calves would only cost money and reduce the overall profitability of calf rearing.

Calf transportation

Care should be taken when transporting calves. The less stress calves experience during transport, the healthier they will be on arrival. Bruising of the navel during transport can encourage navel infections, which can develop into joint ill. Take care of calves and handle gently to avoid this.

Top tips for transporting calves

- There should be sufficient room for all calves to lie down.
 - Ensure there is a protective cover on the floor, such as hay, sawdust or a soft mat. This will ensure animals are kept warm and will also reduce injury.
-

- Protect calves from a wind chill and keep them as warm as possible.
 - Avoid overfeeding prior to transporting.
 - Spray navel cord with iodine before and after transport.
 - Educate carriers about low stress handling techniques.
 - Feed electrolytes for the first 12 hours after delivery if they have travelled a long distance.
 - Any calf trailers used must be cleaned regularly and kept dry.
 - Drive carefully.
-



Calf housing

To get the most out of calves, it is essential they are provided with good housing. Poor comfort increases energy demand and stress, which results in reduced performance and immune response.

Young calves are born with very little fat reserves to use to keep warm, so they are susceptible to the effects of wind and rain. Calves should ideally be sheltered inside for at least 3–4 weeks after birth as cold, wet calves will put their energy into staying warm rather than growing. Calves can be moved outdoors at 3–4 weeks old but should still always have access to covered shelter.

Keeping calves warm and dry will prevent them from shivering — which increases energy demand and depresses growth rate. Friesian calves start to shiver at 3°C when dry and 13°C when wet. For jersey calves, this can be around 8°C if dry and 18°C if wet. When calves are out at grass, calf covers can be a good option to keep out the wind and rain and this can be particularly beneficial in exposed surroundings.

Guidelines for calf housing

- A barn with separate pens is necessary. The rule of thumb is 10–12 calves per pen, with an extra pen specifically for sick animals.
- Allow adequate space for calves — at least 1.5–2m² per calf.
- Keep calves in groups according to size, this will minimise bullying and stress, meaning calves will be healthier and will grow faster.
- Dry, draught free pens with good daylight exposure are best. If you can feel a draught on the back of your hand at calf level, it's too draughty.
- Pens should be constructed with three solid walls using sheet metal or untreated plywood, with one end open to allow good ventilation and the removal of gases and ammonia from urine. This open end should ideally face leeward and north for sunshine.
- Pens should be twice as long as it is wide to allow calves to move to the back to get out of wind and rain.
- Ideally the floor should be coarse gravel, sand or small stones and have adequate drainage.
- Bedding should be straw, untreated bark or sawdust and should be 300mm deep or more. The bedding must be kept clean and dry.

- The barn, pens and bedding should be sterilised with a calf-safe virucidal spray (such as Virkon®S) before calves arrive, to kill any viruses. This should then be re-done every 2 weeks thereafter. See page 20 for more details on Virkon®S and how best to use it.
- Keep birds from roosting in the barn, as their droppings can cause disease (such as salmonella).

Top tips for managing the housing environment

- Monitor pens regularly to maintain consistency and upkeep hygiene.
- Minimise the effects of changes in ambient temperature and humidity through well ventilated housing.
- Assess bedding daily and provide additional as required. The “knee test” provides an easy assessment of bedding. Soiled knees = insufficient bedding, risk of bacterial challenge. Wet knees = insufficient bedding, taking heat from the calf.
- Check with a naked flame that calves are not in a draught at ground level but have good air flow well above calf height to prevent ammonia accumulating.



Calf husbandry

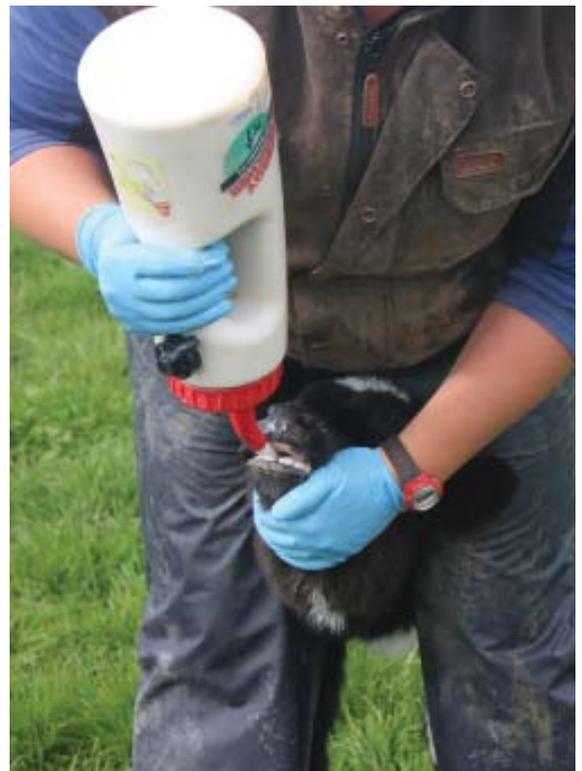
Attention to detail goes a long way when it comes to calf rearing and taking the time to assess calf behaviour and health each day can be very beneficial in terms of calf survivability and productivity.

Calves should have a daily routine, with the same person feeding them every day if possible and at the same time each day. The calf rearer should be quiet and relaxed as this will reduce stress for calves and they will be more likely to drink their share of milk. The rearer should have plenty of time to do their job and complete their daily checks, as it is important that no part of the rearing programme (feeding, cleaning or animal health) is overlooked and that any problems are not unnoticed or put off.

- Calves should have their navels sprayed with iodine and checked regularly. If at 3 days of age the cord is bigger than a little finger, then it will require veterinary attention.
- Bring milk to the calves where practical, not the other way around. This will ensure calves are as relaxed as possible at feeding time.
- Make clean water available at all times.
- Don't let your senses idle when dealing with calves as many potential issues can be picked up by paying close attention to animal behaviour.
- Keep records to help identify problems. You may be able to trace problems back to events, or it may help you in future seasons.

Top tips for caring for calves

- In the first 10 hours of life the calf should have at least 4 litres of colostrum (see colostrum section for more detailed information).
- If possible, pick up calves as soon as they are born. Getting them into the calf shed fast will ensure they are not cold for an extended period of time and will ensure they get the colostrum they require quickly.
- Don't be afraid to stomach tube calves as required if they don't willingly drink their required volume of colostrum or milk. Missing feeds can indicate sickness, so keep your eye on these calves and tube them again next feed if required.



Colostrum

Colostrum is the first milk secreted by the mammary gland for the first 24 hours after birth. It is high in protein, energy, vitamins, minerals and growth factors.

It is crucial that calves receive colostrum after birth as they are born without an active immune system, meaning they are highly vulnerable to infections. Calves that do not receive adequate immunity in the crucial period in early life will be on the back foot from day one and may be more likely to get sick and have poor growth.

Colostrum is important for new born calves as it contains high levels of **immunoglobulins (IgG)**, otherwise known as antibodies. These are large protein molecules that are absorbed by the immature gut and provide passive immunity to help calves fight off infections for the first month of life and partially up to 6 months of age, while the immune system of the calf develops.

Quickly

Timing is extremely important for IgG absorption by the gut and it is crucial to get sufficient levels of colostrum into calves quickly in the first day of life, as after this the gut begins to lose the ability to absorb the IgG. After 24 hours, only a small percentage of the antibodies will reach the calf's blood stream due to this declining ability of the gut to absorb them. It is best to feed colostrum within the first hour of birth and feed the total quantity of colostrum they require within 6–8 hours of birth to ensure highest

absorption of IgG. It is important to remove calves from cows as soon as possible after birth to ensure colostrum is received quickly — do not rely on calves getting colostrum from their mothers following calving, always assume they have not received any.

Quantity

The quantity of colostrum consumed by calves is crucial. Calves must consume enough colostrum in order to absorb enough IgG. However, quantity is closely linked to colostrum quality and more of a lower quality colostrum needs to be fed in order to satisfy IgG requirements. Typically, the total volume of colostrum required is 10% of birth weight. Larger breeds, such as Friesians, should be fed around 6 litres and smaller breeds, such as Jerseys, should be fed about 4 litres on day one of life.

Recommended levels of colostrum are dependent on IgG levels and it is recommended that calves receive a minimum of 200 grams of IgG per calf within 6–8 hours of birth. Stomach tube calves if required in order to reach required volume.

Quality

Quality is another extremely important factor when it comes to colostrum. High quality colostrum will have a higher concentration of IgG and therefore calves will absorb more immunoglobulins when consumed, which will help to build up passive immunity. With very poor quality

Colostrum

colostrum that has low IgG levels, calves can often not drink enough colostrum to satisfy their IgG requirements. Ideally, colostrum should have an IgG level higher than 50g/L and have low bacterial count. Colostrum is best fed at body temperature (39°C) to ensure optimum IgG absorption.

The three Qs of colostrum

Quickly — within 6-8 hours of life

Quantity — 4-6 litres depending on size of calf

Quality — IgG level >50g/L

Checking colostrum quality

Checking colostrum quality cannot be accurately done by simply looking at the colostrum, as colour is not always linked to immunoglobulin level.

Colostrometers are a good tool for testing colostrum quality, as they measure IgG concentration as correlated to the specific gravity of the colostrum. The colostrometer is placed into a full measuring cylinder of colostrum and

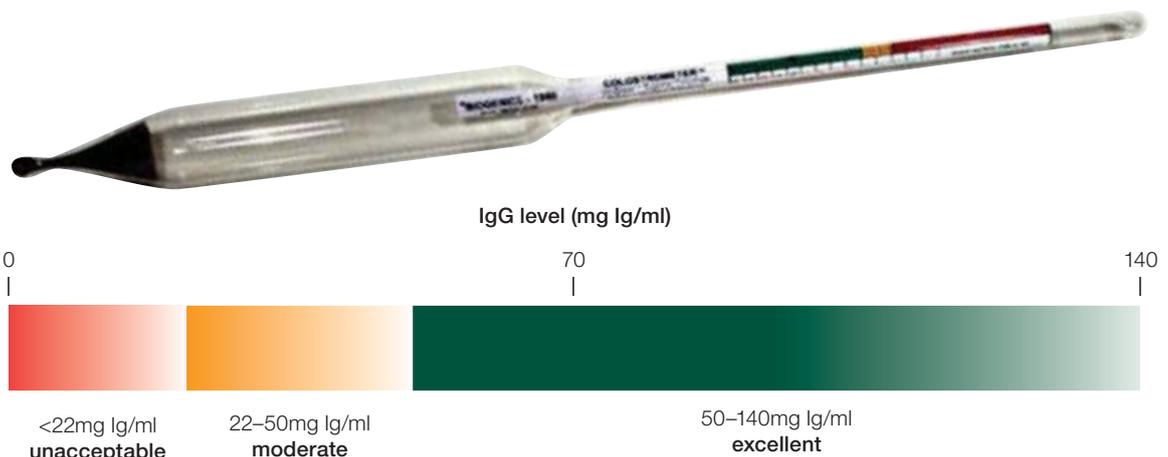
the level the colostrum comes up to on the colostrometer's colour coded scale is indicative of the colostrum quality. Colostrum tested must be at room temperature (22°C). If higher or lower temperature colostrum is used, results can be adjusted using the following temperature correction:

$$\text{Corrected IgG (mg/ml)} = (\text{IgG} - 13.2) + (0.8 \times \text{temp } ^\circ\text{C})$$

Using this scale you can determine if the colostrum is high enough quality to feed to newly born calves. Colostrum that measures in the red zone is not high enough quality, colostrum that measures in the orange zone is average quality and it is best not to feed this colostrum to young calves.

Note: colostrum that tests in the red and orange zone may not be high enough quality to feed to newly born calves in the first few days of life but it is still good to feed to older calves who have lost the ability to absorb immunoglobulins.

For more information on sourcing and using a colostrometer, contact your local NRM Nutrition Specialist.



Disease management

The young calf has a very delicate balance between health and disease as their immune system is underdeveloped, relying on passive immunity from colostrum in the first few months.

Disease can come at huge cost and burden to the calf rearer in terms of loss of growth or animal deaths, loss of future production and also in terms of treatment and prevention measures. Attention to detail is very important when trying to prevent disease and prevention is generally more economical than the cure in most cases. Preventing the introduction and spread of disease is essential in calf management, along with regular monitoring of calf health.

Prevention is better than the cure in terms of both economics and staff morale.

Top tips for preventing disease

- Ensure calves have adequate colostrum intake in the first few months of life (see colostrum section).
- Feeding a cow pre-calving can have an impact on her calf while in the womb and a cow that is well fed pre-calving, is more likely to have a trouble-free birth and produce a calf that is healthier, more lively and set up to do well.
- Ensure calves are fed high quality, clean milk or milk replacer.
- Ensure calves always have access to clean water.
- Ensure calves have all necessary vaccinations.
- Ensure calves have access to a high quality, palatable hard feed, with a coccidiostat included (to prevent coccidiosis).
- Decrease stress inducing factors such as transportation, sudden feed changes, poor ventilation, crowding, temperature fluctuations and draughts. These factors can impact disease resistance.
- Minimise risk of exposure to bacteria, viruses and parasites into the calves environment by using a broad spectrum disinfectant such as Vikron®S. This should be used regularly to clean and sterilise pens, railing, water troughs, feeders and all other equipment and surfaces used. Vikron®S is safe for both people and livestock and can be used to “fog” sheds through the season.
- Control the flow of people in and out of the calf barn, only allow access to essential people. Make foot baths available to those coming into calf pens and/or spray down boots, clothing and equipment with Vikron®S before and after contact with calves. Have dedicated equipment for the calf barn and ensure it is kept clean.
- Always wash hands with soap and warm water before and after handling calves, feed and feeding equipment.
- Keep sick calves in a separate pen away from others.
- Situate the calf barn away from cows and dairy effluents. Cows can be carriers of disease.

Disease management

Put together a management plan and keep careful watch on all calves, intervening early if calves are not doing well or showing signs of illness. Early observation of disease reduces the impact it will have on the animal and will reduce the chance of spread to other calves. Twice daily observations by the same person (for consistency) is the gold standard.

Signs that could indicate a sick calf

- Droopy ears
 - Poor suckle response
 - Calves that are cold to the touch
 - Standing apart from the group
 - Abnormal rectal temperature
 - Grunting, whistling or coughing
 - Abnormal dung (see scours section)
 - Lethargy/weakness
 - Sunken eyes
 - Reluctance to stand
 - Dull coat
 - Reduced appetite
 - Poor growth
 - Nasal discharge
 - Look out for: Pasty, soft, clay-like dung, yellow or white in colour (however, don't rely on dung appearance alone to identify what the issue may be – always use calf temperature).
-

Scours

Scouring (diarrhoea) is the most common health issue seen in calves. There are two types of scours seen in calves – nutritional and infectious.

Nutritional scours

Occurs when un-curdled whole milk “spills” over from abomasum into the small intestine of a calf due to stress, overfeeding or poor quality milk or milk replacer. This causes a scour as the un-curdled milk may flow too quickly through the digestive tract, disrupting the fluid exchange between the blood and intestine. This type of scour is not contagious.

Prevention:

- Calves should not be overfed, diet changes should be made slowly and good quality milk or milk replacers should be used.
- Calves should be fed at the same time each day, by the same person if possible.
- Calves should be fed using teats that induce natural suckling behaviour to stimulate closure of the oesophageal groove and direct milk into the right stomach compartment.

Infectious scours

Can be caused by bacteria (E.coli and salmonella), protozoa (coccidiosis and cryptosporidia) and viruses (coronavirus and rotavirus). Infectious scours are

contagious, with transmission from calf to calf via faeces, urine, saliva and secretions from the eye, mouth and nose. It's best to consult your veterinarian when confronted with infectious scouring to ensure targeted effective treatment. Medication such as antibiotics may be necessary.

Prevention:

- Ensure good colostrum management so calves have good immunity.
- Maintain strict hygiene procedures — cleaning equipment and pens regularly with an effective disinfectant.
- Keep calves warm and in a draught-free environment.

Look out for:

- Loose, watery, bright yellow or green dung with a strong odour. Can be mucousy (however, don't rely on dung appearance alone to identify what the issue may be – always use calf temperature).
- Increased frequency of dung.
- Blood in the dung (indicative of coccidiosis).

Is it a nutritional or infectious scour?

Take the rectal temperature of the animal. If they have a high temperature (>39.4°C) it is likely to be an infectious scour.

Treatment: Initial treatment for both types of calves is similar. Calves should be fed electrolytes, which will provide them with energy and water and replace body salts that have been lost through scouring. Electrolytes alone may not provide

scouring calves with adequate energy, so it is recommended that milk is still fed as well as electrolytes. Keep feeding milk (two 2L feeds per day) and feed up to 6L of electrolytes per day in two feeds (2L feed during the day and ad-lib at night). Contact your veterinarian if chronic scouring persists.

Calves die from dehydration and a lack of energy when faced with scours – not the scours themselves. A calf can lose 5-10% of their body water from 1 day of scouring. Look out for signs of dehydration by viewing the calf's eyes, gums and skin.

Calf symptoms	% dehydration
Diarrhoea	5%
Eyes slightly sunken, skin losing elasticity, calf staggers but still sucking	7%
Eyes sunken, skin slow to flatten if pinched, gums sticky, calf depressed	9%
Eyes very sunken, skin won't flatten out if pinched, calf cannot stand	12%

At a water loss of more than 14%, a calf will die.

Coccidiosis

Coccidiosis is caused by protozoa that destroy the finger-like villi in the small intestine that absorb nutrients. The worst cases of coccidiosis will have bloody scours but most calves won't have any visible signs and will just have lower

Disease management

growth rates. Ensure calf feeds contain a coccidiostat to aid in the prevention of coccidiosis. In high-risk situations it is a good idea to include a liquid form of coccidiostat in the milk, to aid in the prevention of coccidiosis until calves start consuming enough hard calf feed.

All NRM feeds contain a coccidiostat (with the exception of Power Whey, which does not).

Note: Some coccidiostats can be very harmful to horses and dogs, so make sure they cannot get access to medicated milk/meal. Bobby calves should not be fed a coccidiostat.

Worms and parasites

Calves should be on fresh, leafy pasture ahead of the herd and shifted frequently to minimise worms when they are grazing. Drenching for worms should commence 14 days after weaning and continue every 3 weeks, depending on the conditions. Lice should be monitored and treated as required. Lice can be prevalent in calves that wear covers, so need to be checked accordingly.

Navel infections

Infections of the navel cord can occur within the first 24 hours of birth due to overcrowding and bruising. Infection spreads from the navel cord to the liver and then to the joints of the leg. “Joint ill” symptoms include a hot navel cord and swollen painful joints that make it difficult for the calf to walk. Seek veterinary advice

for treatment. Navel infections can be prevented by giving calves plenty of room and soft bedding during transport and spraying the navel cord with iodine.

Calf pneumonia

Poor ventilation and a build-up of ammonia gas can cause pneumonia. The best way to prevent pneumonia is good ventilation. Watch out for dry coughing, rapid, difficult or irregular breathing, runny noses, discharge from the eyes, high temperature and scouring. If symptoms are picked up, seek veterinary advice.

Bloat

Abomasal bloat (right side distension):

Symptoms often appear within 1 hour of feeding, with death resulting from heart failure or asphyxiation 6–48 hours later. Often due to overfeeding or abrupt diet changes. This slows down gut movement, which encourages the growth of clostridia then excess gas builds up and is unable to escape. Abomasal bloat most often occurs in calves 5–10 days old. This type of bloat cannot be relieved by stomach tubing to release the gas.

Ruminal bloat (left side distention):

Caused by delivery of milk into the rumen due to the oesophageal groove not closing, or overfeeding of milk. Normal rumen contractions decrease and belching to remove excess gas becomes impossible. This type of bloat can be relieved by releasing trapped gases via a stomach tube.

Blackleg and leptospirosis

Calves may need to be vaccinated against blackleg and leptospirosis depending on local conditions. Contact your veterinarian.

Troubleshooting for common problems

This table covers common problems that arise in New Zealand calf sheds.

Animal signs	Possible cause	What to do
Blood in the faeces after 21 days of life.	Coccidiosis.	Confirm it is coccidiosis by doing a faeces test. Treat with a coccidiocide. Ensure hard feed and/or milk has a coccidiostat in it for prevention.
Lame and/or inflamed joints.	Navel infection or joint ill.	Seek veterinary advice. Careful handling when transporting and iodine can help to prevent this.
Coughing or noisy breathing.	Respiratory infection or pneumonia.	Increase ventilation in the shed. Seek veterinary advice if symptoms persist.
Shivering.	A draughty shed or inadequate shelter from cold and wet conditions.	Improve the shed facilities. Use calf covers. Ensure you are feeding warm milk.
Bloated on either side of the flank.	Abomasal bloat or ruminal bloat caused by overfeeding of milk.	See earlier section on bloat.
Sunken eyes, dry gums.	Dehydration.	Ensure all calves have access to clean water. Scours could be the issue causing dehydration – feed electrolytes.
Kicking belly.	Abdominal discomfort.	Could be a variety of gastrointestinal issues including colic, ulcers etc. Seek veterinary advice.
Swollen navel.	Navel infection.	Use iodine solution. If infection persists it could develop into joint thrift.
Excessive bellowing or unsatisfied calves.	Under-feeding.	Check your feeding rates and mixing rates of calf milk replacer.
Not eating hard calf meal.	Stale or vermin/pest contaminated feed. Feeding too much milk.	Replace feed regularly. Get rid of feed that calves have slobbered over. Reduce amount of milk.
Slow milk drinking.	Broken teats. Palatability of stored milk/colostrum.	Ensure teats are ok. Separate slow drinking calves and put together. Ensure stored milk is still palatable and not rancid.

Disease management

Prior to the arrival of each batch of calves the calf sheds should be thoroughly cleaned and disinfected with a broad spectrum disinfectant. Pens should be frequently disinfected while in use also to prevent build up of disease organisms.

Virkon®S

Protect calves against disease

Virkon®S is the premium broad spectrum, on-farm, biosecurity solution. A highly convenient, fast-acting, one-stop disinfection package for surfaces, equipment, vehicles, aerial disinfection and water delivery systems. Virkon®S is proven to kill disease agents on-farm, even hardy pathogens such as rotovirus and salmonella in calf shed environments and is fully effective against all 18 families of viruses known to man – in addition to bacteria and fungi.

Calf disease	Disease Type	Virkon®S effective
Rotovirus	virus	✓
Coronavirus	virus	✓
Salmonella	bacteria	✓
E.coli B	bacteria	✓

Virkon®S is so effective and rapid acting that it is the disinfectant of choice for controlling exotic disease outbreaks internationally.

Unlike most disinfectants, Virkon®S does not use glutaraldehyde, which is chemically related to formaldehyde and shares the same dangers. Virkon®S can be misted in the presence of animals. Virkon®S is formulated to degrade naturally within the environment.

Usage information

Treat calf pens and equipment with Virkon®S at the beginning of the season before the calves arrive and continue treating calf pens and equipment regularly throughout the calf rearing season. Treat pens weekly/bi-weekly (depending on disease challenges).

Calf sheds and pens

Dilution rate 1:100. Remove all moveable equipment and organic matter (mud, refuse etc.) and using either a pressure washer, knapsack sprayer or watering can, disinfect all surfaces with Virkon®S solution. Allow surfaces to dry before replenishing bedding and replacing equipment. Use the same dilution across all temperature ranges for airborne and surface contamination. Effective in cold temperature and through organic challenge.

Fogging/Misting

Dilution rate 1:200. Spray upwards with a fine nozzle and low pressure in the pens whilst calves are present to help reduce airborne pathogens. Safe to use in the presence of livestock.



Feeding systems

There are several different early feeding systems used successfully by farmers, twice-a-day versus once-a-day, ad-lib versus restricted. When the performance of different feeds across early feeding systems is studied there is one common conclusion — a quality feed will out-perform an inferior feed in any system.

Calf rearers should feel free to select the feeding system that fits in with the other things happening on their farm. Undeniably, when it comes to the choice of feed to use in your system, invest in quality.

System comparison

Twice-a-day feeding system

Higher milk usage: 22kg of calf milk replacer

Lower dry feed usage: 72kg of meal, withdraw dry feed at 84 days

Higher labour costs: Two milk feedings per day

Lower capital cost: Housed for 2 weeks

Lower animal health risk: More natural, lower stress to calf

Lower management: Outside rearing, less intensive farming

Once-a-day feeding system

Lower milk usage: 18kg of calf milk replacer

Higher dry feed usage: 76kg of meal, withdraw dry feed at 70 days

Lower labour costs: One milk feeding per day

Higher capital cost: Housed for 5–7 weeks

Higher animal health risk: Milk deprivation, increased stress to calf

Intensive management: Indoor rearing, intensive farming, increased biosecurity risk, increased need to monitor and manage individuals



Milk feeding

Top tips for milk feeding

- Ensure calves have received adequate colostrum in the first 3 days of life (see colostrum section).
- Whether you use whole milk or milk prepared from calf milk replacer, calves will grow better when fed milk at a temperature of around 40°C. Calves don't thrive as well when fed cold milk, as cold milk requires more energy to digest compared to warm milk.
- Milk should be fed warm but not too hot. At temperatures above 70°C, proteins in the milk may become denatured and vitamins destroyed. Hot milk can also cause calf discomfort.
- Ensure smaller calves get their fair share, watch out for bullying and ideally group slow drinkers together.
- Handle calves quietly and have a consistent routine, so that calves are more relaxed at feeding time.
- Avoid overfeeding as this can cause nutritional scours (see scours section).
- Ensure you have a stable supply of milk or calf milk replacer, so that the diet is consistent. Any changes must be gradual to avoid digestive upset. The gold standard for changing between calf milk supply (e.g. between different milk replacers or from fresh milk to calf milk replacer or vice versa) is to mix the old and the new milk at 50:50 for 3 days before moving fully onto the new feed.

- Take care when preparing liquid milk, ensure milk is mixed to the correct concentration and is mixing evenly. Milk that is too high in concentration may induce nutritional scours and milk that is too weak in concentration may be mistaken as water by the calf and therefore directed to the rumen rather than the abomasum, causing scouring and bloat (see calf milk replacer preparation section).

- Ensure all equipment used for feeding is cleaned regularly.

Milk options

Calf milk replacer: It is essential that milk powder provided to calves is good quality. Milk powders should contain ingredients that have been selected for digestibility, solubility and stability for easy mixing in warm water and optimum digestion by the calf. Most importantly, the milk replacer must be palatable and meet all of the nutritional requirements for a calf.

Calf milk replacers can have benefits over using whole milk from the vat, as they include a range of additives lacking in whole milk, such as a coccidiostat (not in all calf milk replacers), plus vitamins and minerals, which can be present in whole milk at lower concentrations than are recommended for growing calves. They can also be more economical than taking milk from the vat and more consistent in relation to fat and protein content.

For more information on different milk replacer options, see pages 25-27.

Whole milk: Whole milk from the vat, waste milk or milk from cows still within the restricted “colostrum period” (sometimes called transition milk), can be fed to calves. This milk can be convenient as it is already in liquid form, however it can be more expensive to feed if it is milk that could have been sold, depending on the pay-out relative to the milk replacer price.

When whole milk is fed from the vat, often it is fed with less constraint compared to feeding a calf milk replacer that is mixed up more precisely for the number of calves being reared. Whilst calves may look well when fed on high levels of whole milk, they may struggle when weaned on to grass if they have been slow eating hard feed (see rumen development section pages 30-31).

Whole milk from modern dairy cows is not always ideal for calves — it typically contains more fat and less essential minerals, trace elements and vitamins than calf milk replacer. Calves fed a high fat diet are more likely to have a high fat body composition — they may reach weight targets but not be ideally set-up for a healthy and productive life.

Milk that is not fit for sale may contain antibiotics, which may affect the development of natural gut microflora. Internationally many dairy farmers pasteurise their own waste milk before feeding to calves, as they are worried about the possible transmission of diseases to the next generation of cows.



Fortifying cow's milk

Using calf milk replacer

Calf milk powders can be used to fortify whole cow's milk, which can be an effective way to increase the protein content of whole milk, reduce the fat content and add in vitamins and minerals that are often lacking in whole milk.

Whole milk is the equivalent to 125 grams of calf milk replacer powder per litre. This is important to keep in mind when adding calf milk replacer to whole milk, to ensure that you get the correct total amount of energy into calves.

Tip when using whey powder

When fortifying with a whey based calf milk replacer, do not add more than 250 grams of the whey powder to 4 litres of milk, as this can interfere with curdling in the abomasum.

How do I mix in the calf milk replacer powder?

There are three options when mixing calf milk replacer in with whole milk:

1. Mix calf milk replacer at the usual rate of 125g/L with water (or at the rate specified on the bag), then add to the cow's milk.
2. Mix the powder with a small amount of hot water before adding to the cow's milk.
3. Introduce the powder directly into the cow's milk and mix it well (watch out for blocked teats if doing it this way).

Options two and three can work well, as the resultant reduced volume of milk (due to the reduced amount of water added to the whole milk during the mixing process) will encourage the intake of hard feed and enhance rumen development.



NRM Calf Milk Replacer with Bovatec®

NRM Calf Milk Replacer is a whole milk replacer for young calves. An all milk powder blend providing excellent calf response to the natural food sources of milk fat, milk protein and sugar.

Directions for use

Mixing ratio: Typically 125g NRM Calf Milk Replacer made up to 1 litre with water when fed twice daily, 250g NRM Calf Milk Replacer made up to 1 litre with water when fed once daily.

Dissolve NRM Calf Milk Replacer powder in hot (not boiling) water. Mix to a creamy, smooth consistency and add cool water to make up the required amount. Feed at body temperature (38-40°C). Mix only when required.

Feed after a good intake of colostrum has been achieved (from 4 days after birth). Keep buckets, bottles and other equipment clean. Ensure calves have access to long fibre and quality calf feed.

Ingredients

Milk powder, vitamin A, D3, E, K3, B1, B2, B3, B5, B6, B12, ascorbic acid, potassium, Lasalocid (Bovatec), niacin, pantothenic acid, biotin, cobalt (organic), copper (organic), dextrose, ferrous iron, iodine, selenium (organic), magnesium, manganese (organic), zinc (organic), antioxidants, lecithin. Additional copper or selenium should only be given following consultation with a nutritionist or veterinarian.



MILK FAT



MILK PROTEIN



COCCIDIOSTAT

Typical analysis

Crude Protein	25%
Crude Fat	20%
Lactose	44%
Ash	6%

(Approximate on an as fed basis)

NRM Calf Milk Finisher with Bovatec®

NRM Calf Milk Finisher is a complete milk replacer for young calves. An economical calf milk replacer, formulated as a full replacement of natural cow's milk, which can be fed to calves after the initial colostrum period.

Directions for use

Mixing ratio: Typically 150g NRM Calf Milk Finisher made up to 1 litre with water when fed twice daily, 300g NRM Calf Milk Finisher made up to 1 litre of water when fed once per day.

Dissolve NRM Calf Milk Finisher powder in hot (not boiling) water. Mix to a creamy, smooth consistency and add cool water to make up the required amount. Feed at body temperature (38-40°C). Mix only when required.

Feed after a good intake of colostrum has been achieved (from 4 days after birth). Keep buckets, bottles and other equipment clean. Ensure calves have access to long fibre and quality calf feed.

Ingredients

Whole milk powder, whey powder, vegetable fats, soy protein, vitamins, minerals, Bovatec® 20CC, Bovatec Technical. Additional copper, Bovatec Technical or selenium should only be given following consultation with a nutritionist or veterinarian.



PROTEIN



MINERALS & VITAMINS



COCCIDIOSTAT

Typical analysis

Crude Protein	24%
Crude Fat	20%
Lactose	38%

(Approximate on a as fed basis)

NRM Power Whey

NRM Power Whey is specifically designed for New Zealand conditions. NRM Power Whey is a milk replacer for calves from 4 days old. Suitable for all feeding systems.

Feeding recommendation

As a guide, a calf should receive at least 10% of its body weight daily. For example a 40kg calf requires 4 litres 4 x 125g/L of calf milk replacer per day. For fortified once-a-day feeding systems, NRM Power Whey may be fed in a reduced volume of water (refer to feeding rates table). For best results feed NRM Moozlee ad-lib from day 5.

In periods when calves are stressed (e.g. disease recovery, environmental) NRM recommends a higher rate of NRM Power Whey addition (150g/L in a twice-a-day or 700g/2.5L in a once-a-day feeding system).

Jersey calves are best fed on a twice-a-day regime of 125-150g/L until weaning. Always allow free access to fresh, clean water.

Ingredients

Premium milk whey, hydrolysed wheat gluten, soya protein concentrate, nutritional pre-mix (containing vitamins, minerals, prebiotic, probiotic and organic acids), quality vegetable oils, flavouring, nutritional emulsifier and flavouring and free flow agents.



Typical analysis

Crude Protein	23%
Crude Fat	20%
Crude Fibre	<0.2%
Lactose	38%
Moisture	4%

(Approximate on a as fed basis)

Preparing milk powder

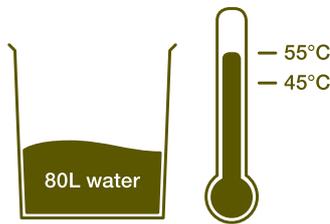
Mixing

Work out how much calf milk replacer (CMR) powder you require to make up the litres of rehydrated CMR you need. For example, with a CMR that recommends a feeding rate of 125g/L, in order to make up 160L of rehydrated CMR you would need 20kg of CMR powder.

Amount of CMR powder required per feed (kg) = Number of calves x total litres of CMR per calf per feed x the recommended feeding rate of the CMR (g/L)/1000

The concentration of the rehydrated CMR is important, so make sure you read recommended feeding rates of products and calculate the amount you require per feed carefully. Add the required amount of powder to half the required volume of hot water (45°C - 55°C) and mix vigorously using a whisk or a paint mixer until smooth (about 1 minute). Top up to the required volume of water using cool water so that the CMR is fed at 38°C - 40°C. Check the temperature before feeding.

An example of mixing up 160L of a 125g/L calf milk replacer



Water

Water temperature to dissolve CMR should be between 45°C - 55°C



Add 20kg CMR powder

Concentration (dosage CMR powder)

Too much CMR powder:
too many nutrients = feeding diarrhoea (nutritional scours)

Perfect concentration:

20kg CMR powder = 160L finished CMR

Too little CMR powder:
CMR in rumen instead of abomasum = bloat



Fill up to 160L

CMR

Calf drinking temperature should be between 45°C - 55°C

Too cold CMR:

CMR can enter the rumen instead of the abomasum and needs energy from the calf

Make sure you calibrate and check all measuring equipment regularly to retain accuracy. Also maintain strict hygiene practices and make sure any equipment used is cleaned between feeds.

How much should I be using?

A quick guide to how much milk replacer you should be going through in different calf rearing systems.

Number of calves	Fortifying whole milk			Traditional (4L/calf/day)			Accelerated (high growth rate)		
	1	10	100	1	10	100	1	10	100
g powder/calf/day	250	250	250	500	500	500	750	750	750
kg powder/day	0.25	2.5	25	0.5	5	50	0.75	7.5	75
kg powder/week	1.75	17.5	175	3.5	35	350	5.25	52.5	525
kg powder/4 weeks	7	70	700	14	140	1400	21	210	2100
kg powder/8 weeks	14	140	1400	28	280	2800	42	420	4200
Bags required/8 weeks	0.7	7	70	1.4	14	140	2.1	21	210



Nutrition and rumen development

The main goal of the calf rearing process is to develop the rumen of the calf, so that when it is weaned it can get nutrients from eating high fibre feeds such as grass.

When a calf is born it is classed as a pre-ruminant, the rumen is small (30% of the digestive tract) with the main stomach compartment being the abomasum. By weaning time, the rumen needs to develop from 30% to 70% of the digestive tract and be fully geared up for digesting grass.

In the mature cow, a large percentage of carbohydrates and proteins in pasture and supplements are digested by microbes in the rumen to produce volatile fatty acids (energy) and protein for use in maintenance, milk production or pregnancy. Calves are born with an undeveloped rumen and large abomasum. The large abomasum is important for digesting and obtaining nutrients from the highly concentrated milk or milk replacer. It is essential that within 3 to 4 months, the rumen develops to being the main stomach where digestion takes place.

Feeding a high starch calf feed from day 1 of life helps to get the rumen working, which in turn stimulates its growth and development. The rumen is a muscular organ and it will not start to grow in a calf until it is being used

Profitable and successful calf rearing relies on weaning the calf at the youngest possible age without hampering growth rates. This means the calf must be provided with the proper ingredients for rumen development, so it can utilise grass at weaning.

The following are needed for rapid rumen development:

- **A high quality calf feed that contains high levels of starch:** Dry calf feed does not stimulate the closure of the oesophageal groove, so the feed is deposited in the rumen where it stimulates development. Starch promotes the growth of the population of microbes in the rumen and in particular those that produce volatile fatty acids or energy. In turn these volatile fatty acids stimulate the development of rumen papillae, which are finger-like projections that absorb them. The longer and denser the rumen papillae, the more energy the calf will get from grass and pellets at weaning.
- **Hay or straw for effective fibre:** Hay/straw promotes the development of the muscles that surround the rumen, as well as rumen size. This is important for encouraging rumen motility, feed movement around the rumen for digestion and removal of feed from the rumen. A small amount of effective fibre is required for rumen development and rumination stimulation, however a large amount of hay/straw can result in depressed hard feed intake and a large rumen size but with little papillae development. For this reason make sure hay/straw is available to animals but don't offer too much.
- **Clean water:** The microbes in the rumen require water to survive. Milk or milk replacer is not free water as it bypasses the rumen via the oesophageal groove. Water helps with the absorption of volatile fatty acids and

stimulates the intake of calf feed. The water should be clean and fresh to reduce the risk of pathogens and disease.

Weaning off milk

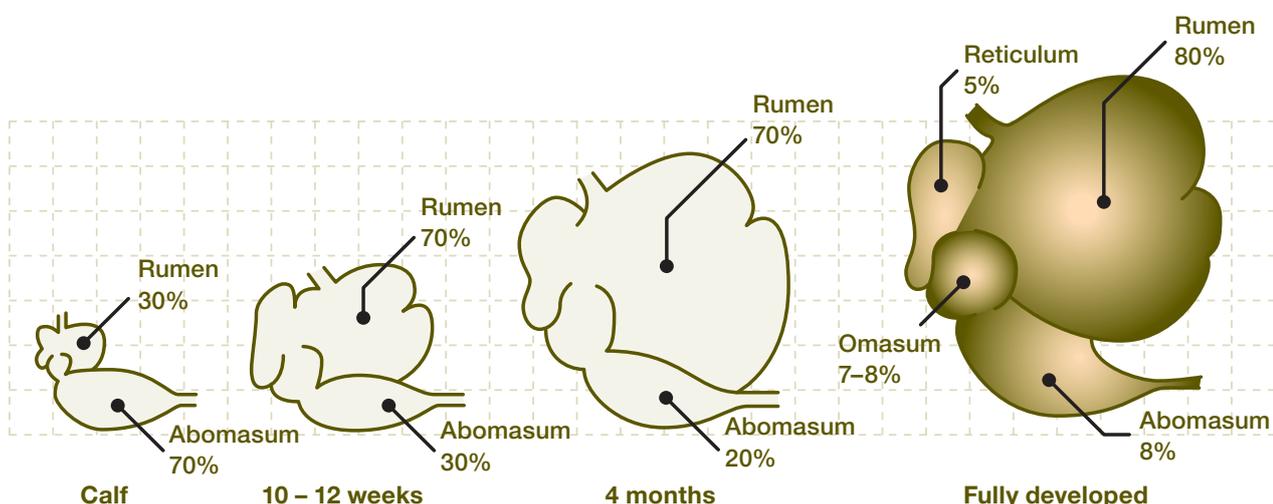
Use at least two parameters together when making weaning decisions for improved success and less of a post-weaning growth check. Wean calves from milk only when they are eating a minimum of 1 - 1.5kg of high quality pellets per day for a minimum of 3 consecutive days. Wean by weight rather than age.

Using scales or wither measuring sticks can be useful to ensure calves are ready for weaning. Be prepared to hold calves back if they are not meeting weaning weight targets. Although leafy young grass appears to contain sufficient crude protein, it lacks the by-pass protein required by calves lacking a fully functioning rumen. Also, fresh

grass is low in dry matter, which can limit dry matter intake due to the size of the developing rumen. Managing calf paddocks can be difficult. Avoid grazing very young leafy grass, which may contain excessive degradable protein for the newly functioning rumen to cope with. Offer straw at grass and continue feeding pellets to ensure a smooth transition to pasture and maintain target growth rates. Continuing to feed pellets at grass is particularly important for later born calves that need more feeding to catch up with early born calves but in reality get less because they are sent away to graze alone when younger.

Continue to feed calf pellets at grass until calves are 100 - 120kg, this helps to maintain growth rates and protects calves against coccidiosis, which can often appear post-weaning. Feeding pellets beyond the 120kg stage can also be beneficial particularly if environmental conditions and/or pasture quality is poor.

Rumen development stages



Monitoring growth around weaning

If a calf's rumen has been well developed and they have had adequate hard feed intake, a post-weaning check will be less pronounced as the calf will have an increased ability to digest grass.

The post-weaning growth check found in many calves is due to three factors:

- Low intakes of dry feed up until weaning will result in limited rumen development. This will result in a significant growth check while the rumen becomes accustomed to digesting significant quantities of dry feeds.
 - High intakes of bulky roughage such as hay pre-weaning. Calves are physically unable to eat enough roughage to sustain rapid growth weights with a small developing rumen.
 - Calves stress when feeds are changed. Continuing to feed familiar hard feed post-weaning will minimise problems.
- Continue to feed hard feed in the paddock, this will help to support the calf as they go through the weaning process and will ensure they still consume adequate energy and protein. Some calf rearers choose to continue to offer hard feed past the weaning period, the extra energy and added bypass protein helps to support calf growth.
 - Do not wean calves during periods of additional stress, e.g. bacterial infection, dehorning, exceptionally hot or cold weather.
 - Wean via a graduated method where calves are gradually offered lower amounts of milk, this is the preferred method. Abrupt weaning can be a challenge for calves.
 - Keep an eye on calves, continue to monitor weight and offer more hard feed if periods of poor pasture quality or pasture deficit arise, to ensure they continue to reach growth targets.

Top tips for minimising the post-weaning growth check

- Ensure calves are eating a minimum of 1 - 1.5kg (depending on the calf breed) of hard feed for at least 3 consecutive days before they are weaned. This will ensure their rumen is developed enough to handle the change to fermenting larger quantities of grass.
-

Continuing growth post-weaning to mating

Calves that have been grown well up to weaning can slip behind growth targets during their first summer, autumn and winter if pasture supply is limited or pasture quality declines. Falling behind on growth targets can have an impact on the fertility of a calf when it comes to their first mating, as one of the main triggers of puberty is body weight rather than the age of an animal.

If a calf does manage to get pregnant but is still struggling to reach growth targets, this can have a significant impact on the production in their first lactation as they will still have growth to catch up on post-calving and milk production will be sacrificed in order for the animal to continue growing.

Well grown animals with good muscle and skeletal growth will also be able to compete with older animals in the herd, whereas smaller, under-grown heifers may be bullied and miss out on their fair share of feed.

Summer can be a period of pasture deficit, as dry periods or excessive heat can limit pasture growth and encourage reproductive growth and reduced feed quality. Autumn can be a period of higher pasture growth but the pasture can often be lacking in sugar due to decreased sunlight, which can slow

down rumen fermentation. Winter can be a tough time for calves, particularly if weather conditions are poor. In all of these situations calves may be struggling to meet growth targets, going through periods of below target growth rates or even weight loss followed by periods of catch-up growth if pasture quality allows. This is an inefficient way to grow a calf and it is better to grow them consistently and to support lean muscle and frame growth and avoid fat deposition.

One way to ensure you continue to meet growth targets regardless of pasture quality or quantity and weather events, is to offer calves hard feed post-weaning through to mating when necessary — particularly if you notice that the calves are not putting on the weight that they need to. Feeding a pelleted feed during periods of poor pasture growth or quality will ensure that calves still reach growth targets and are well set up for a productive life. If calves cannot be weighed, height can be correlated to liveweight and provide a useful indication of how calves are doing.



Hard feeds

In order to get good hard feed intakes it is important to offer fresh, palatable feed in a way that is easy for calves to access.

What to look for in a hard calf feed

It is important to provide calves with good quality calf feeds that are highly digestible, contain balanced levels of energy, protein, minerals and vitamins, promote rumen development and calf growth and that help to protect against coccidiosis.

Quality ingredients: It is important that hard calf feeds contain quality ingredients that are highly digestible to calves and have a good level of starch. Take care when comparing different brands of calf feed, that the products are of similar digestibility and have a good level of starch and contain the same level of nutrients. A calf feed may appear cheaper but because the digestibility is lower, the calves get less out of the feed and more is required to get the calf to weaning weight. This means the cheaper feed is less economic in the long run. Fat can be added to boost the low energy content of some by-products but too much fat is detrimental to rumen development and dry matter intake.

Coccidiostat: A coccidiostat in calf feed is essential to help protect calves against coccidiosis (see coccidiosis page 17).

Vitamins and minerals: Look for a calf feed that contains a wide range of vitamins, minerals and trace elements. Vitamins A, D and E as well as important B group vitamins, are important to include in a calf feed and they help to support calves on whole milk where levels of these vitamins have been shown to be low. Also ensure a calf feed contains trace minerals such as cobalt, copper, selenium, iodine, manganese, iron and zinc, which are all essential for calf growth and health.

Premium calf feeds may contain organic trace minerals, which combine an essential trace mineral with a fragment of protein. They are considered more available to the animal because they are less likely to react with other minerals but are also safer to the animal.

Good pellet quality: Calf feed usually comes in a pelleted form (excluding start mixes). Pelleting feed helps to increase utilisation and reduces wastage and dust. Dusty feeds can irritate the lungs of calves and cause pneumonia, which increases the cost of medications and reduces growth rates. Ensure pelleted feed is high quality with minimal dust.

Hard feed quality checklist

- | | |
|--|--|
| <input checked="" type="checkbox"/> Tastes good | <input checked="" type="checkbox"/> High quality ingredients |
| <input checked="" type="checkbox"/> Smells good | <input checked="" type="checkbox"/> Firm pellet/nut |
| <input checked="" type="checkbox"/> Balanced ingredients | <input checked="" type="checkbox"/> Coccidiostat |

Hard feeds

Top tips for feeding hard feed to calves

- Offer hard feed ad-lib from day dot. Calves may not eat much in the first few days but it will get them used to it and feed intakes will build with age.
 - Always make sure that fresh feed is put out for calves daily and that any older uneaten feed is removed. Feed that is left for too long can go mouldy and can attract vermin. Calves will not eat feed that is stale, mouldy or contaminated by vermin. This is even more important when calves are first getting onto hard feed. For this reason, in the pens of young calves, put a small amount in the trough daily to begin with and increase from there.
 - Clean troughs very thoroughly regularly, wet compacted feed provides a favourable environment for mould growth and can put calves off feed.
 - Avoid dusty feeds — calves don't like eating dusty feeds.
 - Introduce calves to hard feed by feeding some by hand each day after their milk feed in the first few weeks of life. This will get them used to the flavour and texture.
 - Ensure fresh water is always available to calves — a lack of water will inhibit dry feed intake and rumen development.
 - Ensure unopened bags of feed are stored away from direct sunlight and away from possible vermin contamination in order to keep it as fresh as possible. Take the shrink wrap off pallets of calf feed as soon as it arrives.
 - Ensure feed troughs are easily accessible to calves and there is adequate trough space for the number of calves in pens.
 - Ensure you are not overfeeding milk as this can fill up calves and decrease their hunger for hard feed. About 4 litres of milk a day is a good rule of thumb for calves.
-



NRM Moozlee®

NRM Moozlee® is suitable for calves reared for both beef and dairy heifer replacements. An extremely palatable and nutritious feed that contains a mix of fibre, quality grains and protein meals, molasses, vitamins, minerals and a coccidiostat. Specifically formulated to encourage hard feed intake to stimulate early rumen development, NRM Moozlee® gives calves the head start they need to reach their full potential.

Feeding recommendation

Wean off milk gradually at 65kg minimum weight, when consuming 1kg of NRM Moozlee® per day. NRM Moozlee® should be offered fresh each day. If fed in troughs, clean out frequently. Ensure fresh, clean water is always available. You may wish to switch to a lower protein feed such as NRM GrowUp® Finisher once the calves weigh more than 80-100kg.

Ingredients

Grain and grain by-products, oilseed meals and by-products, lucerne chaff, molasses, minerals (including limestone, mono-dicalcium phosphate, salt), vegetable oils, organic acids, vitamins and trace minerals, flavour, Bovatec® 20CC.

Typical analysis

Protein 18%

Moisture 14%

(Approximate on a dry matter basis)



PREMIUM FEED



BALANCED



PKE FREE

NRM GrowUp® 20%

NRM GrowUp® is a high protein (20%), balanced supplementary feed designed to bridge the energy/protein gap and meet the calf's rapidly growing nutritional needs from 4 days old. Contains Bovatec® to aid in the prevention of coccidiosis and NRM Moozlee® flavour to minimise intake checks when transitioning to pellets.

Feeding recommendation

Use with the NRM Moozlee® system to avoid growth checks or as the sole dry feed in any rearing system. Calves should be fed whole milk or calf milk replacer up to 5-6L per day until weaning. NRM GrowUp® should be introduced gradually at 4 weeks and fed for at least 3-4 weeks after weaning. NRM GrowUp® should be offered fresh each day. If fed in troughs clean out frequently with Virkon®S. NRM GrowUp can be fed to dairy replacements up to 20 weeks of age to help support continued development. Always allow free access to fresh, clean water.

Ingredients

Grain and grain by-products, oilseed meals and by-products, molasses, minerals (including limestone, mono-dicalcium phosphate, salt), vegetable oils, organic acids, vitamins and trace minerals, flavour, Bovatec® 20CC.

Typical analysis

Protein 20%

Moisture 12%

(Approximate on a dry matter basis)



PREMIUM FEED



BALANCED



PKE FREE

NRM GrowUp® 16%

NRM GrowUp® Finisher is a balanced feed designed to bridge the energy/protein gap of growing stock beyond 80-100kg liveweight. Calves that have been weaned onto high protein spring pasture require less protein in a concentrated feed than younger stock. Using NRM GrowUp® Finisher 16% together with pasture will help support calf development during the critical post-weaning phase. Alternatively, use strategically to supplement the diet of growing stock whenever the quality or quantity of the pasture available is sub-optimal.



Feeding recommendation

Use with the NRM Moozlee® system to avoid growth check, or as the sole dry feed in any rearing system. Calves should be fed whole milk or calf milk replacer up to 5-6L per day until weaning. Wean off milk gradually at 80kg minimum weight, when consuming 1kg of NRM GrowUp® Finisher per day. When consuming 1.5kg of NRM GrowUp® Finisher, wean off milk completely. Continue to feed NRM GrowUp® Finisher at 1-1.5kg/calf per day for 3-4 weeks after weaning from milk. Use GrowUp Finisher after NRM Moozlee®, NRM GrowUp® or NRM Ready Rumen®. Always allow free access to fresh, clean water.



PREMIUM FEED



BALANCED



PKE FREE

Ingredients

Grain and grain by-products, oilseed meals and by-products, molasses, minerals (including limestone, mono-dicalcium phosphate, salt), vegetable oils, organic acids, vitamins and trace minerals, flavour, Bovatec® 20CC.

Typical analysis

Protein 16%

Moisture 12%

(Approximate on a dry matter basis)

NRM Ready Rumen®

NRM Ready Rumen® is a blend of high protein mineralised pellets, lucerne chaff and molasses. The long fibre in NRM Ready Rumen® is included to aid rumen function and rumination activity. A complete feed that requires no added roughage, vitamins or minerals, NRM Ready Rumen® offers a hassle free feed for all types of calf rearing systems.

Feeding recommendation

NRM Ready Rumen® is a complete feed suitable for ad-lib feeding to calves housed inside from 4 to 70 days of age. An easy to use complete feed, NRM Ready Rumen® is ideal for both once-a-day and twice-a-day systems. NRM Ready Rumen® should be fed ad-lib with fresh feed offered each day. Calves fed NRM Ready Rumen® do not require access to pasture until 8-10 weeks of age at up to 1.5kg/head/day.

Ensure calves always have access to clean, fresh water. Ensure young animals have access to a feed containing a coccidiostat at least 2-3 weeks prior to weaning, as a coccidial challenge is most likely to occur in the first 8 weeks after weaning.

Ingredients

Grain and grain by-products, oilseed meals and by-products, molasses, roughage, minerals (including limestone, mono-dicalcium phosphate, salt), vegetable oils, organic acids, vitamins and trace minerals, flavour, Bovatec® 20CC.



PREMIUM FEED



ALL-IN-ONE



PKE FREE

Typical analysis

Protein 19.5%

Moisture 12.5%

(Approximate on a dry matter basis)

NRM Sweet 16 Pellets

NRM Sweet 16 is an all purpose grower feed. Suitable for beef calves and dairy heifer replacements. For calves weaned to pasture after 5-6 weeks on traditional and early wean systems or for finishing stock when pasture is limited.

Feeding recommendation

Feed up to 1.5kg per calf per day from weaning. Any changes to calves diets should be done gradually.

NRM Sweet 16 is not a complete feed. Always ensure adequate pasture or other roughage is available. Ensure calves have access to clean, fresh water at all times.



Ingredients

Grain and grain by-products, various plant proteins, molasses, non-protein nitrogen, minerals, vegetable oils, organic acids, vitamins and trace minerals, coccidiostat.

Typical analysis

Crude Protein	16%
Moisture	12%

(Approximate on a as fed basis)

Calf rearing shopping list

- Good quality hard feed
- Disinfectants, e.g. Virkon®S
- Adequate meal troughs and water troughs
- Hay racks
- Rodent and bird control
- Thermometer (rectal and one for calf milk)
- ID neck ties
- Colostrometer
- Replacement teats, different teats for slow and fast feeders
- Milk mixing equipment and utensils
- Measuring stick / girth tape / scales
- Coccidiostat for milk if using whole milk
- Colostrum / milk tubing equipment
- Milk warmer if using whole milk
- Electrolytes
- Iodine spray / dipping cup
- Spray marker
- Disposable gloves
- Calf covers
- Ear tagger and tags
- Metabolics for the cows



Nobody is closer to your animals than you – and nobody understands their unique nutrition needs more than our qualified NRM nutritionists. It's their expertise that make our range of feeds some of the most scientifically advanced in the market. Plus having nationwide access to their in-depth knowledge will support your understanding of animal nutrition to improve the productivity and profitability of your farming operation.

If you have any queries, please contact us.

0800 800 380
nrm.co.nz

