THE IMPORTANCE OF YOUNG ANIMAL NUTRITION

The health and wellbeing of animals in their infancy is crucial to ensuring their maximum potential throughout the rest of their life, and consequently, the profit return to the rearer. Without an optimum nutrition plan in place, young animals may suffer from impaired growth, reduced immunity, and higher susceptibility to disease. Weaning is just one of the stages of the life cycle, but it has a large impact on cumulative growth throughout the subsequent stages of life. Most importantly, birth weight and health will affect weaning weight and health, which will in turn affect adult weight and health.

Good weaning practices can help dairy and beef farmers efficiently reach their animal growth rate targets faster, which can help to accelerate the onset of puberty when rearing females for mating. Similarly, effectively rearing beef calves can increase the efficiency of lean muscle growth that will result in greater financial returns from reaching slaughter weights earlier in life. The benefits of good calf rearing can also lead to less complications through pregnancy and a more productive lactation.

As the cost of feed is a considerable portion of production costs, it is essential that the quality of the feed sourced matches the metabolisable energy and nutrition requirements of the animals, so that feed costs are not wasted. It is also crucial for the rumen and digestive system to have the kick start needed for the development and maintenance of an ideal fermentation environment, as well as manage the adaptions of milk to meal feed, milk to pasture, meal feed to pasture and so forth.

With any feed it is important to source products that are highly reputable and made from high quality ingredients which have been designed and based on comprehensive formulations, backed by quality scientific research, to trust that young animals will receive the very best nutrition they need to begin life in the best possible way.

Nicole Wheadon, NZAgbiz Ltd

NZAgbiz Limited, a Fonterra business unit, produces a range of premium Milk Replacers for calves, lambs and other infant animals for the New Zealand market.

The NZAgbiz Milk Replacer range is manufactured from the best raw materials sourced from Fonterra which are processed through extensive testing regimes. Once formulated, all products are thoroughly tested again - tolerance pass marks are set deliberately high to guarantee the products are of the highest quality before entering the marketplace.

The testing regime covers fat and protein levels, infectious agents, foreign matter, microbiological counts and curding. A rheometer is used to test the gel strength in our milk powders to ensure a satisfactory curd level is achieved.

NZAgbiz works closely with Denkavit, based in Holland, to deliver the highest quality products and additives to the New Zealand market. Specialising in whey products, Denkavit are global specialists in young animal nutrition. They also undertake research and have international expertise in developing and manufacturing innovative feed specialities to deliver high grade animal nutrition for the first stages of life.

Over the past 10 years NZAgbiz has developed into a leader in animal nutrition, providing the best quality and the most nutrition focused products in the market by:

• Constantly evolving formulations
• Implementing new testing procedures and quality standards
• Running research and on-farm trials
• Working with global partners to develop new milk replacer options and source natural additives

We focus on educating our customers and the industry on best practice and what to look for in a milk replacement product.
GUIDELINES FOR SUCCESSFUL Calf REARING

1. Select a strong, healthy calf initially.
2. Treat navel with an approved iodine solution immediately after birth and following transportation, to prevent infection.
3. De-stress calves after transportation. It is recommended only electrolytes (about 4L) should be offered at the first feed.
4. Colostrum must be fed to calves within the first 10 hours, ideally 4L (10% of body weight).
5. When feeding CMR, always follow instructions carefully.
6. Clean, fresh ad lib water and a fibre source (hay or straw) must be available from day one.
7. Bring milk to calves, not calves to milk. Keep milk lines as short as possible.
8. Ideally, the same person(s) should feed the calves at the same time each day.
9. Ensure feed increases/changes are made.
10. Shelter should be available for all calves to keep dry and warm – the rearing area must also be kept ventilated.
11. Separate into age groups (i.e. older from younger calves).
12. Keep calves away from adult stock and from other cowsheds and feeding pads.
13. Don’t over crowd pens or sheds, allow approximately 1.5m² per calf – 10 calves per pen is best, but no more than 20 per pen or 100 calves per shed.
14. Ensure good hygiene. Spray the sheds with a complete anti-viral product twice a week and daily for sick calves.
15. Ensure adequate bedding e.g. bark, straw, sawdust, woodchips is provided and topped up regularly.
16. Control rodents and birds. Do not allow dogs to wander from pen to pen.
17. There must be no free lying water, mud, drains or cowshed effluent near the calf shed and weaning areas.
18. Carefully observe all calves daily to identify problems early – use a clinical thermometer to identify sick calves and isolate.
19. Use approved antibiotics and electrolytes at therapeutic levels for treatment of sick calves.
20. Autopsies and laboratory tests are useful to find the cause of death or illness to help prevent further problems.
21. For all serious health challenges and disease prevention consult your vet.

Ancalf™

Ancalf™ is a premium Calf Milk Replacer made of a precise blend of casein dairy ingredients blended to meet the nutritional requirements of young calves.

Ancalf™ has been a trusted brand in New Zealand since 1966 and is still the most preferred Calf Milk Replacer in New Zealand.

Ancalf™ contains a premix which provides calves with their essential mineral and vitamin requirements. It contains extra calcium for greater bone development. It can be fed to calves from day four.

Ancalf™ contains Deccox™, which aids in the prevention of Coccidiosis. Coccidiosis is a parasitic disease that causes reduced feed consumption and feed conversion in the sub-clinical form. Clinical signs include bloody scouring and weight loss.*

Ancalf™ contains Actigen™ from Alltech Inc., a natural and traceable carbohydrate fraction that increases animal performance and growth through the supporting of an animal’s natural defences, maintaining intestinal function and aiding in the absorption of nutrients.

Ancalf™ is made of high quality dairy casein protein which provides good curding and a high digestibility. NZAgbiz tests all batches of Ancalf™ to make sure it achieves a satisfactory curding level.

Ancalf™ can be fed once or twice per day as per the daily feeding programme and can be used in automatic feeders.

Ancalf™ without Deccox™ is also available.

TYPICAL ANALYSIS

<table>
<thead>
<tr>
<th>Nutrient</th>
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<tr>
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<td>Moisture</td>
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<tr>
<td>Minerals</td>
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</tbody>
</table>

*If users wish to feed a CMR without a coccidiostat as part of their CMR feeding programme.
**Supacalf™**

*Supacalf™* is a premium Calf Milk Replacer made of a precise blend of casein dairy ingredients blended to meet the nutritional requirements of young calves.

*Supacalf™* has a loyal customer base dating back over 30 years and is a favourite of beef rearers in New Zealand.

*Supacalf™* contains a premix which provides calves with their essential mineral and vitamin requirements. It can be fed to calves from day four.

*Supacalf™* contains Deccox™, which aids in the prevention of Coccidiosis. Coccidiosis is a parasitic disease that causes reduced feed consumption and feed conversion in the sub-clinical form. Clinical signs include bloody scouring and weight loss.*

*Supacalf™* contains Actigen™ from Alltech Inc., a natural and traceable carbohydrate fraction that increases animal performance and growth through the supporting of an animal’s natural defences, maintaining intestinal function and aiding in the absorption of nutrients.

*Supacalf™* is made of high quality dairy casein protein which provides good curding and a high digestibility. NZAgbiz tests all batches of *Supacalf™* to make sure it achieves a satisfactory curding level.

*Supacalf™* can be fed once or twice per day as per the daily feeding programme and can be used in automatic feeders.

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**Supastart by Denkavit**

*Supastart* by Denkavit Premium Whey CMR is at the cutting edge of calf milk replacer nutrition. Using a scientifically proven blend of high quality vegetable proteins and fats, *Supastart* is a non-curding option designed in Holland specifically for New Zealand conditions.

Denkavit has had a presence in New Zealand since 1962 and are still producing high quality whey based CMR’s for Kiwi farmers.

*Supastart* contains high levels of protein and fat, comparable with high quality casein CMRs, which increases growth performance and assists in early rumen development. Using highly digestible whey, wheat and pea protein, Denkavit have produced a highly digestible product that is designed to be used in New Zealand’s variable rearing conditions.

As *Supastart* is precisely formulated, Denkavit nutritionists have identified target ingredients to decrease the risk of digestive disorders. This is achieved through a combination of essential oils, acidification and balancing raw materials to reduce pre-digestion issues.

*Supastart* also contains a prebiotic and acidifiers to enhance disease resistance, plus a high level of vitamins and minerals. It has excellent mixability and is highly palatable to calves.

*Supastart* can be fed on once and twice a day programmes, and is an excellent two stage product if feeding whole colostrum or casein product early. It can also be fortified with whole milk and be used in automatic feeders.

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**TYPICAL ANALYSIS**

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*Supastart* is imported from Holland
**Brown Bag CMR™**

Brown Bag CMR™ is a low cost CMR, formulated from non-curding dairy ingredients. It is ideally suited to two stage feeding systems or for heifer calves after colostrum.

Brown Bag CMR™ is an economical milk replacer option, designed to be fed to calves at 14 days of age onwards.

It is recommended that calves receive colostrum, whole milk, or a casein CMR such as Ancalf™ or Supacalf™ prior to using Brown Bag CMR™, and then make the transition to a two-stage feeding programme with Brown Bag CMR™.

Brown Bag CMR™ contains Actigen™ from Alltech Inc., a natural and traceable carbohydrate fraction that increases animal performance and growth through the supporting of an animal’s natural defences, maintaining intestinal function and aiding in the absorption of nutrients.

Note: Brown Bag CMR™ is a non-curding CMR and rearers should make the change from a curding CMR to Brown Bag CMR™ quickly. We do not recommend mixing Brown Bag CMR™ with whole milk or a casein based CMR as they function differently in the gut. During the changeover from casein CMR to Brown Bag CMR™, it may be useful to decrease the overall volume or dilute the mixing rate to prevent overloading the digestive system.

Brown Bag CMR™ does not contain a coccidiostat.

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**Jumpstart™**

Jumpstart™ Full Cream Colostrum is a replacement colostrum powder designed as a natural supplement for newborn animals that have received little or no colostrum at birth. It is a supplement that will provide essential immunoglobulins for newborn animals.

Immunoglobulins (IgG’s) are the initial building blocks of health and immunity in ruminants. IgG’s are antibodies that are essential to form the immune system of young animals.

Jumpstart™ Colostrum contains the IgG’s that are essential for the immune system to thrive, along with growth performance nutrients and vitamins and minerals, in particular Vitamin A, E and Niacin.

As Jumpstart™ is made from high protein casein and high fat cream powder, it is designed to act as a from birth colostrum alternative and has high curding levels.

For maximum IgG uptake Jumpstart™ should be fed solely on day one. For days 2-4 it is recommended that the animal receives one feed of Jumpstart™ and one feed of milk or a suitable milk replacer each day.

Each 600g sachet makes 4L of colostrum milk, which provides two feeds for a calf or four feeds for other species e.g. lambs, goat kids, foals, fawns, puppies, piglets and cria.

**TYPICAL ANALYSIS**

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<td>Minerals</td>
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CURDING VS. NON-CURDING

There is a debate around whether curding or non-curding is more beneficial. They are different processes, and neither one is more superior than the other. It is important to understand the differences between them so an informed choice can be made about what to feed your young animals.

Importance of Curding
The natural way a calf digests milk is by having it curd in the abomasum – the calf’s fourth stomach. When a calf drinks milk or milk replacer, it bypasses the rumen and enters the abomasum. Here it is split into whey and curd by natural rennet and enzymes. Whey is a watery substance that is quickly passed through the intestines and digested whereas the curd is a solid, yoghurt-like substance that stays in the abomasum and is digested slowly over time.

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.)

Curd Quality – Important points:

• Casein based milk powders must curd sufficiently to be digested by the calf or lamb
• Milk powders that do not curd sufficiently or consistently will cause stomach upset and scouring
• Ancalf™, Supacalf™ and Anlamb™ are tested by NZAgbiz and are not cleared for sale unless they curd to our standard.

Benefits of Whey
Whey based CMRs work differently to casein CMRs. Whey based CMRs do not curd as they are formulated from vegetable sourced proteins and therefore do not contain casein. Whey based CMRs bypass the abomasum and enter the small intestine where it is quickly absorbed and utilised by the animal.

Scientific research suggests that when feeding a whey based CMR with high quality raw materials:

• Calves are likely to transition to solid feed faster, which enhances rumen development and promotes early weaning
• There is a low risk of digestive disorders

(Information source: Gert Van Trierum, Denkavit, International Dairy Topics — Volume 1 Number.)

CMR FEEDING GUIDELINES

• Mix milk powder prior to feeding, not the day before as settling can occur and milk can go off from 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. Add milk powder to half the final volume, mix well and then top up to the required volume with warm or cold water as required.
• Use a thermometer if unsure of correct temperatures.
• Rinse and clean all equipment after every feed and disinfect equipment regularly. Ensure teats do not become blocked.
• Increase feeding levels in stages, making changes every third day to prevent nutritional scours.
• Warm milk should be used as energy will be consumed heating cold milk up to blood temperature for digestion.
• Do not over or under feed by changing the concentration of milk powder – always follow the manufacturer’s guidelines.
• Be observant at feeding - teats may block, bullying may occur in compartment feeding, and there may be slow feeders.
• Ideally, use a compartment feeder for the first three weeks, especially when feeding high concentrate milk in the once a day system.
• Maintain a consistent feeding time, preferably with the same person feeding the calves.
• Ensure that clean ad lib water is always available.
CMR FEEDING INSTRUCTIONS

- Calves are usually fed in the morning and again in the evening, or ad-lib.
- As a guide, eight hours should elapse between feeds.
- Mixing concentration is constant throughout the rearing.
- Clean water should be available ad-lib.

Twice a day feeding

Suggested feeding rate and volume – mixing rate 150g/L

<table>
<thead>
<tr>
<th>AGE (Days)</th>
<th>VOLUME PER FEED* (150g/L water)</th>
<th>GRAMS/FEED</th>
<th>GRAMS/DAY</th>
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<tbody>
<tr>
<td>0 - 4 days</td>
<td>Colostrum fed ad-lib</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>5 - 10 days</td>
<td>2L</td>
<td>300g</td>
<td>600g</td>
</tr>
<tr>
<td>11 - 21 days</td>
<td>2.5L</td>
<td>375g</td>
<td>750g</td>
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<tr>
<td>22 days to weaning</td>
<td>3L</td>
<td>450g</td>
<td>900g</td>
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</tbody>
</table>

*Add CMR to 1/2 the ‘volume per feed’ and mix thoroughly. Top up with water to correct volume and temperature.

Once a day feeding

Suggested feeding rate and volume – mixing rate 150g/L

<table>
<thead>
<tr>
<th>AGE (Days)</th>
<th>VOLUME PER FEED* (150g/L water)</th>
<th>GRAMS/FEED</th>
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<td>Colostrum fed ad-lib</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>5 - 10 days</td>
<td>1L x 2 a day</td>
<td>300g</td>
<td>600g</td>
</tr>
<tr>
<td>11 - 21 days</td>
<td>2L</td>
<td>600g</td>
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</tr>
<tr>
<td>22 days to weaning</td>
<td>2L</td>
<td>700g</td>
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</tbody>
</table>

*Add CMR to 1/2 the ‘volume per feed’ and mix thoroughly. Top up with water to correct volume and temperature.

Twice-A-Day VS. Once-A-Day Feeding

Milk fed twice a day

- Volumes fed up to 6L/calf/day
- Milk not fortified with extra CMR
- Feed approx. 20-30kg CMR per calf
- Calf tends to eat smaller quantities of meal (40-50kg)
- Calves have access to pasture from 2-3 weeks
- Slower rumen development
- More labour intensive
- Environmental conditions less controlled when outdoors
- Calves weaned to pasture earlier are harder at the same age
- Water should be freely available

Milk fed once a day

- Volumes fed low 2L/calf/day
- Milk fortified. NB. Liquid milk and/or CMR colostrum can be fortified directly or by adding at 150g/L.
- Feed approx. 20kg of CMR per calf
- Ad-lib access to meals will increase meal intakes to 75-90kg per calf
- Pasture is often restricted until week 5-7 to encourage early meal intakes
- Rapid rumen development
- Less labour intensive
- Environmental conditions can be controlled for optimal performance
- The transition from meal to pasture requires care
- Ad-lib access to additional water in the shed is essential

NB: In both systems a Coccidiostat is required in the meal to fully control scour from Coccidiosis before and after weaning off milk.
CALF REARING BEST PRACTICES
FEEDING AND CARE

Once you’ve selected your calves, they will require care and feeding to ensure optimum health.

Selecting calves
Rearing healthy calves begins with a careful selection process. Make sure your suppliers are reputable and build good relationships with them. Buy from as few suppliers as possible and ideally purchase from only those who have vaccinated their herd against rotavirus. Check your calves have received colostrum for at least the first four days following birth.

To prevent infection, the navel should be treated with an approved iodine solution immediately after birth and following transportation. Transportation can be stressful for calves and detrimental to their health so drive with care when calves are in tow and handle calves gently upon arrival. In addition, it is recommended that only electrolytes (about 4L) should be offered at the first feed.

Avoid

• Twins
• Induced calves
• Freebies
• Calves that have been treated with antibiotics
• Mixing age groups of calves

Check

• The umbilicus is dry
• The calves’ eyes are not sunken
• The ears are not droopy
• Calves should be over 40kg at four days (excluding Jersey calves)
• Ensure calves have received colostrum within first 12 hours after birth and up to four days post birth

CARING FOR NEW ARRIVALS

Keep a close eye on your calves to ensure that they are feeding correctly as a first step to help prevent illness.

Colostrum
Colostrum helps to prevent disease. It is high in both fat and protein, providing an excellent source of energy for newborn calves. Immunoglobulins (IgG) in the first milk protect the calf’s immune system, however these IgG levels drop by 75% in subsequent milkings.

Calves should receive at least 10% of their body weight (about 4L) in colostrum within the first 12 hours after birth. That is 2L within four hours following birth and another 2L within 10 hours. Ideally colostrum should be fed for the first four days post birth.

Feeding

1. Check and spray the navel cord daily for the next three days following arrival.
2. Start initial feeding two hours after arrival with warm milk or electrolytes – no more than 2L
3. A curding agent such as rennet, yoghurt (lactobacillus, acidophilus) can help calves transition to their new diet and environment
4. Check feeding teat quality and number – there should be several spare teats per feeder, e.g. eight calves to a ten teat feeder
5. Check for slow feeders. If necessary reassign calves on drinking speed and vigour
6. Warm feeding (30-40°C) will encourage fluid intake and prevent nutritional upsets
7. A gut modifier such as Sodium Bentonite (in the meal trough) is useful
8. Clean, fresh ad lib water and a fibre source must be available from day one
9. Bring warm milk to calves and keep milk lines as short as possible
10. Calves should be fed at the same time each day
11. Use one brand of CMR throughout the feeding programme – follow the manufacturer recommendations carefully
12. Ensure that feed increases/changes are made gradually – every three days is best.

Signs of illness
It is important to monitor the health of the calves daily to recognise symptoms of illness quickly. Common warning signs of illness include; depressed appearance, slow drinking, reluctant to stand or walk, scours.

• Check faeces at feeding for colour, smell, consistency or blood
• If you suspect illness, check the calf’s temperature – the normal temperature for a calf is between 38-39°C. If in doubt consult your vet.
CALF REARING BEST PRACTICES
FACILITIES AND PROCESSES

It’s important to ensure rearing facilities provide adequate shelter and are properly maintained to ensure healthy calves that will maximise your profitability.

The rearing facility

1. The facility must be dry and draught free for calves to regulate their body temperature. Research has indicated there can be up to 20% difference in growth rates between sheltered and non-sheltered calves. Calves should be sheltered from wind and rain in a structure that is twice as long as wide to minimise draughts at the back.

2. Cover the floor surface with materials such as sawdust, shavings, post peelings or wood chip to a depth of at least 200-300mm. Ideally the floor should be lower at the front of the shelter to drain and remove effluent and water. Coil drains can be placed in sand or river metal under the bedding to remove excess urine (ammonia). Regularly top up the bedding area so it is clean and dry. If the shed has grated floors use wind or shade cloth over the slats, then cover with adequate bedding.

3. Good ventilation is essential and is best situated where the walls meet the ceiling. It’s always easier to ventilate across the shed, not down the length of the shed. Ventilation should be adaptable for weather conditions so the use of gaps, interrupted boarding, removable shutters or wind cloth is recommended. Through the roof ventilation with fans is rarely effective.

Spacing the calves

4. 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 calves per pen with a maximum of 20 calves per pen and no more than 100 calves per shed.

5. Having more than one shed allows for easier separation of age groups and feeding levels, provides a safety barrier between sheds in case of disease outbreak, and will allow a shed to be rested for cleaning and sterilisation between batches of calves.

Feeding facilities

When rearing healthy calves it’s not just what you feed them that counts, it’s how you feed them.

1. Each pen must have its own clean, good quality water supply, which should be checked and cleaned daily. In hot conditions, restricted feeding systems, high meal/fibre intakes or scour, an additional 2-6L of water per calf per day is required.

2. 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

3. Keep milk lines as short as possible and ensure there is no stale milk left in hoses between feeds.

Cleaning the rearing area

A clean environment will help raise healthy calves, so keeping the shed in excellent condition with regular cleaning is essential.

1. 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.

2. Calves should not be splashed by manure waste as they may ingest or inhale disease causing pathogens.

3. Spray the rearing area, feeding utensils and teats with approved virucidal product at least twice a week, and daily during a disease outbreak.

4. Rodents and birds must be controlled.

5. Isolate sick calves to minimise risk of diseases spreading.
MEAL AND ROUGHAGE FEEDING

Meal helps stimulate rumen function and prepare the rumen for an all grass diet which allows for a smooth transition from milk to grass feeding. The rumen matures at about three weeks of age and meal hastens this development.

Fibre source
Fibre (hay and straw) contribute to rumen development but is lower in energy and therefore should not exceed more than 10% of the diet. Hay has higher energy, palatability and digestibility than straw. The often quoted benefit of fibre as a ‘scratch factor’ to stimulate the rumenal papillae is a myth. Instead, both hay and straw help to ‘stretch the rumen’. All fibre sources should be free of moulds and have a pleasant odour.

Meal source
The quality of the concentrate is very important as this will drive intake, affect milk feeding requirements, and the palatability of the meal. Characteristics of a quality meal are:

- Highly palatable and highly digestible - molasses can be added to help achieve this.
- Protein levels between 13-20% are recommended.
- A high protein level is required while the calves are indoors. When the transition to pasture occurs, this level can be reduced to save costs (but will not compromise growth rates)
- High in vitamins and minerals
- Contains rumenal buffers to prevent acidosis
- Should always contain a Coccidiostat (Rumensin or Deccox).

Issues to be aware of
1. Calves can be weaned off milk when meal consumption is a minimum of 1kg/calf/day. This should increase to 1.5-2kg/day for the next 4 weeks
2. Be aware of bird fouling contamination in meal feeders - plastic flaps or filling the trough in the evening may help
3. As meal consumption increases it is important allow space for simultaneous access to the trough. Allow 300mm of head space per calf
4. As meal intake increases, water intake increases – feed consumption will be limited if there is not sufficient access to clean ad-lib water

Weaning management
- Weigh a sample of calves to monitor target growth rates before making weaning or management decisions
- Weigh bands are a useful tool to approximate calf weights
- Calves should not be weaned off milk until they are at least 65kg
- Ensure high quality pasture is available
- Calves should be growing at 0.8-1kg per day and consuming 1-1.5kg meal per day when weaned on to pasture
- Feed meal for 3-4 weeks after weaning from milk
- Follow a transition period when weaning onto pasture by feeding 1-2kgs of pellets per day until 10-12 weeks
- Lower protein (16%) meal can be fed once calves are on pasture
- Make sure shelter, water and fibre are still available after milk weaning e.g. hedges or shelter belts
CALF REARING BEST PRACTICES
CALF HEALTH

10 Key Factors to Rearing Healthy Calves

1. Select healthy, quality calves initially
2. Ensure correct colostrum levels are fed for at least four days
3. Minimise stress during and after transportation by driving carefully and handling calves gently upon arrival
4. Shelter, pen size, ventilation, drainage and bedding must be of a high standard
5. Make sure that the CMR or milk volume and frequency of feeding is appropriate
6. Supply a good quality meal, fibre and clean water
7. Good quality, clean feeding utensils are important
8. Monitor calves daily to check for early warning signs of health issues
9. Prevent disease by treating ailments at therapeutic levels
10. Employ quality staff to look after the calves.

Assess calf health using your senses

When assessing calf health it is essential to be observant to 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?
- Is their skin soft and shiny?
- 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
- Is there a discharge from the mouth or nose e.g. saliva, mucous or blood?

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

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

CHECK
- The milk, meal, fibre and water are fresh
- Any additional products offered to the calves should be palatable and free from fungi and moulds.

Temperature

Use a clinical thermometer to diagnose illness early and monitor treatment.

The normal temperature of a calf will vary, but as a guide should be between 38°C-39°C. Compare the temperature of another pen mate before checking the sick calf.

Fortification of CMR

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

CMR powder is mixed with water at a rate of 150g/L and then combined with whole milk to reach the desired feed volume.

Where a concentrated CMR feed is required for once a day systems, CMR 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 CMR powder
There are some common infections calves are susceptible to. It’s important to identify these warning signs of illness and know how to control and prevent infectious diseases among calves. If in doubt, consult your veterinarian.

### Signs of Illness

<table>
<thead>
<tr>
<th>Lame/retraitant to stand</th>
<th>Injury, joint ill (navel infection), diarrhoea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swollen navel</td>
<td>Navel infections, hernia, pizzle sucking</td>
</tr>
<tr>
<td>Sunken eyes</td>
<td>Dehydrated, also likely to be scurvy or losing condition</td>
</tr>
<tr>
<td>Reluctant to drink or slow drinking</td>
<td>Any infectious disease, injuries to the mouth or tongue, poor quality milk</td>
</tr>
<tr>
<td>Teat/tubing quality</td>
<td>White or yellow faeces</td>
</tr>
</tbody>
</table>

#### Scours

- **Nutritional**: Faeces watery or yellow or foul smelling, contains mucus or blood. Temperature elevated above 39°C
- **Infectious**: Often appears normal in the first three days. Check if the calf is ‘bright’ and the temperature normal. A ‘dull’ calf with a high temperature is indicative of Salmonella or Coccidiosis

#### Blood in the faeces

Respiratory infection from poor ventilation or infectious agents

#### Coughing or rapid respiration

Cold or wet conditions, feeding cold milk, draughty calf shed

#### Shivering

Abdominal pain, colic, peritonitis, gut catastrophes – ulcers, twisted bowel, indigestion-overfeeding of milk, cold milk, gorging on meal. Poor quality milk, fibre or meal kicking at the belly

#### Bloat

Cold milk feeding – milk in rumen Over-drinking or gorging on meal, young fresh grass, Clostridia diseases

#### Salivation

Indication of high fever – check temperature Mouth, tongue or cheek lesions, injured jaw, ulcers and abscesses

#### Grinding of the 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-standing in mud, lice, fungal skin infections.

### Common Infectious Agents

Scours – a guide to common pathogens and their significance.

Scours or diarrhoea in calves is usually nutritional or infectious in origin. The colour, consistency and smell of the faeces can give a clue to the cause, but cannot be solely relied on for diagnosis. For accurate diagnosis, laboratory testing is required. Calves with nutritional scours display normal temperature, but calves with infectious scours usually have a significant rise in temperature. See below for the common causes of infectious scours.

Tip: when checking temperatures, check the healthy pen mates before checking the sick calf.

The severity of scours, percentage of calves’ affected and consequent mortality rates vary depending on the immunoglobulin defence of the calves. Mixed infection is common and can further affect the scours, so it is important to separate sick calves to avoid spreading infection.

### Infectious agents, symptoms and treatments

Note: Diseases marked with an *** are contagious to humans and dogs – use good hygiene, and consult your doctor immediately if you think you may have contracted an infection.

#### Escherichia

Escherichia (E. coli) causes a high mortality rate in calves. It can cause acute scours and death within the first three days of life, particularly in calves that have received a low Immunoglobulin’s (IgG) intake. Temperatures usually rise to 39.5°C and above. It is crucial to check the water supply and colostrum intakes. Treatment is antibiotics, but difficult as the condition is so acute.

#### Cryptosporidiosis***

This infection usually occurs in the first 10 days after birth and is often seen in conjunction with rotavirus. Symptoms include acute diarrhoea which is usually a watery pale yellow colour, lasting approximately 3 days. Temperatures are usually between 39-39.8°C. Mortality rates are low if effective treatment is administered early. Antibiotics are of little value – treatment is rehydrating and maintaining energy and fluid intakes with electrolytes and milk.

#### Rotavirus ***

Symptoms of rotavirus include acute watery yellow faeces, which are foul smelling and contain mucus. It is extremely contagious between calves and around the shed. Duration of scours is usually three days, and mortality rates are between 2-20%, depending on treatment. Temperatures range between 39-40°C. The best prevention is to purchase...
calves from vaccinated herds. Antibiotics are of no value in treating rotavirus, treatment is hydration – increasing fluid intakes with electrolytes and milk. Once recovered, calves grow well.

**Campylobacter ***

Campylobacter usually occurs during the first 3 weeks after birth and mortality rates are usually low. Symptoms include acute scours which are foul smelling and watery, which are usually of short duration. It is mostly associated with an infected water supply. Antibiotics are of little use- treatment is rehydration.

**Corona Virus***

Corona Virus is considered as a secondary opportunist virus, which rarely causes disease by itself. It often occurs alongside Cryptosporidiosis and Rotavirus and causes acute scours. Mortality rate is low and calves usually recover well. Treatment is hydration – increasing fluid intakes with electrolytes and milk.

**Salmonella ***

Salmonella is the most serious disease in the calf shed. It is usually caused by the arrival of infected calves, or introduced by birds and rodents. Salmonella is contagious so it quickly spreads to calves in adjacent pens and causes rapid fatality (often above 20% mortality rate) even before scours are seen. Salmonella causes bacterial diarrhoea that is watery, foul smelling and may contain mucus and blood. Temperatures are often higher than 40°C in the early stages, and calves that recover have depressed growth rates for several weeks due to gut lining damage.

Success of treatment depends on early detection and an aggressive treatment protocol. Treatment involves antibiotics, antipyretic drugs and rehydration with electrolytes and milk. Vaccination with a salmonella vaccine on calf arrival or if an outbreak is suspected can help to prevent control the spread of disease, as well as having bird and rodent prevention in place.

**Coccidiosis***

Coccidiosis is a protozoan infection of the gut in young calves that is transmitted through faeces of other calves, adult stock and water sources that are contaminated. Symptoms include scours with mucous and blood, straining and presence of blood around the anus. Temperatures remain normal. The condition is rarely seen before three weeks of age, and usually only in calves exposed to pasture or mud.

It is rarely fatal but seriously affects the growth rate of calves.

The most cost effective way to diagnose and monitor the infection is through faecal testing. Coccidiosis is best prevented by feeding meal or pellets containing a Coccidiostat (Deccox, Rumensin) in conjunction with a CMR containing a coccidiostat (cow’s milk does not contain a coccidiostat). Most purchased concentrates are medicated and will provide a full cover with an intake of 1kg/calf/day. For full control it is recommended meal feeding should be continued for at least one month after weaning off milk. Treatment with an approved antibiotic or Coccidiocidal drug may be necessary – consult your vet.

Traditionally CMRs contain a coccidiostat (a drug to control this disease e.g. Deccox) added as an extra safety precaution especially for calves reared in the paddock. Two of the CMRs in the NZAgbiz range (Ancalf™ and Supacalf™) contain Deccox at therapeutic levels. Brown Bag CMR™ and Denkavit Superstart do not contain a coccidiostat.

**Bovine Virus***

Bovine virus or Bovine Viral Diarrhoea (BVD) is an infection that causes symptoms including acute scours, salivation and shallow ulcers on the tongue and gums. Temperature will often be elevated to 40°C in the early stages. Usually a small percentage of calves are affected at one time, but the virus will spread in waves from pen to pen. Antibiotics are helpful in treatment – seek veterinary advice for treatment and control.

**Yersinia***

Yersinia is a bacterial infection found in weaned calves and often seen during periods of environmental stress in the Autumn. Symptoms include scours with green mucous and blood, and elevated temperature. Treatment is antibiotics and vaccinations in close contact stock.

The information contained in this document is provided as a guide only. While every effort has been made to ensure this information is correct, NZAgbiz Limited and Fonterra make no express or implied warranty about the accuracy of this information and accept no liability for reliance of its content. If in doubt, please consult your veterinarian.
Calf Rehydration during Scouring

- Calves that are suffering from scouring lose high amounts of water from the body in the form of salts (electrolytes) and energy. This can cause alarming weight loss, so lost fluids and salts must be replaced as quickly as possible to maintain calf energy.

- Diarrhoea is treated the same for nutritional or infectious causes. A good quality oral electrolyte 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. Milk should never be withheld for longer than 24 hours.

Calf symptoms

<table>
<thead>
<tr>
<th>% Dehydration</th>
<th>Calf symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>5% (even if only scouring for one day)</td>
<td>Eyes slightly sunken, skin losing elasticity, calf staggered on its feet, but is still suckling</td>
</tr>
<tr>
<td>7%</td>
<td>Eyes sunken, skin slow to flatten if pinched gums sticky, calf depressed</td>
</tr>
<tr>
<td>9% additional intravenous fluids need to be administered by a vet</td>
<td>Eyes very sunken, skin won't flatten out if pinched, calf cannot stand.</td>
</tr>
<tr>
<td>12% additional intravenous fluids need to be administered by a vet</td>
<td>Eyes very sunken, skin losing elasticity, calf staggers on its feet, but is still suckling</td>
</tr>
</tbody>
</table>

Calf Rehydration Calculation

Use the below calculation to determine the fluid volume required to correct dehydration.

Multiply the calf weight by the % of dehydration (from table above).

Example: 40kg calf x 7% dehydration = 2.8L electrolyte to correct the fluid loss

Also:

Add a further 10% of the body weight in fluids for maintenance that day.

Example: 40kg calf requires a minimum of 4L of fluids/day.

Therefore:

Total rehydration daily requirement = rehydration + maintenance volumes. In the example above = 6.8L or more. No more than 2L should be given per feed; so this needs to be fed over 3-4 feeds per day. Do not mix electrolytes with milk. Feed both separately, with the interval between feeds to be less than two hours.
Lamb Milk Replacer

NZAgbiz Ltd.’s milk replacers are specially formulated for feeding lambs in New Zealand. They are also suitable for goat kids, piglets, puppies, fawns, cria (infant alpaca) and foals. This section of the guide primarily looks at rearing lambs but also contains feeding guidelines for goat kids, foals, fawns, piglets, puppies and cria.

Feeding Lambs

Colostrum is essential for young lambs. A newborn lamb should receive colostrum from its mother within 6-12 hours of birth. This colostrum feeding would naturally be continued for the next four days. If this has not occurred the chances of survival are greatly reduced. After ensuring the lamb has received colostrum, Anlamb™ or Denkavit lamb should be introduced.

Anlamb™ Bottle

Anlamb™ Bottles are manufactured from durable recycled polyethylene and come with its own lamb teat. Feeding measures on the side of the bottle ensures that the lamb receives the correct amount of LMR from day one to weaning. Anlamb™ Bottles are available from all leading merchant stores and are proudly marketed by NZAgbiz Ltd.

Hygiene

Lambs navels should be checked and sprayed with iodine to prevent navel infection. All feeding and mixing equipment must be thoroughly cleaned between feeds. Pens should be cleaned prior to lambs arriving and between batches of lambs.
**Anlamb™**

Anlamb™ is New Zealand’s favourite lamb milk replacer. It is a specialised milk powder sourced from New Zealand cow’s milk and has helped to raise thousands of young animals since the 1970s.

Anlamb™ is made from the highest quality whole milk powder sourced by NZAgbiz Ltd. As lambs are often difficult to hand rear, they require the finest quality raw materials for growth. The formulation contains essential vitamins and minerals required for early growth and development.

As Anlamb™ is made from casein protein ingredients and it is made to curd in the gut. Anlamb™ is also a popular milk replacer for other species, in particular for goat kids.

This guide has feeding recommendations for Anlamb™ when feeding to lambs, goat kids, foals, fawns, puppies, piglets and cria.

Anlamb™ contains no Coccidiostat so it is safe for all species recommended on the label.

<table>
<thead>
<tr>
<th>TYPICAL ANALYSIS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>26%</td>
</tr>
<tr>
<td>Fat</td>
<td>26%</td>
</tr>
<tr>
<td>Lactose</td>
<td>38%</td>
</tr>
<tr>
<td>Moisture</td>
<td>3.5%</td>
</tr>
<tr>
<td>Minerals</td>
<td>6.5%</td>
</tr>
</tbody>
</table>

**Ankid™ by Denkavit**

Ankid™ by Denkavit milk replacer is a specialised whey based milk replacer developed by Denkavit in Holland specifically for rearing goat kids in New Zealand conditions.

Denkavit has provided high quality CMR’s in New Zealand since 1962 and continue to do so through scientific research and precise formulations.

Ankid™ milk replacer is a precise and proven blend of premium quality whey proteins, vegetable proteins, and highly digestible vegetable oils and lactose, combined with a curding skim milk solid fraction, plus vitamins and minerals.

Whey based milk replacers are the preferred choice to rear goat kids on. However, weight gain can be slower compared to the response from a whole milk diet. Ankid™ addresses these issues to combine both whey and casein protein. It is predominantly whey based which provides efficient rumen development, resulting in a smooth weaning transition, but also contains casein protein from skim milk powder to provide curding in the stomach.

Ankid™ contains oregano oil which acts as a natural defence to the effects of coccidiosis.

Ankid™ is GMO free.

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Ankid™ contains oregano oil which acts as a natural defence to the effects of coccidiosis.

Ankid™ is GMO free.
Jumpstart™

Jumpstart™ Full Cream Colostrum is a replacement colostrum powder, designed as a natural supplement for newborn animals that have received little or no colostrum at birth. It is a supplement that will provide essential immunoglobulins required for newborn animals.

Colostrum is essential for young lambs. A new born lamb should receive colostrum from its mother within 6-12 hours after birth and, should the lamb remain with the ewe, this colostrum feeding would continue over the following days.

If no colostrum is available Jumpstart™ full cream colostrum can be used as an alternative for the first day. For the next three days a lamb milk replacer – Anlamb™ should be fed along with Jumpstart™.

Immunoglobulins (IgG’s) are the initial building blocks of health and immunity in ruminants. IgG’s are antibodies that are essential to form the immune system of young animals to promote growth later in life.

Jumpstart™ Colostrum contains the IgG’s that are essential for the immune system to thrive, along with growth performance nutrients and vitamins and minerals, in particular Vitamin A, E and Niacin.

As Jumpstart™ is made from high protein casein and high fat cream powder, it is designed to act as a from birth colostrum alternative and has high curding levels.

For maximum IgG uptake Jumpstart™ should be fed solely on day one. For days 2-4 it is recommended that the animal receives one feed of Jumpstart™ and one feed of milk or a suitable milk replacer each day.

Each 600g sachet makes 4L of colostrum milk, which provides four feeds for lambs and other species – goat kids, foals, fawns, puppies, piglets and cria.

REARING YOUR LAMB

Rearing lambs can be a fun learning experience. With this comes a responsibility to care for it properly and involves hard work and dedication until the lambs are weaned.

Taking your lamb home

Lambs require a shelter to live in which needs to be secure, clean and safely penned off. An individual lamb requires approximately 16 to 20 square feet of space. The shelter will require bedding for sleeping to provide warmth, insulation and comfort e.g. straw, hay, sawdust, wood shavings, and leaves. Keep this area clean and dry to prevent bacteria accumulating and to prevent the spread of disease. Always ensure there is plenty of water available in the lamb pen.

Hygiene

The lamb’s navel should be checked and sprayed with iodine or disinfectant to prevent a navel infection. Whilst hand-rearing, and particularly for the first few weeks, it is important to keep all bottles and teats thoroughly clean to prevent infections. Diluted bleach can be used as a disinfectant, but rinse the utensils well before re-using for feeding.

Feeding

Always follow feeding instructions. A lamb will continue to drink as much as possible, but the most natural way a lamb feeds is little and often. Lambs have small stomachs so be cautious when feeding large volumes of milk replacer as this can cause discomfort and bloat. We recommend 4-6 feeds per day depending on age and weight. To reduce overload feeding, check the hole in the teat is not too big – If the milk is free flowing from the teat the hole is too big. If the lamb is weak and unable to suckle, a lam reviver (tube feeder) should be used to feed colostrum and/or a lamb milk replacer.

Feeding rates

Mix the lamb milk replacer at a rate of 200g/L of water. Add the powder to half of the required volume and mix thoroughly. Top up with water to the required volume ensuring that the temperature of the milk is around 40°C. Each bag contains a 40g scoop (this makes approximately 200mL of milk as a guide). Wash the bottle and teat thoroughly after every feed.
### Bloat in Lambs

**What is bloat?**

Abomasal bloat is a major cause of discomfort and can lead to death in bottle fed lambs.

Bloat is caused by sarcina bacteria which feed on lactose in the milk and convert lactose to lactic acid. This creates an environment where good bacteria cannot survive and harmful bacteria flourish. As a result gas is released into the abomasum which expands the stomach and can cause death either by compressing other organs causing them to fail, or rupturing the stomach wall.

Bottle fed lambs are fed a higher volume of milk in fewer feeds, than when feeding from the ewe. This causes a larger amount of lactose in the stomach and in-turn more lactose for bacteria to feed on. This results in bacteria multiplying rapidly and producing large amounts of gas.

**Recommendations**

- All lambs should receive colostrum (or Jumpstart®) within six hours of birth. This promotes immune development and protection against bloat causing bacteria (sarcina).
- Lamb milk replacer should be fed little and often. Do not increase volumes to reduce the amount of feeds required, as lambs have small stomachs. We recommend 4-6 feeds per day depending on the age of the lamb
- Lambs showing signs of bloat should be fed smaller quantities, more often
- Decreasing milk temperature to approximately 4°C (average tap water is 6°C) helps prevent bloat. Always mix warm first following package instructions and then allow the milk to cool
- The yoghurt method (overleaf) is a method to reduce bloat
- Check the size of the hole in the teat. Milk should only trickle out when the bottle is tipped upside down, not flow freely.
- Some lambs have a tendency to over feed even when not hungry – always follow our feeding recommendations.

---

<table>
<thead>
<tr>
<th>Age of kid (days)</th>
<th>Number of feeds per day</th>
<th>Volume per feed (mL)</th>
<th>Quantity of 40g scoops required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 day</td>
<td>6</td>
<td>100</td>
<td>Colostrum</td>
</tr>
<tr>
<td>2 to 4</td>
<td>6</td>
<td>150</td>
<td>&gt;0.5</td>
</tr>
<tr>
<td>5 to 7</td>
<td>4</td>
<td>250</td>
<td>1.25</td>
</tr>
<tr>
<td>8 to 21</td>
<td>4</td>
<td>350</td>
<td>1.75</td>
</tr>
<tr>
<td>21 to weaning</td>
<td>2</td>
<td>500</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Fresh water must be available at all times and a meal concentrate and a fibre source may be offered from day seven onwards to promote the development of the digestive system. Once the lamb reaches 4 to 6 weeks old, 50% of its nutrients should be from solid feed such as pasture or grain.

**Weaning**

Weaning is the transition of the lamb’s diet from milk replacer to solid feed. Lambs should be eating solid feed for a minimum of 10 days, and be drinking water freely at the time of weaning. As a general guide, lambs should be at least 40 days old and weigh approximately 15kg, before weaning. Lambs should be weaned gradually. This can be done by reducing the frequency of feeds to one 500mL feed per day, which should be introduced for at least a week before the lamb is taken off milk.

**Troubleshooting**

- If your lamb is showing signs of bloat, refer to the Bloat in Lambs information on page 37.
- Scouring in lambs and can also be caused by overfeeding. Once again it is important to follow feeding instructions.
- Some plants can be poisonous to lambs e.g. rhododendrons so make sure the lamb pen is secure.
- Coldness is a common cause of lamb sickness when they are young so ensure measures are in place to keep them warm and dry e.g. cardboard box, under-blankets.
CULTURED Anlamb™ FEEDING METHOD

**Equipment needed:**
- 5L jug
- Large waterproof chilly bin
- Acidophilus yoghurt
- Anlamb™
- Clean warm water

**Method**
- Mix 800g of Anlamb™ with 2L of warm water (approximately 40ºC) in the 5L jug
- Add 100mL of the acidophilus yoghurt and mix thoroughly
- Place in the chilly bin and fill with warm water to the level of the mixture in the jug
- Allow to thicken to yoghurt consistency overnight
- Top up to 4L with water and mix thoroughly the next morning
- Feed lamb(s) as directed on your Anlamb™ package

For future use, simply save around 100-200mL of the thickened mixture as a replacement for the acidophilus yoghurt. Discard the soured Anlamb™ after five days of refrigeration and start the recipe again by using pure acidophilus yoghurt.

**Mixing rates for soured milk**

<table>
<thead>
<tr>
<th>No. of lambs fed in one day</th>
<th>Anlamb™ (g)</th>
<th>Water (mL)</th>
<th>Acidophilus yoghurt (mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>200</td>
<td>500</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>400</td>
<td>1000</td>
<td>50</td>
</tr>
<tr>
<td>5</td>
<td>1000</td>
<td>2500</td>
<td>125</td>
</tr>
<tr>
<td>10</td>
<td>2000</td>
<td>5000</td>
<td>250</td>
</tr>
<tr>
<td>15</td>
<td>3000</td>
<td>7500</td>
<td>375</td>
</tr>
<tr>
<td>20</td>
<td>4000</td>
<td>10000</td>
<td>500</td>
</tr>
</tbody>
</table>

**NB:** This recipe will feed four lambs for one day at the suggested feeding rates specified on the Anlamb™ package.

FEEDING GOAT KIDS WITH Ankid™

**Mixing**
- One litre of mixed milk replacer requires 175g of Ankid™ milk replacer
- Fill the mixing container with half the required amount of warm water (45°C)
- Add Ankid™ milk replacer and mix thoroughly with a whisk, then top up to the correct volume.

**Feeding Rates**
- All feeding rates are based on average weights for newborn animals.

<table>
<thead>
<tr>
<th>Age of kid (days)</th>
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<td>2 to 4</td>
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<td>1/2</td>
</tr>
<tr>
<td>5 to 7</td>
<td>4</td>
<td>250</td>
<td>1 scoop</td>
</tr>
<tr>
<td>8 to 21</td>
<td>3</td>
<td>450</td>
<td>&gt; 1 scoop</td>
</tr>
<tr>
<td>21 to weaning</td>
<td>2</td>
<td>500</td>
<td>2</td>
</tr>
</tbody>
</table>

For use in automatic feeders, set the machine to a rate 190g of Ankid™ Goat Kid Milk Replacer per litre of water. This equates to 175g/L of mixed Ankid™ Goat Kid Milk Replacer.

Ensure clean fresh water is available ad lib and meal can be introduced from week two.

FEEDING GOAT KIDS WITH Anlamb™

**Feeding recommendations**
- Mix 160g/L water. Add Anlamb™ to half of the required volume of water and mix thoroughly.
- Top up with water to the correct volume and ensure the temperature of the milk is about 40°C. Always follow the feeding instructions and do not increase volumes or concentrations above recommended levels.

The information contained in this document is provided as a guide only. While every effort has been made to ensure this information is correct, NZAgbiz Limited and Fonterra make no express or implied warranty about the accuracy of this information and accept no liability for reliance of its content. If in doubt, please consult your veterinarian.
FEEDING FOALS WITH Anlamb™

It is important that foals receive colostrum within four hours of birth. It is unlikely a foal will survive if it does not receive colostrum. If colostrum is not available from the mare, Jumpstart™ Full Cream Colostrum should be fed.

Ensure clean fresh water is available from day one, and from the first week high protein, high energy pellets should be offered.

**Feeding recommendations**

Mix 100g/L water using the feeding guide below as a guide. Volumes may vary depending on the size and strength of the foal but DO NOT increase the concentration (100g/L).

These tables below are a guide only. Feed requirements vary between 21% and 25% of bodyweight. If in doubt contact your vet.

From 21 weeks the amount of milk should be gradually reduced over a 3 week period. Ensure that the foal is strong and consuming adequate amounts of foal pellets and soft hay.

**Horse**

<table>
<thead>
<tr>
<th>Age of foal (days)</th>
<th>Number of feeds per day</th>
<th>Volume per feed (mL)</th>
<th>Anlamb™ per feed (g)</th>
<th>Total volume per day (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 2 weeks</td>
<td>12</td>
<td>900</td>
<td>90</td>
<td>10.8</td>
</tr>
<tr>
<td>2-6 weeks</td>
<td>12</td>
<td>1100</td>
<td>110</td>
<td>13.2</td>
</tr>
<tr>
<td>6-12 weeks</td>
<td>8</td>
<td>1300</td>
<td>130</td>
<td>10.4</td>
</tr>
<tr>
<td>12-21 weeks</td>
<td>6</td>
<td>1500</td>
<td>150</td>
<td>9</td>
</tr>
</tbody>
</table>

**Pony**

<table>
<thead>
<tr>
<th>Age of foal (days)</th>
<th>Number of feeds per day</th>
<th>Volume per feed (mL)</th>
<th>Anlamb™ per feed (g)</th>
<th>Total volume per day (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 2 weeks</td>
<td>12</td>
<td>720</td>
<td>70</td>
<td>8.6</td>
</tr>
<tr>
<td>2-6 weeks</td>
<td>12</td>
<td>1000</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>6-12 weeks</td>
<td>8</td>
<td>1100</td>
<td>110</td>
<td>8.8</td>
</tr>
<tr>
<td>12-21 weeks</td>
<td>6</td>
<td>1300</td>
<td>130</td>
<td>7.8</td>
</tr>
</tbody>
</table>

From 21 weeks the amount of milk should be gradually reduced over a 3 week period. Ensure that the foal is strong and consuming adequate amounts of foal pellets and soft hay.

FEEDING FAWNS WITH Anlamb™

Ensure that fawns receive colostrum at birth. Colostrum should be available for at least 24 hours, and longer if possible. If hind colostrum is not available, fresh cow, goat or Jumpstart™ Full Cream Colostrum are suitable alternatives. Clean fresh water should be available at all times.

**Feeding recommendations**

Mix 240g/L of water. Add Anlamb™ to half of the required volume of water and mix thoroughly. Top up with water to the correct volume and ensure the temperature is approximately 40°C. Always follow the feeding instructions – do not increase volumes or concentrations above recommended levels.

**Age of red deer fawn (days)**

<table>
<thead>
<tr>
<th>Age of red deer fawn (days)</th>
<th>Number of feeds per day</th>
<th>Volume per feed (mL)</th>
<th>Anlamb™ per feed (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 day</td>
<td>6</td>
<td>150</td>
<td>colostrum</td>
</tr>
<tr>
<td>2 to 4</td>
<td>6</td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>5 to 7</td>
<td>6</td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>8 to 10</td>
<td>4</td>
<td>300</td>
<td>2</td>
</tr>
<tr>
<td>11 to 14</td>
<td>3</td>
<td>500</td>
<td>3</td>
</tr>
<tr>
<td>14 to weaning</td>
<td>3</td>
<td>650</td>
<td>4</td>
</tr>
</tbody>
</table>

**Fallow deer fawns require 1/2 of the feeding rates for red deer.**
**FEEDING PUPPIES WITH Anlamb™**

It is important that puppies receive colostrum within the first 12 hours of birth. Ideally the puppies should receive colostrum from a bitch, but if this is not possible Jumpstart™ Full Cream Colostrum should be fed.

**Feeding recommendations**

Mix 200g/L of water. Ensure the water has been pre boiled and bought down to a suitable feeding temperature of 38°C before adding the Anlamb™ powder. Always follow the feeding instructions – do not increase volumes or concentrations above recommended levels.

Puppies need to be fed by bottle and teat until their eyes are open. Puppies can then lap milk. When lapping begins, drinking water must be readily available to the puppies.

<table>
<thead>
<tr>
<th>Dog size</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixing Rate</td>
<td>200g/L</td>
<td>200g/L</td>
<td>200g/L</td>
</tr>
<tr>
<td>Age</td>
<td>Feeds per day</td>
<td>Milk per feed (mL)</td>
<td>Feeds per day</td>
</tr>
<tr>
<td>1 to 3 days</td>
<td>Feed colostrum (10% of bodyweight)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 to 7 days</td>
<td>10</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>1 to 2 weeks</td>
<td>10</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>2 to 4 weeks</td>
<td>5</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>4 to 8 weeks</td>
<td>3</td>
<td>25</td>
<td>3</td>
</tr>
<tr>
<td>8 to 12 weeks</td>
<td>3</td>
<td>45</td>
<td>3</td>
</tr>
</tbody>
</table>

**FEEDING CRIA WITH Anlamb™**

If bottle feeding from birth, it is important that colostrum is fed to cria (infant alpaca) within six hours of birth and then for at least two days. If alpaca colostrum is not available then colostrum from deer, goats or cows may be used. Alternatively Jumpstart™ Full Cream Colostrum is available from your rural retailer.

Research and information on feeding cria is not abundant in New Zealand. Feeding recommendations below are a guideline only, as many rearers are still working on ‘trial and error’ with rates and concentrations. We would appreciate your feedback of experience with hand rearing cria. Phone us on 0800 809 011.

**Feeding recommendations**

Unlike many other infant animals, cria will stop feeding when they are full, so it is best to offer them more than you expect them to drink.

Mix 200g/L* of water. Add Anlamb™ to one third of the required volume of water and mix thoroughly. Top up with water to the correct volume and temperature.

<table>
<thead>
<tr>
<th>Age of cria (days)</th>
<th>Number of feeds per day</th>
<th>Volume per feed (mL)</th>
<th>Quantity of 40g scoops required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 4**</td>
<td>6</td>
<td>100</td>
<td>1/2</td>
</tr>
<tr>
<td>5 to 14</td>
<td>6</td>
<td>150</td>
<td>1</td>
</tr>
<tr>
<td>15 to 21</td>
<td>4</td>
<td>200</td>
<td>1</td>
</tr>
<tr>
<td>22 - weaning***</td>
<td>3</td>
<td>350</td>
<td>2</td>
</tr>
</tbody>
</table>

*This concentration may be increased if weight gain is not adequate. **Cria should be fed colostrum for a minimum of the first two days. Anlamb™ should only be fed during this time if no form of colostrum is available. ***Bottle fed cria often wean themselves earlier than naturally suckled cria. This may happen from around three months.
FEEDING PIGLETS WITH Anlamb™

It is important the piglet receives colostrum at birth. Colostrum should be available for at least 24 hours. If colostrum is not available from the sow, JumpStart™ Full Cream Colostrum should be fed.

Feeding recommendations

Mix 160g/L of water. Add Anlamb™ to half of the required volume of water and mix thoroughly. Top up with water to the correct volume and ensure the temperature of the milk is 40°C.

<table>
<thead>
<tr>
<th>Age of red deer fawn (days)**</th>
<th>Number of feeds per day</th>
<th>Volume per feed (mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 day</td>
<td>8</td>
<td>20-30 colostrum</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>20-30 Anlamb</td>
</tr>
<tr>
<td>3 to 7</td>
<td>6</td>
<td>40-50 Anlamb</td>
</tr>
<tr>
<td>8 to 14</td>
<td>6</td>
<td>80-100 Anlamb</td>
</tr>
<tr>
<td>16 to weaning</td>
<td>ad-lib</td>
<td>ad-lib Anlamb</td>
</tr>
</tbody>
</table>

**Encourage piglets to drink from an auto feeder or shallow dish as early as possible. Introduce milk based feeds to the piglets at 8-14 days.

Brutus™

Brutus™ is a high protein milk powder supplement for weaners and mature pigs.

Brutus™ can be fed as a liquid milk or mixed with dry-feed.

If wet feeding, mix at a rate of 200g/L. For best results feed Brutus™ in-conjunction with pig meal or alternative pig supplements.

Brutus™ is not designed to be fed to any animal breeds other than pigs. It is not a complete infant animal feed. Due to its high protein and low fat formula, it is not suitable for calves, lambs, fawns, puppies or any other infant animals.

The typical metabolic energy (ME) of Brutus™ is between 14-16 mega joules/kg dry matter.

NZAgbiz recommends piglets are reared with Anlamb™ due to its more suitable fat content.

Brutus™ does not have adequate fat content to feed to piglets as a complete milk food. If feeding Brutus™ to pigs less than five weeks of age as a protein supplement only, feed in conjunction with pig meal or molasses.

TYPICAL ANALYSIS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>31%</td>
</tr>
<tr>
<td>Fat</td>
<td>8%</td>
</tr>
<tr>
<td>Lactose</td>
<td>50%</td>
</tr>
<tr>
<td>Moisture</td>
<td>4%</td>
</tr>
<tr>
<td>Minerals</td>
<td>7%</td>
</tr>
</tbody>
</table>
ECONOMIC DECISIONS FOR CALF REARING

There is no one way to rear calves. Select a system to suit your needs and resources. However it is important to address the following factors:

- Husbandry / Management skills
- Staff skills/training and relief staff
- Facilities available for rearing and their condition
- How many calves you can accommodate
- 4 day old and 100kg weaner prices, and demand
- Local availability of calves and other source options
- Availability and price of colostrum
- Calf Milk Replacer pricing and quality
- Meal pricing and quality
- Weaning policy
- Availability of pasture

Calf rearing economic worksheet

QUESTIONS TO ASK: What is your financial situation? Do you have an overdraft? Be realistic - look at margins / credit availability for August - December.

<table>
<thead>
<tr>
<th>Rearing Expense</th>
<th>Indicative $/head excluding GST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calf Milk Replacer (30kg)</td>
<td>$135.00</td>
</tr>
<tr>
<td>Meal 20% (50kg)</td>
<td>$50.00</td>
</tr>
<tr>
<td>Meal 16% (50kg)</td>
<td>$45.00</td>
</tr>
<tr>
<td>Animal Health &amp; Drenches</td>
<td>$7.00</td>
</tr>
<tr>
<td>Hay</td>
<td>$4.00</td>
</tr>
<tr>
<td>Grazing (100kg dry matter)</td>
<td>$20.00</td>
</tr>
<tr>
<td>Bedding</td>
<td>$5.00</td>
</tr>
<tr>
<td>Housing</td>
<td>$10.00</td>
</tr>
<tr>
<td>Dehorning</td>
<td>$5.00</td>
</tr>
<tr>
<td>Tags</td>
<td>$7.00</td>
</tr>
<tr>
<td>Cartage</td>
<td>$5.00</td>
</tr>
<tr>
<td>Power &amp; Fuel</td>
<td>$2.00</td>
</tr>
<tr>
<td>Repairs &amp; Maintenance</td>
<td>$5.00</td>
</tr>
<tr>
<td>Losses (3%)</td>
<td>$3.00</td>
</tr>
<tr>
<td>Interest</td>
<td>$7.00</td>
</tr>
<tr>
<td>REARING COST</td>
<td>$310.00</td>
</tr>
</tbody>
</table>

OUTSIDE INFLUENCES THAT MAY IMPACT REARING:
- Weather - Extreme wet / Drought
- Other - Rates / Insurance / Pasture Regeneration / Fertiliser / Development / Machinery

CONTACT US

For further nutritional advice and sales enquiries, please contact our technical sales managers below or alternatively contact the NZAgbiz Ltd office directly.

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