



REARING GUIDE

CALVES



NZAGBIZ



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REARING BEST PRACTICE

INTRODUCTION

The better start a calf has in life, the better animal they will be in years to come.

Rearing a quality calf starts with good nutrition and management of the cow to support a healthy, robust calf at birth followed by quality nutrition and management practices during rearing.

Nutrition, and thus feed inputs, plays a crucial role in the development, growth and well-being of young calves. As with any feed it is important to source products that are nutritious, highly reputable, carefully designed and made from high-quality ingredients.

“GIVE TOMORROW’S STOCK THE BEST START TO LIFE TODAY”

This Feed Guide has been designed to provide you with best practice rearing guidelines, informed by recent scientific and applied research, the product options available to you and our recommended usage.

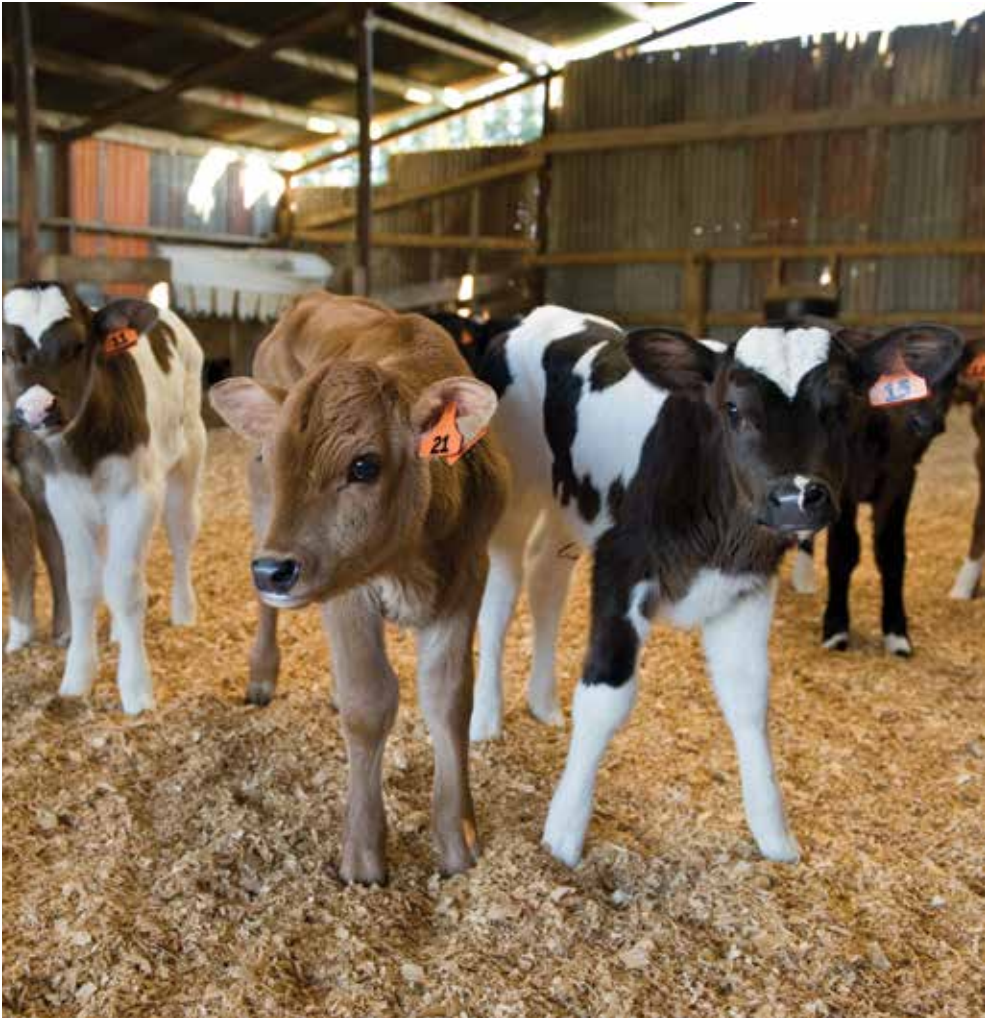
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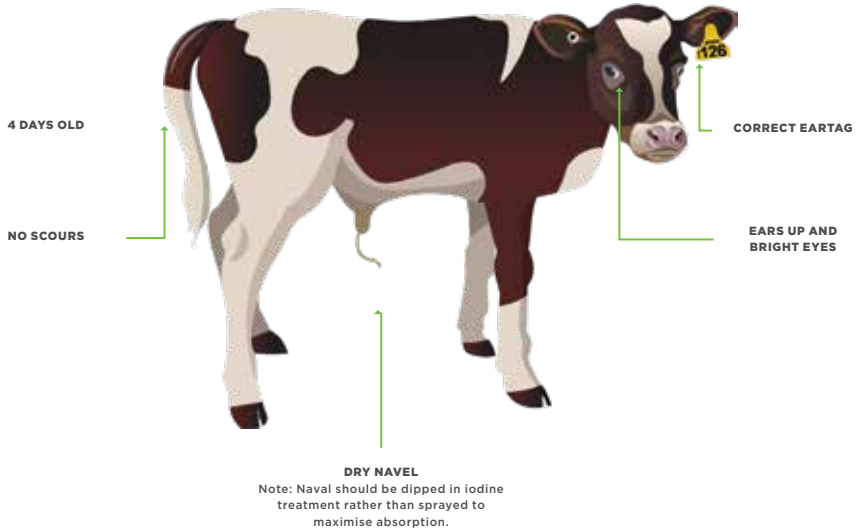
CALF SELECTION

Rearing healthy calves begins with a careful selection process. Ideally you want to be able to buy from as few suppliers as possible and from those who have good feeding and management practices on their farm including vaccinating their herd against rotavirus.

Ask about the farm's colostrum management practices and how they ensure that a calf receives adequate colostrum (Refer to page 11) within the first 12 hours after birth. If the Serum Total Protein (STP) or Immunoglobulin G (IgG) is known for a calf at the time of sale, it is worth paying more for these calves because good levels will protect calves from disease during the first month of life.



At purchase, check calf navels, which should be clean and dry with no sign of infection or inflammation (e.g. swelling, pus or scabs). A wet navel indicates a calf is under 24 hours old and therefore too young to purchase (a calf should be more than 4 days old before it's moved). Also check eyes, ears, feet and tails (look for scours - see page 18) to ensure animals are in good health before they enter your rearing facility and ask about antibiotic treatments (if any). To prevent infection, the navel should be treated with an approved iodine solution immediately after birth and following transportation. If possible, check for signs of iodine treatment (e.g. yellow hair around the navel).



Transportation can be stressful for calves and detrimental to their health. Drive with care when calves are in tow, provide them with sufficient space to lie down and a clean, dry, draft-free environment, and handle calves gently upon arrival. If a calf is dehydrated after coming from a sales yard or a long journey, it is recommended that an electrolyte (approx. 4L) is offered for the first feed. If a calf is sourced locally, the first feed should be milk.

AVOID	CHECK
<ul style="list-style-type: none"> Twins Freebies Calves that have been treated with antibiotics Mixing age groups of calves 	<ul style="list-style-type: none"> The umbilical cord is dry The calves' eyes are not sunken The ears are not droopy The calves were >35-40kg at 4 four days old (excluding Jersey and Jersey-cross calves) The calves received colostrum (refer to page 11)

FACILITIES

Rearing facilities should be set-up and maintained well to ensure calves stay healthy. Young calves should be housed for at least 4 weeks to ensure they stay warm and are using their energy for growth.

Housing

- Must be dry and draught-free for calves to regulate body temperature. Calves should be protected from wind and rain in a structure twice as long as wide
- Cover the floor surface with dry materials such as sawdust, shavings, straw, post peelings or wood chip to a depth of at least 200-300mm. Avoid dusty materials. Ideally the floor should be lower at the front to help drain effluent and water. Regularly muck out and top up the bedding so it is clean and dry
- Good ventilation is essential and is best situated where the walls meet the ceiling. It's easier to ventilate across the shed, not down the length. Ventilation should be adaptable, so the use of boards, shutters or wind cloth is recommended



Spacing calves

- Calves are less stressed and have higher intakes in smaller groups. The shelter should provide a minimum of 1.5m² per calf and, where possible, minimise calf contact between pens. The best approach is 10-20 calves per pen
- Depending on how many calves you are rearing - having more than one shed separated into pens allows for easier separation of age groups and feeding levels. Having more pens also provides a safety barrier between calves in case of disease outbreak and will allow a pen/shed to be rested for cleaning and sanitation between different batches of calves



Feeding facilities

- Each pen must have clean, quality water, which should be checked, cleaned and refreshed daily. In hot conditions, restricted feeding systems, high meal/fibre intakes or scours, an additional 2-6L of water per calf per day is required
- Meal troughs should have sufficient space for feeding at least half of the calves at the trough at any one time. Provide a minimum of 300mm of trough space per calf
- Keep meal feeders free from moisture and clean weekly to avoid fungal growth
- Keep milk lines as short as possible and ensure there is no stale milk left in hoses between feeds

Cleaning

- Ensure all feeding equipment is regularly cleaned and treated with disinfectant. Bottles or cafeterias should be cleaned between feeds and automatic feeders (mixing bowls, lines and teats) should be cleaned and calibrated at least weekly
- Use a broom to remove any excess material in laneways. Do not use a high-pressure hose inside the shed, as this will aerosol bacteria and viruses to calves in other pens
- Spray the rearing area, feeding utensils and teats with approved virucidal at least once a week and daily during a disease outbreak
- Rodents and birds must be controlled
- Isolate sick calves to reduce risk of spreading disease

FEEDING

Following the colostrum period, calves should be fed clean whole milk from the vat or a good quality calf milk replacer (CMR). Fortunately, research has shown that calves can thrive on a good quality CMR. For further information on selecting a CMR (refer to page 26)

- Start initial feeding 2 two hours after arrival with warm milk or electrolytes (such as Novolyte - refer to page 31)
- Consider a quality probiotic (such as Biosupport - refer to 32) to help calves transition to their new environment
- Check teat quality (replace if damaged) and quantity – there should be spare teats on each feeder e.g. 8 eight calves to a 10-teat feeder
- Clean the feed equipment and teats after each feeding
- Check for slow-drinking calves that struggle to compete within the group. If necessary, re-group calves on drinking speed and vigour
- Check milk temperature. Feeding warm (38-40°C) is recommended
- Clean, fresh water must be available ad lib from day one
- Calves should be fed at the same time each day
- Offer a good quality forage source (e.g. chopped grass hay, pasture, chopped silage), plus a grain-based starter, from week 1. The solid feed offered should be tailored to suit the rearing system selected. Calves can be reared successfully on high levels of milk (e.g. 8L/day) plus good quality forage



COLOSTRUM

Colostrum is produced only in the first milking after calving, it is higher in protein and fat than milk, contains a wide array of other beneficial bioactive molecules, specific nutrients, hormones and growth factors, and has a distinctive yellow colour.

Following the first milking a cow will produce 'transition milk' for a few days which only has some of the characteristics of colostrum. Normal milk production will happen from about four days post-calving. Colostrum is very energy and nutrient dense which is helpful when feeding a very young calf with an immature digestive system.

Calves are born with a naive immune system and have no resistance against bacteria and viruses that can cause disease. Colostrum contains very high concentrations of immunoglobulins (defense proteins), and for the first 24 hours or so after birth a calf's intestine is porous to these antibodies, allowing the calf to absorb them and transfer the immunity of the mother to the calf. There is a rapid decline in the ability of the calf to absorb immunoglobulins after 12 hours of birth.

At around 24 hours of age the calf stops being able to absorb those immunoglobulins and this 'gut closure' is the reason it's so critical to get colostrum into newborn calves (quantity, quality, quickly) immediately after collection from the calving areas. Even after gut closure, colostrum has a protective effect, as immunoglobulins floating freely in the intestine can bind to bugs to reduce their disease-causing ability to the calf.

It is important to note that the immunoglobulin concentration of colostrum coming out of a cow declines rapidly following first milking, and bacterial contamination levels can increase rapidly in colostrum that isn't stored well. Therefore, feeding fresh, first milking colostrum or Jumpstart (Refer to page 25) is advised for newborns.

FEEDING COLOSTRUM

- Newborn calves should drink 15% (2.5-4 Litres) of their body weight in colostrum within the first 12 hours, but the sooner the better
- If a calf refused to drink colostrum at the first feed, try feeding colostrum after 3-4 hours or consider using a stomach tube to administer colostrum
- Ideally newborn calves should continue to be fed colostrum/transition milk for the next 4 days after birth

MILK

Calves are born with an underdeveloped digestive system. Therefore, for the first 4-6 weeks of their life they exclusively rely on milk or milk-based feeds (calf milk replacer – refer to page 26) for nourishment before their digestive tract matures sufficiently to digest solid feeds. Vat milk and good quality milk-based milk replacer provide high quality easily digestible nutrients to calves during the first 2 months of their life.

Research has shown that increasing milk supply (ranging between 4-10 L/day) of either vat milk or milk replacer during the first 2 months of life promotes growth and is beneficial to the development of various organs (e.g. gut and mammary gland). Further, international studies have shown that accelerating pre-weaning growth through improving milk supply can promote greater lifetime milk production and studies in New Zealand have shown improved growth and thus reduced time to cull and environmental impact without compromising meat quality in dairy-beef heifers.

Therefore, feeding calves more milk (around 20% of their initial body weight, 6-10 L/day for calves with 25 to 50 kg of initial body weight) during the first 2 months of life will not only improve growth and organ development of the calves but could potentially enhance the lifetime performance of the calves in commercial herds.

It is highly recommended to feed calves consistently. Changing the feeding time and abrupt changes in feed type (between vat milk and milk replacers) or volume fed can perturb the digestive system of the calves causing scours and/or metabolic disturbances that can affect calf health, growth and wellbeing. Maintaining cleanliness of the feeding equipment and the rearing environment (pens and milk preparation areas) is equally important for successful milk feeding and calf rearing programmes. It is a good practice to clean and sanitize bottles, teats, mixing and storage equipment at every use to reduce pathogen loads.



SOLID FEEDS

Initiation of solid feed intake is necessary for rumen development before there is a change in diet from milk to other solid feeds. Both concentrate/grain-based (meals) and forage-based starter feeds are available to farmers. Generally, meal starter feeds are energy dense, contain high quality plant proteins and are more digestible than forage-based starter feeds. Both physical and metabolic development of the rumen is required to help the calf transition from a milk to a solid feed diet without compromising growth, health and wellbeing.

Forage feeding

Calves perform well if given free access to good quality forage. Therefore, free access to forage should be available from a young age. This can be good quality hay, silage or access to pasture. Forage is important for rumen development and the establishment of microbiota required to ferment forage at weaning.

AgResearch trials have demonstrated that calves can be successfully reared without using concentrates on a good quality forage-only solid feed diet (e.g. ensiled Lucerne or grazed pasture; >10 MJ/ME and >16% crude protein) without adverse effects on lifetime performance in dairy-beef calves. This can be successfully implemented in calves fed a high milk allowance (e.g. >6/L day).



Meal feeding

Solid feed should be introduced early (e.g. from 1 week of age). Meal should be used when farmers choose not to feed high levels of milk (e.g. 10% body weight systems) and can't provide access to quality pasture or another high-quality forage source.

If calves are fed meal, it is a good practice to choose a high-quality meal (pelleted or texturised having 16-20% crude protein and a coccidiostat) and fed in combination with chopped grass, meadow hay, silage or pasture during the pre-weaning period to promote solid feed intake and rumen development. It is also good practice to provide the meal and forage ad libitum pre-weaning. Depending on the availability and quality of forage, a meal containing 16% crude protein should be used for feeding older calves after weaning.

Other considerations:

- Bird fouling can contaminate feeders - add plastic flaps or fill troughs in the evening
- As meal consumption increases it is important to allow space for simultaneous access to the trough. Allow 300mm of head space per calf
- As meal intake increases, water intake also increases. Therefore, ensure there is good access to clean ad-lib water

NOTE

A calf cannot eat enough meal to replace milk nutrients during the first 8 weeks of life, hence the importance of feeding a good quality milk/milk replacer in the early stages of life.



WEANING

Minimising weaning stress is one of the most critical aspects of rearing calves. Every change should be carefully planned and gradually implemented to avoid abrupt changes in feeding practices, such as removing milk or meal suddenly. Also avoid major changes in the environment (e.g. use the same paddock if weaning off milk outside onto pasture, and don't wean off milk indoors and then abruptly put your calves outside into a foreign environment).

A calf's rumen development is the most important factor to consider when making a weaning decision. The only way this can be assessed is by measuring the amount of solid feed your calves are readily eating, which should be at least 1 kg of meal or 2 kg of pasture per day when commencing the weaning process.

WEANING OFF MILK

The best time to start implementing "step-down weaning" will depend on your milk feeding system, but three good rules of thumb are:

- weight-for-age target met (common weights used for weaning are 70kg for Jerseys, 80kg for Crossbreds, and 90kg for Friesians)
- eating more than 1kg of meal or 2kg of good quality forage (e.g. pasture) per day
- calves are in good health and not receiving animal health treatments

Prior to weaning monitor calves closely to establish whether all calves are consuming solid feed (i.e. eating at the feed trough and demonstrating rumination behaviour). Monitor closely for signs of illness and consider separating and reintroducing milk for any calves that don't seem to be coping.

Once a day feeding with restricted milk allowance can be used as a weaning method. Low milk allowance calves can be weaned over 3-4 days, while high milk allowance calves (>6L/day for an average size calf) need 2-3 weeks, to increase solid feed intake and thereby help prepare the rumen for better post-weaning performance. Ideally, the step-down weaning procedure should be implemented in 4-5 steps where 20-25% of the milk offered is reduced every 4-5 days. If using automatic feeders, a 5% linear reduction of milk offered daily over 20 days is ideal.

Weaning off meal:

When to wean off meal is less well defined, as calves may struggle to get optimal nutrition out of dry summer grass. However, it is generally good to keep feeding at least 2kg of meal per calf for at least 2 weeks post-weaning off milk and then gradually weaning calves from meal feeding over a 2-week period to give the calves' digestive tract (including microbes) and metabolic system time to adapt to the change in diet. This will reduce metabolic upsets and maintain an adequate flow of nutrients to the animal to support growth and health.

Other considerations:

- Weigh a sample of calves to monitor target growth rates before making a weaning or management decision. Weigh bands are a useful tool to approximate calf weights
- Make sure shelter and water are easily accessible post weaning e.g. shelter belt

ASSESSING CALF HEALTH

When assessing calf health, it is essential to observe their condition and behaviour. Using your senses will help to determine if there is any cause for concern.

Look

- Are the calves drinking and eating as normal?
- Are their eyes bright and alert?
- Are their ears drooping?
- Is their coat soft and shiny?
- Is there a discharge from the mouth or nose e.g. saliva, mucous or blood?
- Examine the navel for swelling, redness and discharge
- Watch the calves moving, standing up and stretching to ascertain steadiness and energy
- Check the colour and consistency of the faeces for abnormalities

Smell

- Does the bedding and air smell clean, dry and ammonia- free?
- Do the faeces smell normal or foul?
- Check the smell of the milk, meal, hay and water - is it fresh?

Listen

- Are the calves grinding their teeth, bellowing or coughing?

Check

- Any additional products offered to the calves should be palatable and free from moulds
- Temperature: Use a digital thermometer to diagnose illness early and monitor treatment. The normal temperature of a calf will vary, but as a guide should be approx. 38°C. Compare the temperature of another pen mate before checking the sick calf

IDENTIFYING INFECTION

Calves are susceptible to some common infections. It's important to identify warning signs of illness and know how to control and prevent infectious diseases should they arise. If in doubt, consult your veterinarian.

SYMPTOMS	CAUSES
Lame/reluctant to stand	Injury, joint ill
Sunken eyes	Dehydration
Swollen naval	Naval infection, hernia
Scours	<p>Nutritional: Faeces pale in colour, can be yellow and softer than normal</p> <p>Infectious: Dull calf, high temperature, faeces foul smelling and may contain mucous or blood</p>
Reluctant to drink	Any infectious disease, injuries to the mouth or tongue, poor quality milk
Coughing, rapid respiration or shivering	Respiratory infection from poor ventilation or infectious agents. Cold or wet conditions, feeding cold milk or a draughty calf shed
Bloat	Cold milk feeding – milk in the rumen, over drinking or gorging on meal, young fresh grass, poor sanitation of feeding equipment
Salivation	Mouth, tongue or cheek lesions, injured jaw, ulcers and abscesses
Grinding teeth	Abdominal pain, scours, lack of fibre, boredom
Pizzle sucking	Low volume feeding, unsatisfied sucking instinct, lack of water
Hair loss	Often after a bout of severe scours, excessive cold and wet (mud), Malnutrition

IDENTIFYING INFECTION

Scours

The most common cause of scouring is nutritional scours, which happens when there is a change in diet, or the diet is inappropriate for that age group of calves. Calves with nutritional scours are often still bright, and their faeces are not smelly or bloody. Nutritional scours can be prevented by ensuring dietary changes are slow and that feeds are suitable for that age of animal. Most nutritional scours resolve without specific treatment within a few days, but electrolytes (such as Novolyte - refer to page 31) can help prevent dehydration.

Scours can also be caused by viruses, bacteria, protozoa, or parasites. Infection occurs orally when calves are exploring their new environment. Many of these infectious organisms can be found at low levels in the faeces of healthy adult cows which means calves will be exposed from birth, reinforcing the importance of good colostrum management (refer to page 11).

Prevention of contagious scours requires good colostrum management, well designed calf sheds with freely draining bedding, meticulous hygiene with milk preparation and feeding equipment, and a rapid response should a calf become sick.

Having a hospital pen where sick calves can be isolated until they are let outside can be an effective component in preventing further spread of disease. Make sure to interact with the sick calves last and thoroughly disinfect equipment before using it with healthy calves. Testing of faecal material by your local vet can be a useful method to identify the cause of scours and appropriate animal health interventions to reduce further disease spread.

Vaccination of pregnant cows against common diarrhoea causing pathogens will boost antibody levels in their colostrum, but this only helps if calves are getting their first feed of colostrum in a timely manner.

Navel ill

Before a calf's navel dries up it is effectively another opening into their body that can allow bacteria a way in. The wet weather typical over the calving period doesn't help, as it results in slower drying and higher levels of contamination. This is why dipping navels in iodine right down to the skin at the base of the navel helps reduce disease; these products contain iodine to kill bacteria and alcohol to help dry the tissue. If a navel does get infected, the body doesn't have any physical barriers to prevent the infection going deeper and the calf becoming systemically unwell. This can lead to liver or lung abscesses or swelling and infection of joints.

It is recommended to dip the navels of newborn calves at the time of collection before putting them into the transport trailer to reduce the risk of infection. Daily checking of navels (palpation) by feel for at least the first 4 days when the calves are in the nursery pens and fed colostrum is recommended to enable early detection of swelling or infection and early animal health interventions to reduce severity of disease.

Respiratory disease

Respiratory disease of calves is less common in New Zealand than in some other countries, and it is one of the reasons you see calves overseas reared in individual hutches. In this country respiratory disease tends to be sporadic, often with only one calf affected at a time. Prevention is by ensuring calf housing is warm and dry and free from drafts, but with enough airflow that ammonia doesn't build up. Affected calves usually need antibiotics and are at real risk of having long term damage to their lungs.

Intestinal parasites

Adult cattle are reasonably resistant to intestinal parasites, but it takes about 18 months for that resistance to build up, and so young stock are commonly drenched semi regularly up until they enter the milking herd. In theory a calf can start shedding worms three weeks after first going out onto pasture, and for total worm control it is recommended to drench every four weeks. Because young stock are the main shedders of worm eggs onto pasture, if calves are grazed in the same paddocks year after year those paddocks can have very high levels of eggs on pasture. The speed and severity of parasite burdens is somewhat dependent on dose and exposure, so calves grazing pasture that has been 'cleaned up' by cross-grazing with adult cattle or sheep will need less drenching. Talk to your local vet about which anthelmintic are recommended for your young stock.



INFECTIOUS AGENTS

Frequent, bloody, foul-smelling scouring is almost certainly something serious and will require vet assistance and/or laboratory testing for an accurate diagnosis. If this is the case, we would recommend contacting your local vet as soon as possible.

INFECTIOUS AGENT	POSSIBLE SYMPTOMS	RISK	TREATMENT	OTHERS AFFECTED
ESCHERICHIA COLI (E. COLI)	<ul style="list-style-type: none"> • Acute scouring • High temperature (39-40°C) • Low colostrum intake 	<ul style="list-style-type: none"> • High mortality – fast acting • Contagious – depends on strain 	<ul style="list-style-type: none"> • Rehydration • Antibiotics 	<ul style="list-style-type: none"> • Humans • Pets
ROTAVIRUS	<ul style="list-style-type: none"> • Acute, foul smelling, watery scouring • High temperature (39-40°C) 	<ul style="list-style-type: none"> • High mortality if not treated quickly • Highly contagious 	<ul style="list-style-type: none"> • Rehydration • Vaccination of cows pre-calving 	<ul style="list-style-type: none"> • None
CORONA VIRUS	<ul style="list-style-type: none"> • Acute scouring 	<ul style="list-style-type: none"> • Often associated with Cryptosporidiosis or Rotavirus • Low mortality 	<ul style="list-style-type: none"> • Rehydration 	<ul style="list-style-type: none"> • None
CAMPYLOBACTER	<ul style="list-style-type: none"> • Acute, foul smelling, watery scours • Scours usually of short duration 	<ul style="list-style-type: none"> • First 3 weeks of life • Medium contagiousness 	<ul style="list-style-type: none"> • Rehydration • Improve water supply 	<ul style="list-style-type: none"> • Humans • Pets
SALMONELLA	<ul style="list-style-type: none"> • Acute, foul smelling, watery scouring • High temperature (39-40°C) 	<ul style="list-style-type: none"> • High and rapid mortality • Highly contagious • Poor recovery – if any 	<ul style="list-style-type: none"> • Rehydration • Antibiotics • Antipyretics • Vaccination 	<ul style="list-style-type: none"> • Humans • Pets
COCCIDIOSIS (associated with weaning off meal)	<ul style="list-style-type: none"> • Scouring with mucous and blood present • Presence of blood around the anus • Normal temperature • Occurs from 3 weeks of age 	<ul style="list-style-type: none"> • Non-fatal • Inhibits growth • Transmitted through faeces of other bovine stock and contaminated water 	<ul style="list-style-type: none"> • Rehydration • Feed sources medicated with a coccidiostat • Possibly antibiotics 	<ul style="list-style-type: none"> • None
CRYPTOSPORIDIOSIS	<ul style="list-style-type: none"> • Acute, pale, watery scouring for 3 days • High temperature (39-40°C) • More commonly occurs in the first 10 days 	<ul style="list-style-type: none"> • Can occur in conjunction with Rotavirus 	<ul style="list-style-type: none"> • Rehydration • Maintain energy 	<ul style="list-style-type: none"> • Humans • Pets

REHYDRATION DURING SCOURS

Calves suffering from scours lose fluids and salts and don't absorb the sugars they need for energy. This can cause alarming weight loss and dehydration. Therefore, lost fluids and salts must be replaced as soon possible to maintain calf energy.

- A good quality oral electrolyte (such as Novolyte - refer to page 31) at therapeutic levels during the diarrhoea and recovery period is the most efficient way to ensure optimum calf health
- Oral electrolytes are lower in energy than milk, so milk feeding should be continued during the scouring period

SYMPTOMS	% DEHYDRATION
<ul style="list-style-type: none">• Diarrhoea only	<ul style="list-style-type: none">• 5% even if only scouring for one day
<ul style="list-style-type: none">• Eyes slightly sunken, skin losing elasticity, calf staggers on its feet, but still suckling	<ul style="list-style-type: none">• 7%
<ul style="list-style-type: none">• Eyes sunken, skin slow to flatten if pinched, gums sticky, calf depressed	<ul style="list-style-type: none">• 9% - additional intravenous fluids need to be administered by a vet
<ul style="list-style-type: none">• Eyes very sunken, skin won't flatten out if pinched, calf cannot stand	<ul style="list-style-type: none">• 12% - additional intravenous fluids need to be administered by a vet

CALF REHYDRATION

It's important to feed both milk and electrolytes during rehydration. Ideally feed 2L of milk followed by 2L of electrolytes. These feeds should be 4 hours apart as the electrolytes can interfere with milk digestion.

Key points

- Use high-quality electrolytes (such as Novolyte - refer to page 31) to ensure a balanced intake of salts and energy
- Electrolytes can be offered via a teat feeder, trough, bucket or tube feeder
- Warm feeding (38°C) is recommended to increase voluntarily drinking



PRODUCT RANGE

NZAGBIZ

The NZAgbiz milk replacer range has been designed for young animals being reared in New Zealand conditions. Our products are made from carefully selected local ingredients, most of which are sourced from Fonterra. Once formulated, all products are thoroughly tested to ensure they meet our high-quality standards before entering the marketplace.

“WE ARE FOCUSED ON PROVIDING TRUSTED NUTRITION FOR YOUNG ANIMALS TO THRIVE”

Each product has been carefully designed, for the appropriate species and a specific purpose, by our nutritional experts and is backed by reputable scientific research.

With NZAgbiz you can be sure your young livestock are receiving optimal nutrition. From ingredients to formulations, manufacturing to testing, NZAgbiz high standards are never compromised.

That’s the NZAgbiz difference

CALVES	Day 1	Day 2-4	Day 5-13	Day 14-21	Day 22- weaning
Jumpstart	●	●			
Ancalf		●	●	●	●
Nutricalf			●	●	●
Ancalf Finisher				●	●
Biosupport	●	●	●	●	●
Novolyte	●	Use when required			

COLOSTRUM

When cows are pregnant there is no transfer of immune factors across the placenta. This means that, once born, calves depend totally on colostrum for immune protection. Therefore, it is of utmost importance that the calf receives plenty of high-quality colostrum right after birth.

Calves should be fed at least 15% of their body weight (approx. 3-4L) in good quality colostrum or Jumpstart within the first 12 hours after birth. That is 1.5-2L within 4 hours following birth and another 1.5-2L within 10 hours. Ideally newborn calves should continue to be fed colostrum/transition milk for the next 4 days of their age.



JUMPSTART



TYPICAL ANALYSIS

Total Protein	43%
Immunoglobulin G	9%
Fat	27%
Lactose	24%
Minerals	6%

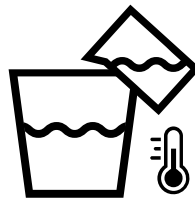
Jumpstart Full Cream Colostrum is a replacement colostrum powder designed as a natural supplement for new-born animals. It provides IgG antibodies that are essential to form the immune system of young animals.

- Contains 9% Immunoglobulins (IgG's) which are the initial building blocks of health and immunity in ruminants.
- Contains vital growth performance nutrients Vitamin A, E and Niacin
- Soluble, good mixability and curd
- Made from high-casein protein and high-fat cream powder
- Formulated as a complete first feed, meaning no mixing with milk is required

MIXING RATE



300g of Jumpstart



made up to 1L
with warm water
(approx. 38°C).

CALF MILK REPLACERS (CMR)

Following the colostrum period, the calf should be fed clean whole milk from the vat or a good quality calf milk replacer (CMR). Often it is not viable to feed whole milk to the calves hence the need for CMR.

The younger a calf is, the closer its diet should be to whole milk. Once they're over four weeks old their digestive system has developed enough that they can cope with a wider variety and quality of feeds, but there are growth and performance impacts that can come from feeding poor quality feeds to young calves.

There are many different types of calf milk replacer on the market, with subtle differences that can make comparisons difficult, so it's important to understand what to look for in a CMR. Most of the differences relate to the types and concentrations of fat and protein in the product.

Protein

Whole (bovine) milk consists of 3.3-3.5% protein which consists of 2 types of protein – caseins (~80% of the milk protein) and whey (~20% of the milk protein) proteins. Both casein and whey proteins are being used to produce calf milk replacers. Caseins are large proteins that curd and are what clumps together and solidifies when you make yogurt or acidify milk. Whey proteins are much smaller, and do not curd. The differences in curdling behaviour between casein and whey affect the transit rate of milk replacer through the digestive tract and therefore performance of the calf.

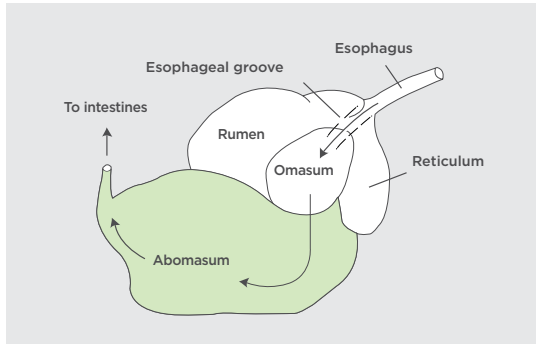


No Curd



Good Curd

When liquid feed is swallowed by a calf it is diverted away from the developing rumen and into the abomasum, or gastric stomach. If the feed is milk, the casein curds in the acid environment, slowing digestion and allowing salivary enzymes time to break it down. Because whey protein is non-curding it passes through unchanged to the small intestine. If the calf is very young, the intestinal digestive enzymes will not be sufficiently developed to extract all the nutrition from the whey protein.



Once calves are over four weeks their intestinal enzymes will have developed enough that the difference between casein and whey protein is less significant, but for young calves that distinction is very important for health and growth

Fats

In calves under four weeks of age it is a good idea to check the fat content of your calf milk replacer is coming from milk fat, ideally limit vegetable fats to no more than 10% of the fat content. A Whole Milk Powder (WMP)-based CMR provides milk fat as its primary fat source providing the correct fatty acid profile, and with milk fat being the only fat containing the fatty acid butyrate, it's important for rumen development.

Skim or whey powders must have fat added back into them to provide high enough levels of fat. Vegetable fats are cheaper than milk fat therefore the likes of palm, coconut, and canola oils are used. Combinations of these oils can provide reasonably similar profiles to the composition of milk fats, but they aren't the same, and the same issues around digestibility apply to fats as well as proteins.

WHY IS CURDING SO IMPORTANT?

Scientific research suggests that a curding milk replacer fed to calves less than 14 days old can;

- Increase growth rates
- Develop insulating fat around the organs
- Lower mortality rates in calves facing bacterial infection

(Information source: Beef+Lamb Research and Development, June 2012.)

Important points to note:

- Milk powders that do not curd sufficiently or consistently can cause stomach upsets and scouring which may lead to health issues
- Artificial curding agents can cause stone-like clots which could potentially damage the abomasum

ANCALF



TYPICAL ANALYSIS

Protein	26%
Fat	20%
Lactose	43.5%
Moisture	3.5%
Minerals	7%

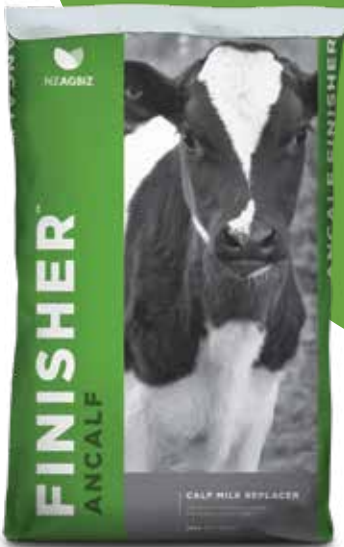
New Zealand's full curding whole milk powder based CMR, trusted by kiwi farmers since 1966. Suitable from day 4 through to weaning*

- Nutrient profile almost identical to raw whole milk, providing calves with the very best start to life
- 26% protein primarily from NZ sourced whole milk powder, providing essential nutrition for growth
- 20% fat from dairy sources, the only fat that contains butyrate, which is important for rumen development
- High casein component for a strong curd, like nature intended, for initial digestion in the stomach and improved nutrient supply & uptake

- Actigen® prebiotic supports calf health by preventing some bad bacteria (gram negative bacteria) populating the intestine, enabling the gut to function more efficiently and liberates nutrients for growth and health
- Coccistop® coccidiostat to help combat the effects of coccidiosis. Safe for dogs and horses
- Specific vitamins and minerals to enhance calf development and health
- Every batch thoroughly tested to provide product consistency and meet rigorous Fonterra quality standards
- Can be used in automatic feeders and for fortifying whole milk to increase nutrition and consistency

*can be used in conjunction with Jumpstart Full Cream Colostrum from day 2-4, if good-quality colostrum is not available. (Refer to page 25)

ANCALF FINISHER



TYPICAL ANALYSIS

Protein	22%
Fat	20%
Lactose	48.5%
Moisture	3%
Minerals	6.5%

A high-quality finishing CMR with curdling properties, manufactured from NZ dairy ingredients.

- Suitable from 21 days old through to weaning, when calves are becoming able to digest more complex proteins
- Designed for a two-stage feeding system, to help lower rearing costs. Feeding should begin with colostrum followed by quality whole milk or Ancalf™
- 22% protein and 20% fat primarily from high quality dairy sources, providing essential nutrition for growth and development
- Good casein component, providing a partial curd, to assist with initial digestion in the stomach and improved nutrient supply & uptake
- Actigen® prebiotic supports calf health by preventing some bad bacteria (gram negative bacteria) populating the intestine, enabling the gut to function more efficiently and liberates nutrients for growth and health
- Specific vitamins and minerals to enhance calf development and health
- Does not contain a coccidiostat, suitable for Bobby calves
- Every batch thoroughly tested to provide product consistency and meet rigorous Fonterra quality standards
- Can be used in automatic feeders

NUTRICALF



TYPICAL ANALYSIS

Protein	24%
Fat	20%
Lactose	46.3%
Moisture	2.5%
Minerals	7.1%

A nutritionally complete CMR made from a precise blend of carefully selected dairy and vegetable proteins, developed in conjunction with Denkavit BV.

- Suitable from day 4 through to weaning
- Designed as a value alternative for low cost operations
- 24% protein and 20% fat from a unique blend of whey-based dairy protein plus specially formulated vegetable ingredients
- Actigen® prebiotic supports calf health by preventing some bad bacteria (gram negative bacteria) populating the intestine, enabling the gut to function more efficiently and liberates nutrients for growth and health
- Coccistop® coccidiostat to help combat the effects of coccidiosis. Safe for dogs and horses
- Specific vitamins and minerals to enhance calf development and health
- Every batch thoroughly tested to provide product consistency and meet rigorous Fonterra quality standards
- Can be used in automatic feeders

NOVOLYTE ELECTROLYTE



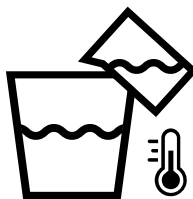
TYPICAL ANALYSIS

Energy	70kJ/100ml
Total Sugar	70% w/w
Sodium	45mg/g
Chloride	53mg/100g
Potassium	16mg/g

Scientifically formulated in conjunction with leading NZ veterinary scientists, to provide energy and a combination of essential salts to assist with calf rehydration. It contains high-grade ingredients in a dry powdered formulation that is soluble and therefore easy to mix.

- Balanced solution that contains optimal sodium levels to restore fluid and electrolyte losses
- Contains alkalising agents like acetate and propionate to help with the sodium absorption in the intestines and to correct acidosis in scouring calves, without exerting negative effects on milk clotting and emptying of the abomasum
- Has a high Strong Ion Difference (SID) which also helps the calf to recover from blood acidosis due to scours
- Supplies energy in the form of dextrose and lactose to aid rehydration and to provide an energy source to the calf

MIXING RATE



50g/L warm water
(approx. 38°C).

Feed up to 4 four doses per day.

For guidance on calf rehydration during scours refer to page 21

BIOSUPPORT PROBIOTIC

TYPICAL ANALYSIS

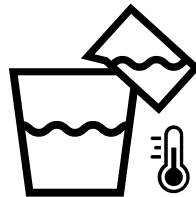
Bifidobacterium Animalis	>10 ⁹ /g
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A powerful probiotic suspended in dry milk powder, designed by NZAgbiz and the Fonterra Research & Development Centre, to enhance the immune system and promote gut health of young animals.

- Aids gut health and animal well-being
- Freeze dried powder format to retain good bacteria. The good bacteria lie dormant until introduced to liquid, meaning no good bacteria degradation
- Suitable to add to liquid milk or milk replacer from new born age
- Bacterial count of one billion good bacteria per gram
- Good solubility and flow properties
- 100% dairy milk powder
- Readily digestible

MIXING RATE



1g/L of warm milk
(approx. 38°C).



USAGE GUIDE - CALF MILK REPLACER

CALF MILK REPLACER FEEDING GUIDELINES

If a feeding level of 13% of body weight is selected, as the preferred feeding regime, the below example will provide you guidance on feeding quantities. If your calf is larger or smaller than the averages indicated below, please adjust accordingly.

TWICE A DAY FEEDING - 150g/L				
Age	Approx. Weight	Volume per feed*	Grams per feed	Grams per day
0-4 days	0-30kg	Colostrum or Jumpstart fed ad-lib		
5-10 days	30kg	2L	300g	600g
11-21 days	40kg	2.5L	375g	750g
22-32 days	50kg	3.0L	450g	900g
33 days to weaning	60kg	3.5L	525g	1050g

One 20kg bag makes 133L of calf milk replacer

ONCE A DAY FEEDING - 300g/L			
Age	Approx. Weight	Volume per feed*	Grams per feed
0-4 days	0-30kg	Colostrum or Jumpstart fed ad-lib	
5-10 days	30kg	Follow twice a day feeding guide	
11-21 days	40kg	2.5L	750g
22-32 days	50kg	3.0L	900g
33 days to weaning	60kg	3.5L	1050g

One 20kg bag makes 66.5L of calf milk replacer

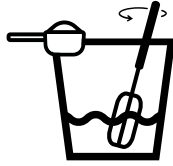
Note: the latest advice supports twice daily feeding due to animal welfare. However, if you are running a farming operation where once daily feeding is best suited this is still a viable option. Automatic feeders are also now becoming more popular and provide more flexibility in feeding options. Mixing rates should be carefully checked when using automatic feeders and the machines calibrated weekly.

MIXING INSTRUCTIONS



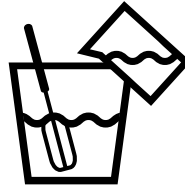
1

Measure half the volume of warm water required for feeding



2

Add the required amount of ANCALF and mix thoroughly



3

Top up with water to full feed volume required



4

Test milk is 38-40°C before feeding



FORTIFICATION OF ANCALF

Where whole milk (including colostrum) availability is limited, or not cost effective. Ancalf can be used in conjunction with whole milk to meet the daily feeding requirements of the calf.

Ancalf powder is to be mixed with warm water at a rate of 150g/L and then combined with whole milk to reach the desired feed volume. A common ratio is 50% whole milk and 50% Ancalf.

Where a concentrated Ancalf feed is requirement for once-a-day systems, Ancalf powder can be added directly to the whole milk at a rate of 150g/L of whole milk.

Note: a typical litre of milk is equivalent to 150g of Ancalf powder.



CONSIDERATIONS WHEN FEEDING CMR

Feeding calves with buckets should be avoided as this can lead to overflow of milk into the rumen and result in health issues. Rather, feed milk using teats as this more closely mimics nature where calves suckle their dam. When calves are reared naturally by their dams, they generally drink milk 6-8 times daily.

Automatic calf feeding systems are now being adopted on many commercial farms and these systems can be used to allow calves to demonstrate more natural suckling behaviour by increasing the frequency of feeds per day. However, the number of calves per automatic milk feeding station should be chosen wisely. It is a good practice to keep 20-25 calves per automatic feeder. Increasing the number of calves per teat will reduce the time per calf and influence the feeding pattern of calves in crowded pens. It is recommended to monitor feeding behaviour and competition at the feeder to determine whether animal numbers need to be modified.

When manually feeding calves with bottles or cafeterias, large quantities (> 6/L per day) of milk should be divided into 2 equal meals. Increasing the feeding frequency will reduce the load on their digestive tract and allows enough time to extract and absorb nutrients from the feed.

- Mix milk powder prior to feeding, but not the day before as settling can occur and milk can be affected by bacterial growth
- Store opened bags of milk powder in a dry, cool, rodent-free environment to avoid contamination or spoiling
- Mix powder thoroughly in fresh, clean, warm water
- Use a digital thermometer to ensure correct temperatures (38-40°C)
- Warm milk should be used as energy will be consumed heating cold milk up to blood temperature for digestion
- Rinse and clean all equipment after every feed and disinfect equipment regularly
- Ensure teats are not damaged, to minimise rapid consumption of milk, or blocked causing feeding issues and bullying within the group
- Increase feeding levels in stages, making changes over time to allow calves to adjust and to avoid health issues such as nutritional scours
- To avoid digestive troubles, consistency of feeding is important, in terms of time, concentration and daily allowance
- Calves are usually fed in the morning and again in the evening, as a guide, 8 hours should elapse between feeds
- Ideally, use a compartment feeder for the first 3 weeks, especially when feeding higher concentrate milk on the once-a-day system
- When using automatic feeders ensure they are set up correctly to avoid over feeding, unless a true ad-lib system is adopted
- NZAgbiz CMRs can be used in automatic feeders, including on-demand (ad-lib) feeders and those with controlled intakes
- Feeding guidelines based on body weight (BW) are useful as the requirements of a calf is dependent on size. Feeding systems can include the low-input, dairy/beef Poukawa system (4L milk or 10% BW + meal) through to improved milk feeding levels (e.g. 8L/day or 20% BW). Recent research indicates 10% is the absolute minimum
- Ensure that clean water and good-quality solid feed is always available (e.g. concentrate starter diets, forage-based starter diets, good-quality pasture)

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