



The Beginner's Guide to **Calf Rearing**



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Contents

5	Golden principles of good calf rearing	21	Action Plan for Scouring Calves
7	Preparation	21	Nutritional Scours
7	Environment	22	E.coli Scours
7	Bedding	23	Rotavirus Scours
8	Housing and Shelter	24	Cryptosporidia Scours
8	Pen and Shed Sizes	25	Corona Virus Scours
8	Pest Control	26	Salmonella Scours
9	Equipment	28	Navel Ill/ Joint Ill
9	Calf Selection	30	Pneumonia
10	Signs of a Healthy Calf	30	Colic
10	Calf Transport/Pickup	30	Poisoning
10	Calf Arrival	30	Disbudding
11	Colostrum and Antibody Transfer	30	Dehorning
11	Bobby Calves	30	Castration
		31	Weaning
		35	Post Weaning
13	Pre-Weaning	35	Live Weight Targets
13	Liquid Feeds	35	Weighing
13	Colostrum	36	Feeding
14	Antibody Levels and Bacterial Contamination	36	Ruminant Gut Anatomy
14	Cow Selection	36	Rumen Development
14	Colostrum Preservation	37	Parasites
15	Postassium Sorbate Preservation	37	Gastrointestinal Parasites
16	Milk	37	Lungworm
16	Milk Powder	37	Lice
17	Solid Feeds	38	Ticks
17	Water	38	Clostridial Diseases
17	Low Volume/Restricted Milk Feeding	40	Leptospirosis
18	Health Plan	41	Coccidiosis
18	Scours (Diarrhoea)	44	BVD
19	Fluid Replacement for a Scouring Calf	45	Pinkeye
20	Oral Fluid Therapy for Scours	45	Thiamine Deficiency
20	Feeding Regime for Scouring Calves	45	Ryegrass Staggers
20	Faecal Sample Collection	46	Facial Eczema
20	Hygiene and Disinfection Practices	46	Ringworm

Building Blocks To Good Calf Health



✓ Rotagen Combo

For prevention and treatment of calf scours caused by Rotavirus 6 & 10, Crypto, E coli K99, Salmonella, Coronavirus. Rotagen Combo is anti-biotic FREE and GMO FREE.

✓ Enerlect

Enerlect is a high energy source electrolyte that also supplies all the important electrolytes lost during diarrhoea caused by infectious agents or due to a nutritional imbalance.

✓ Vetsan "Super" Concentrate

Virucide, biocide and deodoriser for all surfaces on farm including farm sheds and animal housing such as calf pens. Vetsan is active against all the important pathogenic micro-organisms that can cause calf scours including **Rotavirus, Cryptosporidium, Salmonella, E coli, Coronavirus**. Also effective against **Mycoplasma Bovis**.



The Golden Principles of Good Calf Rearing

1. Select good quality calves
2. Treat calves with care – especially when transporting
3. Provide and feed good quality first milking colostrum as soon as possible - 10-15% of body weight in first 12 hours (by drencher if necessary)
4. Give adequate nutrition – colostrum, whole milk or milk replacer, plus meal or hay to develop rumen
5. Calves should be DRY (note not WARM but DRY)
6. Housing should be draught free but well ventilated
7. Segregate age groups, older calves from younger and keep separate from adult stock (away from the cowshed is best)
8. All in/all out system works best
9. Isolate and treat any sick calf promptly
10. Provide clean air and water
11. Have an adequate manure disposal system
12. Maximum of 100 calves per shed with maximum of 20 calves per pen
13. Take the milk to the calves, not the calves to the milk
14. The same person(s) to feed calves each day, preferably female





Preparation

How a calf is reared affects its future growth and lifetime productivity. A well reared calf has the opportunity to grow and produce to its greatest potential. Investing in calf rearing is an investment in the future of a herd.



Environment

Calves don't need to be warm but need to be reared in a dry and draught free environment as they are born with very little fat reserves to regulate their body temperature. Calves should be housed inside for at least 3 to 4 weeks after birth to give them the best start.

Cold and wet calves will use more energy keeping warm therefore have less available for growth and are more susceptible to illness causing increases in feed and health costs. There is a 20% difference in growth rates and milk consumption if shelter is provided. Once 3 to 4 weeks old, calves can be moved outdoors but should still have access to shelter overnight and on cold or wet days to stay warm and dry.

Bedding

Wood shavings, sawdust, bark or post peelings can be used but sawdust is seen as the 'gold' standard material to rear calves on as even when wet it is warm, it is comfortable for calves to lie down on, faeces stick to it and urine drains through.

Bedding should be a minimum of 150mm deep and must utilise untreated timber. Once the bedding becomes soiled it is best to add more on top rather than rake or disturb it. Bedding should be removed at the end of the calf rearing season, the barn spelled and bedding replaced just prior to the new season.

Before calf arrival the barn, pens and bedding can be treated using a spray which kills multiple pathogens and can be repeated every two weeks. The spray must be safe to use with calves

Air Temperature Threshold for Shivering

Normal Feeding Levels	Friesian Calves	Jersey Calves
Dry Coat, Calm	3°C	9°C
Dry Coat, Wind	8°C	13°C
Wet Coat, Wind	13°C	17°C

Housing and Shelter

Ideally a north or north-east facing shed should be used. The shed should be twice as deep as it is wide to ensure that it will be draught free at the back even if the front (short side) is completely open, with solid partitions around three sides of the pens leaving the front open to allow adequate light and sunlight.

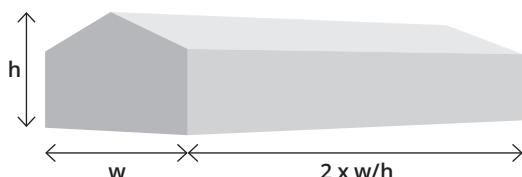
The best flooring is drainage gravel over clay or dirt with an adequate slope in the floor to the sides of the barn to allow for drainage. Drainage should not flow through other pens to minimise the spread of disease.

Wool sheds are designed to provide draughts under sheep so need to be modified to make them suitable for calves by boarding in around the bottom, placing shade cloth over the floor slats and covering with shavings at least 150mm deep and identifying any draughts and correcting them.

Calves from one barn/environmental module should have no direct contact with calves from another barn/environmental module and calves should not be moved from one barn to another.

Pen and Shed Sizes

Each calf pen should allow about 1.5 to 2m² per calf. Each pen should contain a maximum of 20 calves (10-12 is preferred) and each shed/environmental module should contain a maximum of 100 calves.



Key Points

- Keep calves in a dry and draught free environment for at least first 3-4 weeks
- Sheds should be twice as deep as they are wide and face north or northeast
- Pens should have solid partitions on three sides
- Pens require adequate drainage which does not run through other pens
- Bedding material to be at least 150mm deep and untreated
- Pens to allow 1.5 to 2m² of space per calf
- Max 20 calves per pen and 100 calves per shed

Pest Control

Rodent and bird control is necessary to try and prevent the spread of disease e.g. Salmonella from bird droppings. Ideally netting or shade cloth can be used to bird proof sheds to prevent birds from entering while still allowing adequate light and ventilation. If this is not possible then using bird proof feeders, disinfection and removal of residue can help.



Equipment

Thermometer – An essential tool and one of the easiest diagnostic tools available on farm. If a calf is looking unwell check its temperature and that of a well looking pen mate for comparison. A calf's normal temperature is between 38.0 and 39.0 °C.

Calf drencher – to feed colostrum or electrolytes to calves which are not suckling

Electrolyte – on hand for travelled calves or those with any signs of dehydration or scours

Iodine tincture – to spray navels

Antiseptic/cleaner – ideally active against bacteria, virus, protozoa and oocysts

Foot bath – ideally placed at the entry to any calf shed and also any sick pens. The antiseptic solution needs to be kept clean to be effective and often requires daily changes. An alternative is the use of a spray bottle or pressurised sprayer to use on boots after an initial clean to remove any visible dirt.



Key Points

- Have calf rearing first aid kit prepared prior to calving
- Thermometer is invaluable – a must have
- Calves' normal body temp is 38.0 -39.0 °C
- Good quality electrolytes on hand at all times
- Calf drencher to tube feed calves if necessary
- Antiseptic for foot bath and change solution regularly or antiseptic spray solution

Calf Selection and Initial Management

Calf Selection

If calves are being sourced off farm then ideally they should be sourced directly from one farm as buying from sale yards and multiple sources increases the chances of introducing disease. Calves should be 4-5 days old and have received sufficient colostrum as soon as possible after birth and preferably within the first 6-12 hours of life (at least 2 litres but ideally 4 litres). They should be strong and healthy, bright and alert and show no signs of swollen navels, lameness or scours.

Signs of a Healthy Calf

Healthy calves have moist and cool noses with no discharge, are alert, have responsive ears, a shiny coat with supple skin, quiet and effortless respiration and should be bright, active and displaying normal behaviour.



Calf Transport/Pickup

Calves are babies and need to be treated gently and transported with care to reduce stress as much as possible. Calves should be placed gently on trailers in small numbers ensuring each calf has enough room to lie down. Trailer flooring should be soft and easily cleaned. Rubber matting on trailers is ideal as it keeps calves warm, is easily cleaned and helps to reduce the risk of trauma. Calves also need to be protected from wind chill while being transported to keep them as warm as possible.

Calf Arrival

On arrival calves should be assigned pens with similar sized and aged calves and the smallest and weakest given the warmest pens.

Calves that have travelled from off farm should receive 1.5 - 2L of electrolytes on arrival and a further electrolyte feed before being started on milk. If brought straight in from the paddock then

Key Points

- Ideally source calves direct from one farm
- Purchase calves which are 4-5 days old and which have received adequate first milking colostrum
- Select strong and healthy calves
- Transport calves with care
 - protect from wind chill, provide soft flooring and avoid overcrowding
- Monitor and spray navels with iodine, treat promptly with antibiotics if infected
- Feed 1.5 - 2L electrolytes to calves on arrival which have travelled from off farm
- Feed 1.5 - 2L first milking colostrum to calves brought straight in from the paddock
- Ensure each calf receives 10-15% of bodyweight in colostrum in first 6-12 hours
- Maximum of 1.5 to 2L electrolytes/colostrum depending on calf size given to each calf at each feed ideally at body temperature
- Calf pickup at least twice a day
- Feed colostrum for at least first 4 days of life

they should receive fresh first milking colostrum as their first feed.

When the calves arrive at the shed each navel should be checked and sprayed with iodine. Navels should be checked daily for the first week. Any calves with swollen or wet navels need to be monitored closely and treated if the navel

Colostrum management is the single most important factor in improving calf health.



is hot, tender to touch or has any pus present. Calves with navel ill infections require antibiotics. The earlier they are treated the better the chance of cure and the less likely joint ill (swollen and infected joint(s) is to occur.

Colostrum and Antibody Transfer

A calf is born with a very immature immune system and absorbs antibodies from colostrum in the first 24 hours of life to provide passive immunity until the calf's immune system starts to build up its own antibodies.

Colostrum is very important and good quality, first milking colostrum should be harvested and fed as soon as possible to ensure that a calf receives adequate levels of antibodies.

Antibodies (Immunoglobulin G or IgG) are very important for a calf's immunity in the first few weeks of life. The first milking colostrum, also called gold colostrum, contains the highest levels. Immunoglobulin levels can be measured on a Brix refractometer with levels in colostrum greater than 22% best for newborn calves.

Each calf needs to receive 10-15% of their body weight in colostrum ideally in the first 6-12 hours. This means a 40kg calf requires 4-6 litres of colostrum. A maximum of 2L should be given each feed so at least two feeds are needed. If a calf is not drinking then it should be tube fed. Ideally colostrum should be fed at body temperature.

Calves need to be picked up at least twice a day to ensure enough colostrum is received as soon as possible. Leaving calves on cows in the paddock does not ensure a calf receives adequate colostrum early enough.

Bobby Calves

Bobby Calves should be looked after well and need to meet the following criteria before being transported off farm.

1. Minimum of 4 days old
2. Bright and alert
3. Correct ear tag
4. Dry navel
5. No scours
6. Firm and worn hooves
7. Standing and walking normally
8. Full tummy (no antibiotic milk fed)
9. Not treated with any drugs with withholding periods e.g. antibiotics



Pre-weaning

Liquid Feeds

Calves need to receive enough liquid feed to meet their total nutrient requirements until they are at least 4 weeks old and need to receive liquid feeds until their rumen has developed enough to allow them to meet their complete feed requirements from solids.

During the first week after birth calves should receive colostrum, milk or milk replacer at 10-15% of their bodyweight per day. To achieve this they require 2-7 litres per day given in at least 2 feeds per day. Ideally this should be fed warm at body temperature, but not above 39.0 °C. Smaller calves should receive a maximum of 1.5L per feed and larger calves up to 2L per feed. Ensure when group feeding calves that all calves, even the slowest drinkers, are receiving what they need.

To prevent calves from digestive upsets i.e. scouring, changes in feeding need to be avoided or undertaken gradually. Avoid overfeeding, rapid changes in the diet or underfeeding.

All equipment used in feeding calves needs to be thoroughly cleaned after each use using hot water

Key Points

- Feed liquid feeds to meet total nutrient requirements till at least 4 weeks old, then feed until rumen has developed fully to meet their complete nutrient requirements
- Feed colostrum, milk or milk replacer at body temperature at 10-15% of bodyweight during the first week of life in at least 2 feeds per day
- To prevent digestive upsets ensure all equipment is cleaned after each use, avoid sudden changes in feeding, overfeeding, underfeeding or rapid changes in diet

gut immunity. Colostrum should be fed for at least the first 4 days of life.

Early feeding of first milking colostrum to calves is essential to give calves the best opportunity to absorb antibodies. A calf's ability to absorb antibodies decreases with time and is virtually lost by 24 hours after birth which means younger calves absorb antibodies from colostrum better than older calves. Calves need to be fed 10-15% of their bodyweight in colostrum. Ideally they should receive this in the first 6-12 hours of life, but must receive it before they are 24 hours old.

Calves which do not receive adequate amounts of good quality colostrum early enough have failure of passive transfer (FPT) which makes them less able to defend against disease and are four times more likely to die. They also have reduced growth rates, poorer feed conversion ratios, have higher rates of scouring and produce less milk in their first lactation.

Colostrum

Colostrum management is the single most important factor in improving calf health.

Colostrum is a highly digestible and nutritious feed which makes it an ideal feed for calves and can also supply local

New Zealand studies have shown that 25% of day old calves have received no colostrum and up to 40% of day old calves have had insufficient amounts of colostrum.

Antibody Levels and Bacterial Contamination

First milking colostrum contains higher levels of antibodies and nutrients than subsequent milkings and should be fed to new born calves. If colostrum is pooled then ensure new born calves are only receiving first milking colostrum in the first 24 hours after birth.

Cows chosen to provide first milking colostrum for calves need to be milked as soon as possible after calving as antibody levels decrease in the udder over time even before the first milking. The levels also continue to drop after milking if the colostrum is not used immediately or preserved.

The quality of the colostrum also affects how well antibodies are absorbed. High bacterial counts (especially coliforms) interfere and block IgG absorption in the calves' gut. Calves which have been fed colostrum with high levels of IgG can still have failure of passive transfer if the colostrum has high levels of bacterial contamination. To reduce contamination of colostrum it should be fed as soon as possible after collection or preserved. Collection and storage containers and all feeders need to be scrubbed with hot water and detergent after every use to prevent bacterial build up. Storage containers need to be secure to prevent contamination by vermin and birds.

Cow Selection

First milking colostrum should be sourced from healthy cows. Older cows (6 years

and up) have higher levels of antibodies in their colostrum compared with heifers so are a better source of quality colostrum for calves. Cows producing less than 8 litres of colostrum at their first milking also usually produce colostrum containing higher levels of antibodies.

Vaccinating cows with scour vaccines produces an increase in the antibodies present in the colostrum in all ages of animals including heifers.

Cows producing colostrum containing blood (pink colostrum) should not have their colostrum fed to calves or stored as blood is a great nutrient for bacteria.

Colostrum Preservation

If colostrum cannot be fed fresh within 12 hours of milking then it needs refrigeration at 4°C or preservation if kept at room temperature. If refrigeration is not possible then potassium sorbate is the recommended preservation method as it not only preserves IgG levels but also keeps bacterial numbers down and allows colostrum to be stored at ambient temperatures.

Stored colostrum should be stirred thoroughly before being fed to calves and should be fed within 2 to 3 days of collection.

Easiyo probiotics (ie yoghurt) are not recommended as they do not preserve IgG levels and do not prevent bacterial growth. Formaldehyde and hydrochloric acid are also not recommended to be used for preservation in the food industry as they are carcinogens.

Colostrum can also be frozen as this preserves antibody levels and keeps bacterial levels low. Ideally colostrum should be frozen in volumes of 2L and thawed to body temperature in a bucket of warm water prior to being fed.

Key Points

- Give colostrum to calves
- Quickly – in first 6-12 hours (milk cow and feed calf ASAP post calving)
- Quantity – 10-15% bodyweight of calf
- Quality – first milking only (gold colostrum) with low bacterial counts
- Select first milking colostrum from cows milked soon after calving, preferably older cows producing less than 8 litres at their first milking
- Ensure storage containers are secure and all storage containers and equipment are cleaned after every use
- Feed colostrum fresh and at body temperature within 12 hours of collection or preserve with potassium sorbate
- Brix value of first milking colostrum for newborn calves = 22% or higher
- Can check the prevalence of failure of passive transfer by testing the IgG levels in the blood of 12 healthy calves (0-7 days of age) with a Brix refractometer

Potassium sorbate is available in powder or granule form which needs to be mixed to a 50% solution with clean water before use. The amount of powder or granules needed should be added to the required amount of water and mixed till dissolved. The 50% solution is then added to colostrum or milk at a rate of 1% and mixed thoroughly. Treat each new amount of colostrum with the potassium sorbate solution before adding to the bulk container of stored colostrum to avoid errors in dosing. Overdosing with potassium sorbate may cause cardiac problems in calves. Avoid using potassium sorbate solution which has been mixed up for more than a week.

Mixing Potassium Sorbate

- Use clean and sterile equipment
- Use only food grade potassium sorbate and very clean water
- Wear safety glasses, dust mask and latex gloves
- Use accurate scales to weigh potassium sorbate and liquid containers with millilitre measurements

Potassium Sorbate Preservation

Potassium sorbate is a chemical food preservative which stops the growth of bacteria and also preserves the levels of antibodies in first milking colostrum. Only fresh clean colostrum should be used as potassium sorbate only inhibits bacterial growth.



Step 1:

Make Potassium Sorbate 50% solution - mix thoroughly

Potassium Sorbate 50% Solution	Water
---	--------------

50g	100ml
500g	1L
1kg	2L
2.5kg	5L
5kg	10L
10kg	20L

Step 2:

Add 50% Potassium Sorbate to Colostrum or Milk

Potassium Sorbate 50% Solution	Colostrum or Milk
---	------------------------------

1mL	100ml
10mL	1L
100mL	10L
200mL	20L
1L	100L

Mix the solution thoroughly with fresh colostrum or milk then add this to the bulk store.

Milk

Whole milk can be fed after day 4 and is a nutritious and balanced feed for calves. Milk should be fed at body temperature and ideally fed fresh but can be preserved with potassium sorbate (as above for colostrum) to allow it to be stored prior to feeding.

Calves fed on colostrum and whole milk are generally healthier than those reared on milk powder.

Milk Powder

Milk powder is an alternative feed which is used when whole milk is not available. Calves can be fed on milk powder from 4 days of age. Ideally it should be fed warm at body temperature and be freshly mixed. Milk powder is available in curding or non-curdling forms. These should not be mixed when fed. Curding milk powders contain casein proteins and are suitable for younger calves. Non-curdling milk powders don't contain casein and are generally cheaper but should not be fed to calves younger than 2-3 weeks of age.

When feeding milk powder always follow the feeding guide on the bag and adjust as the calves grow. Care needs to be taken to mix the required amount of powder with the necessary amount of liquid to ensure the correct strength is made. Milk powder should always be mixed according to the packet directions and should not be watered down as this can cause scouring.

Key Points

- Feed calves milk or milk powder after 4 days of age at body temperature
- Ideally feed fresh milk and always use freshly mixed milk powder for every feed
- Always mix up milk powder according to packet directions
- Curding milk powders are suitable for younger calves and non-curdling milk powders suitable for calves older than 2-3 weeks

Calves should have access to solid feeds from the first week of life.



Solid Feeds

Calves should have access to solid feeds from the first week of life such as meal, pellets, hay or grass. Eating solids enhances rumen development and begins to prepare the digestive tract for the transition from liquid feeding, to solids only feeding and provides additional energy and nutrition.

Many calf meals contain coccidiostats but calves need to be eating the recommended amount especially around weaning to ensure they are ingesting enough coccidiostat to provide protection.

Palm kernel is not a suitable feed for young calves as it is not palatable so they will not readily eat it.

Key Points

- Clean fresh water must be available at all times
- Ensure access to solid feeds from the first week of life (meal, pellets, hay or grass) to help with transition from milk feeding to solids only feeding
- Ensure calf meal contains a coccidiostat and that calves are ingesting enough to gain protection
- Avoid feeding palm kernel to young calves

Water

Calves should have access to clean and fresh water at all times to reduce the risk of water contamination and disease. Water intake is important for rumen development as milk bypasses the rumen to enter the abomasum via the oesophageal groove.

Low Volume/Restricted Milk Feeding

Milk is the most expensive part of a calf's diet so reducing the amount of milk needed and getting a calf onto pasture sooner reduces the costs of rearing.

Calves fed on milk powders should be fed a higher concentration of powder per litre using the recommended mixing instructions and volumes to be fed from the label. Those calves fed on whole milk can be fed 2L twice a day for the first 10 days, then 3L once a day for another 5 weeks.

Whole milk can also be fortified with milk powder. Calves on low milk systems must be fed using compartment feeders and monitored during feeding to ensure they are receiving their share of milk. Calves also need to be fed calf pellets or meal to encourage early rumen development and meet nutritional requirements while the rumen is developing. Calves need to be kept inside until after weaning to ensure they are eating the concentrates rather than pasture. Calves should be fed concentrates containing 20% protein ad lib from day one until they are on pasture. Straw or low quality hay can also be provided to aid in rumen development.

Key Points

- Milk is expensive to feed - speeding up rumen development reduces calf rearing costs
- Calves are kept inside until weaning and fed a lower volume of concentrated milk powder or moved to once a day feeding on whole milk +/- fortified with milk powder
- Monitor feeding and use compartmental feeders to ensure calves receive their share of milk
- Calves must also have available ad-libitum concentrates (pellets or meal) containing 20% protein to encourage rumen development and meet energy requirements
- Straw or low quality hay can also be provided to encourage rumen development

Calves can be weaned from milk once they have gained at least 20kg live weight

and are eating at least 1kg of concentrates per day. Once calves are weaned and eating good quality pasture, concentrates containing 16% protein can be fed.

Health Plan

Calves are a significant investment and anything affecting them that results in loss of production or life can have a significant economic and emotional impact on calf rearers.

All parties involved in calf rearing benefit from a structured and planned approach to calf health.

The Vet Centre can provide animal health plans for any calf rearing facilities and give recommendations to individual rearing systems. We also have accurate electronic scales available for hire to our members.

The Vet Centre also has qualified Veterinary Technicians available to perform disbudding, drenching, bolus administration, vaccinations, non-surgical castration and weighing.

Scours (Diarrhoea)

There are many causes of scouring in calves but the basis of treatment is the same.

1. Identify and treat the causal agent
2. Correct dehydration and electrolyte imbalances
3. Maintain energy levels



Sunken eyes are a clinical sign of dehydration.



Rotagen Combo can assist in the treatment of scours in neonatal calves. Discuss the appropriate type of Rotagen Combo to use with one of our veterinarians.

The majority of calves that die from scours do not do so as a direct result of the infectious agent(s) but from dehydration, lack of energy and electrolyte imbalances.

The key to a successful outcome in the treatment of scours is by early detection, prompt action and adequate therapy.

Calves which are not drinking require tube feeding and calves which are more than 10% dehydrated require intravenous fluids.

95% of scouring calves can be treated successfully using correct oral electrolytes at the right dose. Good quality, commercially prepared electrolytes such as Revive are recommended due to their higher energy levels.

Degree of Dehydration and Clinical Signs

Body water loss	Clinical signs
<5%	Mild depression
5-10%	Sunken eyes, tight skin, depressed, not eating, reluctant to move
10-12%	Calves go into shock, have cold extremities, are recumbent
12-15%	Death

Fluid replacement for a Scouring Calf

Degree of dehydration	Fluid needed to restore body water (Litres/day)	Maintenance fluid required (Litres/day)	Total fluid requirements (Litres/day)
2%	1.0	4.5	5.5
5%	2.3	4.5	6.8
10%	4.5	4.5	9.0

Oral Fluid Therapy for Scours

Scouring calves can and should be given milk along with the electrolyte solution but most electrolytes require these to be fed separately with 2-3 hours between feeds to allow curding of the milk to occur.

Calves should be rehydrated with electrolytes and continue to receive their regular milk feeds.



Faecal sample collection.

Feeding Regime for Scouring Calves

- 2L milk in morning
- 2L electrolytes at midday
- 2L milk in afternoon
- Access to electrolytes in pen overnight

Electrolytes do not provide enough energy to calves so continuing colostrum or milk feeding is very important to provide them with the energy to help them recover.

Any calf which has been scouring for 12 hours is at least 5% dehydrated and requires electrolytes orally or by stomach tube.

Samples for testing cannot be picked up from the floor of a calf shed as they will be contaminated.

Hygiene and Disinfection Practices

Sheds can be sprayed regularly with a disinfection solution while calves are inside to help prevent the build-up of infective particles in the environment.

Keeping sheds clean and regular cleaning and disinfection of equipment helps prevent disease spread.

Minimising visitors to calf sheds, using footbaths, tending to infected calves after healthy ones and changing overalls and cleaning boots between pens/sheds also helps reduce the spread of disease.



Disinfectant foot bath.

Faecal Sample Collection

Faecal samples MUST be taken from sick calves BEFORE any treatments have been given. The sample should be collected directly from the calves' rectum via a gloved finger and placed into a clean sealed container or sample pottle and kept chilled until testing can be performed.

Ideally testing should occur as soon as possible after collection.

Action plan for scouring calves

- Isolate infected calves - no new calves in environment
- Identify cause - faecal sample (test/culture) or post mortem
- Electrolyte therapy – stomach tube/ad lib electrolytes
- Specific therapy related to cause – restrict antibiotic use to vets' recommendation based on cause
- Initiate prevention methods – spray pens with disinfectant, long term = scour vaccination
- Continue normal milk feeding

As they become dehydrated and lose electrolytes they become depressed, reluctant to feed, are lethargic, often have a dry muzzle, are wet around tail area, have sunken eyes and are dehydrated. Faeces are often bright yellow or white.

Treatment

Scouring calves should be fed milk twice daily and electrolytes 2-3 times daily. Calves should be tube fed if not drinking on their own and may require up to 10 litres of fluid per day depending on the severity of the scour and level of dehydration. Milk is required for energy and electrolytes to replace those lost in the scour. Always ensure there are 2-3 hours between milk and electrolyte feeds to allow the milk to curd properly.

Nutritional scours do not require antibiotics but can develop into an infectious scour so it is important to supplement early and judiciously with electrolytes and monitor calves closely.

Nutritional Scours

Cause

Nutritional scours can occur when there are changes in the management or environment of a calf causing stress.

Causes can include things such as stress from transporting, too rapid a change in diet, overfeeding, improperly formulated milk powder, overcrowding, sudden changes in weather etc.

Nutritional scours occur when milk is inadequately digested in the abomasum and moves into the intestines overloading them with lactose. The lactose draws fluid from the body into the intestines which results in a thin watery scour causing dehydration.

Symptoms

In the early stages calves often appear quite healthy and are still willing to feed.

Key Points

- Nutritional scours are due to stress, overfeeding or changes in feed
- Important to detect early and treat promptly to minimise effect on calves
- Dehydration and electrolyte imbalances cause damage
- Remove calves from milk for 24 hours and feed adequate volumes of electrolytes until recovery from scours
- Do not use antibiotics unless indicated

E. coli Scours

Cause

E. coli scours are caused by the bacterium Escherichia coli. Two types of disease are seen. One is a neonatal infection which occurs in calves less than 4 days of age caused by enterotoxigenic E. coli (ETEC) and the other in calves older than six weeks of age caused by enterohaemorrhagic E. coli (EHEC).

Spread

Spread via oral route from faeces from infected or carrier animals. Normal adult cows can carry the infection. Infected animals excrete large numbers of bacteria.

Symptoms

Enterotoxigenic E. coli (ETEC) occurs in very young calves (<4 days of age). The scour is yellow to white and very watery with a foul odour. Temperatures are normal but drop below normal very quickly. Calves are weak, lethargic and unwilling to drink, often before scouring becomes apparent. Calves can die before showing any signs, within a few hours of clinical signs or after 3-5 days.

Enterohaemorrhagic E. coli (EHEC) occurs in calves older than 6 weeks. The diarrhoea is often mucoid, not very watery, can contain mucosal tissue and blood and often smell foetid. As the large intestine is inflamed some calves will strain to defecate, grind their teeth and can have a fever of up to 40°C. Calves become increasingly dehydrated and can die after several days. Those which survive recover after 7 to 10 days.

Diagnosis

Faecal sample for in clinic testing of ETEC E. coli or faecal samples sent to lab for culture. EHEC E. coli can also be diagnosed from histology of intestine.

Treatment

Calves require aggressive electrolyte therapy and continued milk feeding. Calves with elevated temperatures require treatment with injectable antibiotics.

Prevention

Protection against ETEC E. coli can be given through vaccination of cows 12 to 3 weeks prior to calving and ensuring calves receive adequate amounts of this colostrum early enough.

Key Points

Enterotoxigenic E. coli

- Seen in calves <4 days of age with diarrhoea due to toxins secreted by bacteria causing little intestinal damage but severe dehydration
- Yellow to white watery scour with foul odour
- Weak and lethargic calves which are unwilling to drink, often have low temperatures
- Death can be seen before signs, within a few hours or after 3-5 days
- Treatment with electrolytes and if necessary injectable antibiotics
- Prevention by vaccination of cows pre calving with a vaccine against E. coli K99 and adequate early colostrum feeding to calves

Key Points

Enterohaemorrhagic E.coli

- EHEC E.coli in calves >6 weeks of age with a foetid smelling, mucoid scour often containing mucosal tissue and blood
- Calves can strain to defecate, grind their teeth and have a fever of up to 40°C
- Death can occur after several days, those that survive recover after 7-10 days
- Treatment with electrolytes and injectable antibiotics

Typical rotavirus scours.



Rotavirus Scours

Cause

It is caused by a virus which infects and kills the cells on the tips of the intestinal villi. This damage causes loss of fluid from the intestinal cells as well as impaired absorption of milk and electrolytes which results in dehydration. Calves that die usually do so due to the dehydration and electrolyte imbalances rather than the virus itself. Scouring will continue until the intestinal cells have regrown allowing absorption and digestion to occur.

normally. Calves can shed the virus in their faeces without showing clinical signs and do not build up an immunity so can be re-infected.

Spread

Rotavirus can survive well in the environment and can be infectious for months. Calves less than 3 weeks old are generally affected. Spread occurs when infected calves shed large amounts of virus in their faeces which are ingested by other calves or when virus particles are aerosolised and are inhaled by other calves.

Symptoms

Symptoms are usually seen within 24 to 48 hours after infection occurs. Calves have a pale yellow scour which smells bad and can be watery and sometimes bloody. They are usually reluctant to feed, fussy with the teat or slower to feed than normal. Calves are losing large volumes of fluids and electrolytes so become dehydrated and show signs of dehydration.

Diagnosis

Rotavirus can be diagnosed from faecal samples using an in clinic test or sent to the laboratory. Diagnosis needs to be made quickly to allow calves to be treated promptly.

Treatment

Treatment for rotavirus involves giving large volumes of electrolytes and continuing milk feeding. Sheds can be sprayed twice a week with a virucidal solution during outbreaks and also routinely to try and prevent virus build up.

Prevention

Vaccination of cows against rotavirus and feeding calves with colostrum from these cows can help prevent rotavirus. Antibodies in colostrum from vaccinated cows can provide some local gut immunity to calves during the greatest risk period of 5 to 14 days of age.

Key Points

- Virus so doesn't respond to antibiotics
- Spread via faeces and occasionally airborne
- Calves have a pale yellow scour and are often reluctant to feed
- Can be diagnosed via in clinic testing of faecal samples
- Treatment involves large volumes of electrolytes and continuing milk feeding
- Maintaining hygiene and high levels of cleanliness to prevent spread
- Prevention by vaccination of cows against rotavirus and feeding colostrum from these cows, and the use of virucidal sprays

Cryptosporidia produce oocysts which are excreted by affected calves in their faeces.

Spread

Crypto is spread via faeces and infection is maintained by infected cows which shed oocysts around calving time. Affected calves shed large amounts of oocysts into the environment and can become persistently infected and remain reservoirs for the disease. Crypto usually spreads rapidly and can persist in the environment.

Symptoms

Crypto causes damage and atrophy of the villi lining the small intestine and abomasum. This damage causes decreased digestion and absorption of liquid and milk causing diarrhoea. Diarrhoea can last anywhere from 4 to 13 days. Calves can show abdominal pain and reluctance to feed. Faeces can be watery and yellow or grey, mucoid and slimy. Calves can have large reductions in growth rates if severe damage has occurred to the villi and can have slow growth rates for weeks after infection. Death rates are generally low unless complicated by other infections e.g. rotavirus but many calves can be affected. Many calves can be affected but not show signs of scouring.

Cryptosporidiosis Scours

Cause

Cryptosporidia are small protozoan parasites which infect the gastrointestinal tract of calves causing diarrhoea. Calves are usually affected from 4 to 28 days of age. Cryptosporidia can also affect humans causing signs of nausea, anorexia, abdominal pain, cramps and watery diarrhoea.

Diagnosis

Diagnosis is by faecal testing. Crypto is difficult to distinguish from other causes of scours on appearance alone and is often found in combination with other causes of scours.

Treatment

Treatment involves early aggressive electrolyte therapy to combat dehydration.

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Revive is an electrolyte solution which helps to reduce the recovery period.

Halocur is a drug which can be used to reduce the number of oocytes excreted to help in the prevention and management of an outbreak.

Calves with mixed infections which have a bacterial component to their scour also benefit from antibiotic therapy.

Prevention

Maintaining good hygiene practices and spraying calf sheds with an agent effective against oocysts helps to reduce the level of infection.

Key Points

- Protozoan parasite causing damage to intestinal tract and diarrhoea
- Calves are usually affected from 4 to 28 days of age
- Affected calves excrete large numbers of oocysts in faeces causing high levels of environmental contamination
- Many farms have carrier animals maintaining infection
- Faeces can be watery and yellow or grey, mucoid and slimy
- Death rates are usually low unless complicated by other infections
- Remove from milk for 24 hours and treat with electrolytes and Halocur
- Maintain good hygiene practices and spray sheds with an agent effective against oocysts

Coronavirus Scours

Cause

Coronavirus infection is becoming more common in New Zealand and can occur in conjunction with other causes of scours. It usually affects calves from 5 to 20 days of age and around 15-20% of animals are typically affected.

Coronavirus damages the cells of the small and large intestines and causes villus atrophy resulting in poor digestion and absorption of fluids. Recovery is more prolonged than with rotavirus as coronavirus causes greater villus atrophy.

The virus is sensitive to most disinfectants and to heat but can tolerate cold conditions.

Spread

Coronavirus infection is acquired by ingestion and also possibly by the respiratory tract as the virus can infect the cells lining the nasal turbinates and the airways.

Symptoms

Symptoms are usually seen 3 - 5 days after infection, with diarrhoea for 3 - 10 days. The faeces are watery at first, but become mucoid, may contain undigested milk curd and occasionally blood. Calves can be seen straining to produce faeces. In the initial stages of infection calves continue to feed but become weaker and more lethargic as their energy reserves are depleted and they become dehydrated. Calves can become very thin as they are not able to digest and absorb nutrients. Mild pneumonia can also sometimes be seen with coronavirus infections.

Diagnosis

Faecal samples (at least 3-4) can be tested for the presence of coronavirus in clinic and at the laboratory.

Treatment

Treatment involves keeping calves hydrated with large volumes of electrolytes and continuing milk feeding. Sheds can be sprayed twice a week with a virucidal solution during outbreaks and also routinely to try and prevent virus build up.

- Treatment involves large volumes of electrolytes and continuing milk feeding
- Maintaining high levels of hygiene and cleanliness to prevent spread
- Prevention via vaccination of pregnant cows against coronavirus and feeding calves colostrum from these cows, good hygiene practices and virucidal sprays

Prevention

Vaccination of pregnant cows against coronavirus before calving helps protect calves which are fed colostrum from these vaccinated cows.

Key Points

- Virus so doesn't respond to antibiotics
- Infection acquired orally and by the respiratory tract
- Affects calves from 5-20 days of age
- Damages intestinal cells and causes severe villus atrophy resulting in poor absorption and digestion resulting in diarrhoea
- Faeces can be watery or mucoid, contain undigested milk curd and blood
- Calves may strain to produce faeces and lose weight rapidly
- Diagnosis by testing of faecal samples in clinic (at least 3-4 samples)

Salmonella Scours

Cause

Salmonella is a bacteria that causes intestinal infection in calves resulting in scours. Calves are generally affected from 2-12 weeks of age. Infection can spread to people so care and good hygiene practices need to be used when dealing with infected calves.

Salmonella can survive in the environment and can live for months in partially dry faeces in calf sheds which have not been completely cleaned out, but the salmonella bacteria are affected by drying and sunlight.

Spread

Salmonella is spread by ingestion of bacteria from the environment and in feed or water. Calves which are under stress and/or those who have received inadequate levels of antibodies from colostrum are more susceptible to infection. Calves start to show signs of infection from 1 to 5 days after ingestion of bacteria.

Don't let them all go down



Treat and prevent with Halocur

Highly contagious, calf scours caused by *Cryptosporidium parvum* can take out every calf in a pen – and even spread to humans. Halocur® is the only Registered Veterinary Medicine (RVM) available that can treat scours caused by *Cryptosporidium* and be given to other calves in the pen to help prevent the spread of *Cryptosporidium* diarrhoea. By keeping Halocur at the ready, you'll give your calves their best chance of standing up to an outbreak of Crypto.

Halocur – the only RVM available that does more than just treat.



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 **MSD**
Animal Health

Symptoms

Salmonella causes severe damage to the intestinal lining which results in massive loss of fluids and electrolytes into the intestinal lumen which causes severe scouring leading to dehydration and death. The bacteria produces enterotoxins which cause damage to the intestinal lining allowing the bacteria to enter the bloodstream and lodge in other organs causing septicaemia which leads to blood poisoning and death.

Septicaemia in newly born calves (>1 week old)

- Sudden onset illness with calves found dead in the pen
- Drop in appetite and reluctance to feed
- Marked increase in temperature (40.5-41.5°C) with death in 24-48 hours
- Moderate to severe diarrhoea
- Can have nervous and ocular signs, multiple joints affected and pneumonia
- Death rates can reach 100%

Acute Enteritis in older calves (2-6 weeks old) is the most commonly seen form

- Fever 40.4 to 41.5°C
- Anorexia and depression
- Brown pasty scour that develops into watery diarrhoea
- Temperature often drops once scouring begins and can drop below normal
- Rank smelling scour which can contain pieces of mucous membrane and blood

- Calves can show abdominal pain and sometimes strain
- Dehydration, loss of bodyweight and weakness occurs rapidly
- Calves become increasingly dehydrated which often results in death

Chronic Enteritis or milder cases

- Pasty, yellow-grey faeces
- Often slow growers/poor doers
- Can become carriers and shed bacteria in faeces

Diagnosis

Diagnosis is by sending faecal samples (usually from several calves – at least 5-6) to the laboratory for culture as excretion of bacteria can be intermittent.

Treatment

Early identification of infected calves means that they can be treated quickly with large volumes of electrolytes and injectable antibiotics.

Treatment needs to be early and aggressive to try and avoid permanent damage to the intestines and prevent losses. Once permanent intestinal damage has occurred, death usually results from dehydration as the intestine can no longer absorb fluids.

In outbreaks large numbers of calves can be affected and mortality rates are often high.

Prevention

Sheds should be thoroughly cleaned out at the end of the season to remove all faecal matter. Pens can be sprayed

regularly during the season with antiseptic solution.

Calves need to be treated gently and every effort made to reduce stress such as gentle handling, care with transport and avoiding overcrowding. Ensure all calves receive adequate colostrum as soon as possible after birth. Cows can be vaccinated at 8 and 3 weeks prior to calving to provide protection to calves receiving their colostrum.



Blood and mucous in Salmonella diarrhoea.

Key Points

- Salmonella is a bacteria which causes intestinal infections in calves and humans
- Bacteria can survive in sheds in calf faeces for months
- Affects calves generally from 2-12 weeks of age
- Calves which are stressed and have poor immunity most at risk
- Aggressive disease often with high death rates
- Treatment is with large volumes of electrolytes and injectable antibiotics
- Prevention is by ensuring calves receive adequate colostrum, minimising stress and having good hygiene practices

in the blood and lodge in joints resulting in joint infections, commonly known as joint ill. Often more than one joint will be affected.

Navel infections can be prevented by calving in clean conditions, gentle handling of calves especially when transporting and spraying navel cords with iodine.

If navel infection occurs then treatment with injectable antibiotics is necessary.

Treatment can be unrewarding in calves where the infection has already spread to the liver and/or joints so close monitoring of navels and early detection of infection is important.



Swollen, infected knee joint.

Navel Ill/Joint Ill

Occurs when bacteria colonise and cause infection of the navel cord usually in the first 24 hours after birth. Bacteria can spread causing infection in the liver, and enter the blood stream and be circulated

*Local anaesthetic
prior to horn bud
removal.*

Pneumonia

Pneumonia can occur in calf sheds when there is a build-up of ammonia gas due to poor ventilation. Prevention is by having adequately ventilated sheds and ensuring good drainage to allow urine to escape rather than pool beneath pens.



Colic

Colic is generally seen soon after feeding and often occurs because of rapid drinking. Calves show signs of distress within an hour of being fed such as kicking at their belly and falling over. Teat flow rates should be checked and any that flow very quickly should be replaced. Colic can also be caused by eating too much grain.

Poisonings

Common causes;

- Lead from old painted woodwork or iron
- Arsenic from treated shavings
- Milk fed from improperly rinsed bloat oil containers
- Rodent and bird poisons

Disbudding

Disbudding is best performed before 6 weeks of age using a heated cauterising iron. As this is a painful procedure, by law all calves must receive a local anaesthetic and ideally should also receive an anti-inflammatory injection for ongoing pain relief. Disbudding is performed on sedated calves allowing other procedures to be carried out safely and easily at the same time if needed.

Castration

Castration should ideally be performed before six weeks of age using a rubber elastrator ring. Calves older than this may require a larger ring or surgical castration.

By law any animal over the age of 6 months requires an anaesthetic to provide pain relief.



Key Points

- Navel ill prevention includes a clean calving environment, gentle handling and iodine application to navels
- Prevent pneumonia by ensuring adequate ventilation of sheds and good drainage of liquid wastes
- Watch out for colic which occurs due to rapid drinking or grain engorgement
- Be mindful of what is in the calves' environment and take care with the use of poisons
- Disbudding is the preferred method of horn removal – best performed before 6 weeks of age
- Animals dehorned over 9 months of age require anaesthetic pain relief by law
- Castration with rubber ring preferred - best performed before 6 weeks of age
- Animals castrated over 6 months of age require anaesthetic pain relief by law

and transport which can lead to a check in growth rates, with a reduction in immunity leading to increased susceptibility to other diseases. To minimise weaning stress calves need to be healthy, fed both milk and meal and be growing well before weaning.

The age of weaning depends on the feeding system used but dairy calves in New Zealand are commonly weaned from 7-12 weeks of age. Calves should be weaned according to body weights rather than age alone as this allows smaller calves or those who have been sick time to catch up.

The target weaning weights are dependent on breed with Friesian calves target live weights higher than those of Jersey or crossbred calves.

Calves should be weaned on their live weight depending on which feeding system has been used to rear them.

Calves reared on higher volume milk systems (as generally occurs on NZ dairy farms) need to be weaned at heavier weights as they have slower rumen development. Calves reared on low volume milk systems can be weaned earlier as their rumen has developed earlier.

Weaning

Weaning is a stressful time in a calf's life and needs to be managed well to ensure a smooth transition from milk to pasture. A calf goes from being a single stomached animal eating milk and cereals to a fully functional ruminant which can grow on a pasture based diet.

This transition alone can be stressful but can also be worsened by other factors such as bad weather, regrouping

High Milk System Target Weaning Weights;

- Jersey 80kg
- Cross bred 90kg
- Friesian 100kg

Low Milk System Minimum Weaning Weights;

- Jersey 55kg
- Crossbred 60kg
- Friesian

A calf should be eating at least 1kg of meal daily at weaning with meal feeding continuing for at least a month post weaning. This ensures calves are receiving a high quality energy supplement and also receiving adequate coccidiostat in the meal to prevent the disease coccidiosis from occurring.

Coccidiosis is a parasitic disease that often occurs in young stock between 2-8 months of age and is particularly seen in dairy replacements after weaning. A large number of animals in the mob can be affected with generally few deaths occurring, but often long term damage occurs to the gut. Calves with coccidiosis often strain repeatedly, have bloody diarrhoea and appear unhappy and uncomfortable with decreased feed and water intakes.

The use of coccidiostats in meal helps but where coccidia levels are high a specific drench is needed to treat the disease.

The milk volume fed should be gradually reduced over about a week to encourage the calf to eat more meal or pasture to replace the milk. Meal feeding should be increased to 2kg/calf/day for two to three weeks then can be gradually reduced down to 1kg/calf/day then down to 0.5kg/calf/day after 4-6 weeks.

Calves should be weaned onto clean, high quality pasture to encourage intake. If pasture is not good quality then supplementation with additional meal may be required to maintain growth rates, especially during the summer months when pasture quality declines. Clean water must be available to calves at all times.

Shelter is an important aspect of weaning and access to shelter during sudden weather changes or prolonged bad weather helps decrease susceptibility to health problems.



Key Points

- Base weaning decisions on calf weights (scales available to hire from The Vet Centre)
- Target weaning weights – high volume milk rearing system - Jersey 80kg, Crossbred 90kg, Friesian 100kg
- Target weaning weights – low volume milk rearing system – Jersey 55kg, Crossbred 60kg, Friesian 65kg
- Ensure adequate meal intake prior to weaning - ideally at least 1kg/calf/day or more
- Gradually reduce milk fed over a week and increase meal fed up to 2kg/calf/day
- Transition calves onto clean high quality pasture
- Ensure access to clean water at all times
- Paddock shelter access for young calves helps reduce health risks



Post Weaning

It is very important to continue to monitor calves after weaning to ensure they remain healthy, are receiving adequate nutrition to meet live weight targets and to spot any signs of health problems early.

The Vet Centre can offer individualised health plans to ensure young stock are grown well and are receiving treatments at the optimum times to keep them as healthy as possible.

Live Weight Targets

Live weight targets are set to ensure calves and heifers are growing adequately and making progress towards their mature weight. All heifers need to reach these target weights.

Live weight targets are used to ensure heifers reach adequate weights by mating time to minimise non cycling heifers and ensure heifers are mated early to allow them to calve early. In heifers puberty is weight dependent and occurs when they reach 42-45% of their mature live weight.

Heifers that meet pre-calving target weights will also have increased milk production in their first lactation.

Target weights are individual to each farm

as they are based on the mature live weights of the cows in the herd.

Replacement heifer live weight targets;

- 6 months = 30% mature weight
- 9 months = 40% mature weight
- 15 months (mating) = 60% mature weight
- 22 months = 90 % mature weight

Weighing

Regular weighing of young stock allows their weight gains to be monitored closely to ensure adequate feed is given and allows early changes in feeding or animal health plans to be made if necessary to meet target weights. Young stock should be weighed every 4-8 weeks using electronic scales and assessed against their target weights. Animals should be weighed at a similar time of the day, ideally in the morning to reduce the impact of gut fill on the weights. If some animals in the mob are not reaching target weights then these can be separated and fed preferentially. If weight targets are not being met over a period of time then the animals should be examined, have their health and mineral levels checked and their parasite control programme reviewed.

Mature live weight	450kg	500kg	550kg
3 months	80kg	90kg	100kg
6 months	135kg	150kg	165kg
9 months	180kg	200kg	220kg
12 months	225kg	250kg	275kg
15 months	270kg	300kg	330kg
18 months	330kg	365kg	400kg
22 months	405kg	450kg	495kg

Feeding

Ruminant Gut Anatomy

Cows are four stomached animals which use microbial fermentation to break down feed. Adult cows have a large rumen where the grass is stored and where the microbial fermentation occurs.

The rumen is lined with ruminal papillae which increase the surface area available to absorb the nutrients produced by the microbes.

Calves are born with a functioning abomasum which can digest milk but with a non-functional rumen. The rumen needs to grow and mature before they are able to digest grass or concentrates.

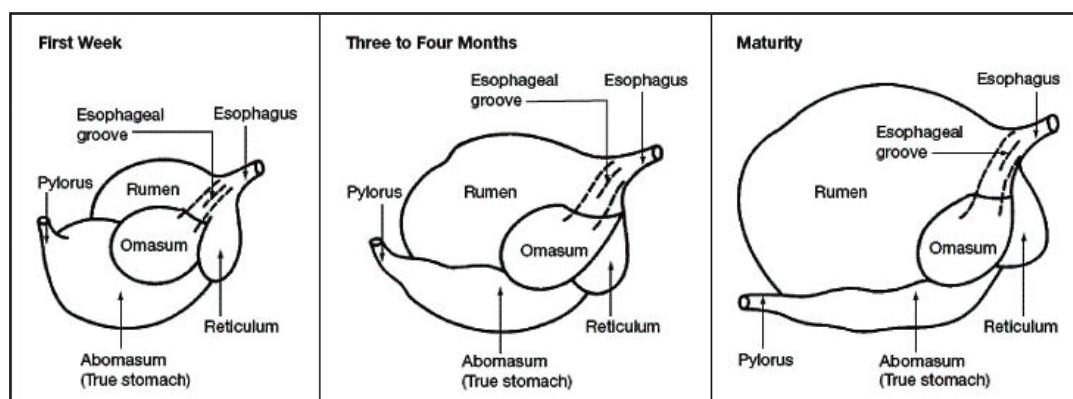
Rumen Development

A calf's rumen is very small at birth and very underdeveloped. Milk is absorbed directly from the abomasum and causes no rumen development. Colonisation of the rumen with microorganisms occurs as the calf nibbles on grass, straw and bedding. Rumen development requires water to allow these bacteria to grow and multiply which is why it is so important that calves always have access to clean drinking water from day one. The rumen not only increases in size but it also becomes lined with rumen papillae which increase the surface area of the rumen

and are used to absorb the nutrients produced by the microbes. Calves which receive concentrates such as meal have faster rumen development than those which only receive milk, grass or hay.

Key Points

- Have a health plan in place to ensure young stock remain healthy, receive treatments when needed and meet live weight targets
- Monitor calves post weaning – health, weights, feed intakes and regularly review and adjust health plan as needed
- Set target weights based on mature cow weights in herd (or use industry standard) and weigh calves regularly (4-8 weekly) using electronic scales
- Understand rumen development and the importance of early concentrate feeding



Microscopic egg of an intestinal parasite.



Parasites

Gastrointestinal Parasites

Calves start picking up worms once they are exposed to pasture. The intestinal worms commonly seen in cattle are Cooperia, Ostertagia and Trichostrongylus. Larval forms of the worms are present on pasture and are ingested by calves when grazing. These larval forms mature in the gut and produce eggs which are excreted in the faeces, which then hatch into the larvae during warm moist conditions. Calves are very susceptible to worm burdens and even low levels of infection can cause reduced growth rates.

Symptoms of worm burdens include a reduction in appetite, reduced weight gain or weight loss, watery faeces, a dull coat and lower levels of activity.

Faecal samples can be taken to monitor faecal egg counts (FEC). FEC greater than 500 eggs per gram of faeces indicate calves have a significant worm burden. Plasma pepsinogen levels can also be used to monitor infection.

Combination oral drenches are the recommended treatment for calves and need to be administered before heavy worm burdens occur. The amount of drench given is based on the weights of the heaviest calves to avoid under dosing. Care must be taken however not to overdose when using drenches containing

levamisole. If there are significant differences in weights within a mob then the mob can be split into groups based on weight to allow more accurate dosing.

Weighing calves regularly allows monitoring of weight gains and also gives accurate weights to calculate the correct dose of drench.

Worm burdens can be decreased by reducing calves' exposure to larvae by:

- Grazing calves on paddocks which have not been grazed recently
- Avoiding grazing the pastures down to very low levels.
- Ensuring calves are healthy and well fed
- Rotational grazing with adult stock to 'clean up' some of the larvae

Lungworm

Lungworm caused by Dictyocaulus viviparus can cause symptoms of mild coughing through to severe respiratory distress and coughing. Infections are not seen as regularly due to modern drenches but can be seen in calves when exposed to a large larval challenge. Diagnosis is made via faecal samples or post mortem. Most modern drenches will treat lungworm. Recovery can be slow with severely affected calves often needing further treatment.

Lice

Lice can be seen on calves from six weeks of age. Lice bite calves to feed and can cause severe irritation. Calves will itch and rub on objects and can have large areas of hair loss. Lice can be seen moving in the coat. The eggs are white and attached to the calf's hairs. Oral drenches do not treat for lice so a pour on or injectable product is needed.

Ticks

Ticks can be a problem throughout much of the year in Northland due to the mild weather and the ticks' lifecycle. Larvae can be present from early spring through to the end of autumn. Ticks also carry the blood parasite *Theileria*. Treatment with Bayticol can be given at strategic times to reduce tick burdens.

Key Points

- Calves are susceptible to gastrointestinal parasitism and require regular drenching to keep worm burdens low, ideally with a combination oral drench
- Grazing management strategies can be used to keep larval challenge to a minimum
- Lungworm infection can be seen occasionally
- Lice cause severe irritation to calves and require treatments with pour-on or injectable drenches
- Ticks are a problem in Northland from early spring through to the end of autumn and can carry the blood parasite *Theileria*

Clostridial infections are caused by a group of bacteria which are found in the soil and also in the digestive tract of animals. These bacteria produce powerful endotoxins which cause severe tissue damage. Animals are often found dead without any prior warning. Losses can be sporadic or larger outbreaks can occur. Clostridial diseases are not contagious so outbreaks generally occur as a result of a triggering factor rather than from transmission from one animal to another. Younger stock are most at risk with often the biggest and brightest of the mob affected. Vaccination is a simple prevention strategy and relatively cheap especially when compared to the cost of losing valuable animals. Occasionally treatment of an animal in the very early stages may result in recovery but generally treatment outcomes are poor.

Clostridial vaccines typically protect calves against the following diseases;

Tetanus

A disease caused by *Clostridium tetani* which produces neurotoxins that cause muscles to spasm and a generalised rigidity. Infection requires a wound to allow entry of the bacteria and production of the toxin.

Black Disease

Not seen in cattle in New Zealand.

Blackleg

Is an acute infectious gangrenous muscle inflammation caused by the activation of spores of *Clostridium chauvoei* which are already present in the muscle. Often triggered by excessive exercise or trauma causing bruising which can occur during yarding and handling of cattle. It can also occur at vaccination or injection sites.

Clostridial diseases

Clostridial vaccines such as Multine 5 in 1 are combination vaccines which provide protection to stock from the main clostridial diseases.

CALF PARASITE CONTROL PACK



CONTAINS:

- 1 x 2.5L BOSS pour-on
- 1 x 2.5L CORPORAL oral drench
- 1 x 1L CATOLYST
- 1 x pour-on applicator
- 1 x oral drench applicator

BOSS, CORPORAL and CATOLYST are registered trademarks of Alleva Animal Health Ltd. Boss pour-on, Corporal and Catalyst are registered under the ACVM act 1997, no. A010817, no. A011042 and no. A011469 respectively.



Malignant Oedema

Similar to blackleg but causes inflammation of the connective tissue of the muscles rather than the muscle fibres. It is caused by several other clostridial bacteria, also referred to as 'pseudo' or 'false blackleg'. Infection usually occurs due to a deep penetrating wound.

Vaccination of young stock should occur at weaning or 12 weeks of age with a booster vaccination given 4 weeks later. Vaccination can start at an earlier age on farms which have had losses in younger stock from clostridial diseases but more vaccinations are required to ensure the last booster vaccination is given at 16 weeks of age.

Vaccine must be stored in the refrigerator and is given by injection under the skin of the neck.

Cattle should be boosted annually after receiving the initial sensitizer and booster vaccination.

Key Points

- Caused by a group of bacteria which are found in soil and digestive tract of animals
- Bacteria produce endotoxins which cause severe tissue damage and often sudden death
- Sporadic cases or outbreaks (not contagious) from triggering factor
- Poor response to treatment = death
- Prevention via vaccination - simple and relatively cheap eg Multine 5 in 1
- Vaccine MUST be stored in the refrigerator to be effective
- Vaccinate calves at 12 and 16 weeks of age and booster annually (can vaccinate earlier and booster every 4 weeks to ensure last vax at 16 weeks of age)

Leptospirosis

Cause

Leptospirosis is caused by bacteria of the genus Leptospira. There are many different species and syndromes affecting different animals. There are maintenance hosts which show very few clinical signs of infection and accidental hosts which usually show severe clinical signs when infection occurs.

Spread

Leptospires can survive for long periods in wet areas (effluent and stagnant water) but are susceptible to heat and drying

out.

Direct contact of mucous membranes and skin abrasions with infected urine is the main way cattle are affected.

Leptospirosis can be contracted by humans by exposure to infected urine. Human infection can range from mild flu like symptoms through to life threatening disease.

Animals which survive the infection excrete the bacteria in their urine for a long time after recovery.

Symptoms

L. Pomona infection in calves causes fevers, depression, pale membranes

which may be jaundiced and anaemia due to red blood cell damage and breakdown. Calves have dark port coloured urine also called 'red water'. Calves are usually off feed and sometimes have diarrhoea. Affected calves often die due to liver and kidney failure. Calves that survive can have relapses.

L. Copenhageni infection is less common but can cause deaths in calves due to contamination of feed with rat urine. Typically this is seen at 3-4 weeks of age. Calves have similar symptoms to infection with L. Pomona. These include lethargy, increased temperatures and dark urine.

Diagnosis

Diagnosis is based on clinical signs and blood or urine testing at the laboratory.

Treatment

Calves with leptospirosis require treatment with antibiotics to control the infection before permanent liver and kidney damage occurs.

Prevention

Prevention is by vaccination and modification of the environment to prevent spread.

Wet areas should be fenced off or drained, contact between cattle, sheep and pigs prevented and rodents controlled.

Vaccination is the most efficient control method with calves receiving two vaccinations starting at 4-8 weeks of age with a booster given 4-6 weeks later followed by a third booster prior to the autumn rainfall, then annually thereafter.

Key Points

- Contracted via urine contact with mucous membranes and damaged skin
- ZOONOTIC – Humans can be infected
- Causes fever, depression, anaemia, red blood cell damage and port wine coloured urine in calves
- Treatment with antibiotics
- Prevention via vaccination and environmental modification to prevent exposure

Coccidiosis

Cause

Coccidia are protozoan parasites which are found within the cells lining the intestinal tract.

Eimeria zuernii and Eimeria bovis affect cattle and cause damage in part of the small intestine and in the large intestine. Oocysts are produced by the protozoa and shed in an infected calf's faeces. These oocysts can survive in warm moist environments for up to 2 years but are destroyed by high temperatures and dry conditions in pasture within a few weeks.

Animals can become clinically infected when there are high levels of oocysts present in the environment or their immune system is compromised by stress, inadequate nutrition or other disease.

Spread

Coccidiosis is often seen at the end of meal feeding in calves from 8 months of age but can be seen in calves as young as 4 weeks if there is a large amount of environmental contamination.

Calves are infected by ingesting faeces containing oocysts from infected animals. The intestinal mucosa is damaged and the villi are lost. This causes significant bleeding into the gut lumen and reduced absorption of fluids resulting in diarrhoea, dehydration and ultimately death. Calves with lower level infection have damage and villus atrophy which reduces absorption of nutrients. These calves are poor doers and have reduced weight gains.

Symptoms

Symptoms can range from mild through to severe and can often be fatal. The amount of stress calves are subjected to directly correlates to the severity of the disease.

Calves can show the following clinical signs;

- Dullness, lethargy and discomfort
- Severe non-productive straining
- Anorexia and dehydration
- Slightly increased temperature – 39.0 to 39.5°C
- Blood and mucous stained faeces around rear end and tail

Mild and longer term cases appear to be poor doers which can show weakness, rough coats, weight loss, anaemia and mild to no diarrhoea. These calves are often in a very contaminated environment and their immune system is struggling to cope.



Symptoms of Coccidia include blood and mucous staining around rear end and tail.

Key Points

- Protozoan parasite which cause damage to intestinal cells and diarrhoea
- Infection occurs with exposure to a contaminated environment or when their immune system is compromised by stress, inadequate nutrition or other disease
- Faecal oral route of infection
- Generally seen at the end of meal feeding in calves from 3-8 months of age
- Damage to intestinal mucosa causing bleeding and diarrhoea resulting in dehydration and ultimately death
- Symptoms include lethargy, severe non-productive straining, anorexia, dehydration, weight loss, blood and mucous staining around rear end and tail
- Diagnosis with faecal testing (can have limitations) or post mortem
- Isolation and treatment of affected calves with oral fluids and coccidiocidal drugs
- Prolonged recoveries with lower weight gains and feed intakes post infection
- Prevention via coccidiostat in feed and rotational grazing



DON'T
ACCEPT POOR
PERFORMANCE
DUE TO
COCCIDIOSIS

ACT
NOW!

- It's best to prevent it before you see signs of it
- Prevention and treatment of subclinical coccidiosis will deliver benefits
- Talk to your Vet



Calves lose weight very quickly and take a long time to regain condition due to the damage caused to the intestinal lining. Post infection calves have lower weight gains and feed intakes and can take weeks to recover.

Diagnosis

Faecal samples can be sent to the laboratory to check for the number of oocysts. Counts of greater than 5,000 eggs/g are considered significant. Diagnosis using faecal counts can be difficult as non-infectious oocysts can also be present in faeces falsely elevating counts, diarrhoea can be seen before oocysts are shed and oocysts numbers can appear lower than they are due to dilution from the diarrhoea.

A post mortem with collection of samples to be sent to the laboratory for further testing can confirm the diagnosis.

Treatment

Treatment involves giving oral fluids and treating the entire mob of calves with a drug active against coccidia such as Baycox C. Affected calves should be isolated and the rest of the animals moved to clean pasture with a reduction in the stocking rate. Calves should be gradually weaned off meal to allow them to build up their immunity.

Prevention

Coccidiosis can be prevented by feeding calves meal containing a coccidiostat and gradually weaning calves off the meal onto pasture allowing their natural immunity to build up. Using rotational grazing over the weaning period also helps reduce the numbers of oocysts

calves are exposed to and allows time for calves to develop their immunity.

Avoiding using the same paddocks year after year also helps to reduce the amount of environmental contamination.

BVD

Bovine Viral Diarrhoea (BVD) is a complex disease caused by Bovine Viral Diarrhoea Virus (BVDV). BVD is relatively widespread in New Zealand. Animals can be transiently infected (TI) or persistently infected (PI). PI animals maintain infection within herds and are infected in utero before 120 days of gestation so are virus positive and antibody negative. PI animals can develop mucosal disease (MD) and eventually die whereas transiently affected animals recover and do not become carriers.

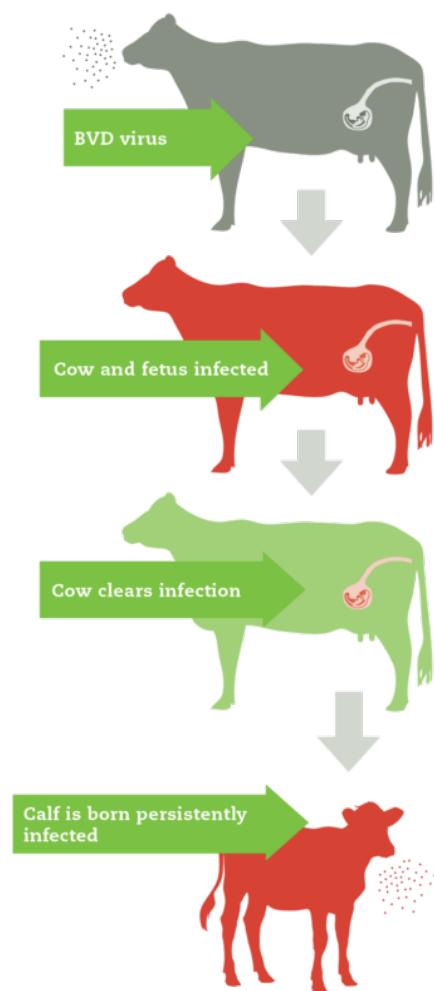
Transiently infected animals can have a fever, reduced appetites, diarrhoea, depression and mouth ulcers and generally recover after a few days.

Symptoms of mucosal disease usually occur from 6-21 months and include fever, anorexia, watery diarrhoea which may contain blood, straining during defecation and mouth ulcers. Death occurs usually within 3-7 days.

Blood testing can be used to determine if an animal is infected. Control programs focus on detecting PI animals and eradicating them from the herd and preventing their return.

Persistently Infected Carriers

- Non-immune
- Non-vaccinated
- Pregnant less than 5 months



Key Points

- Complex disease caused by BVDV
- Widespread in NZ
- TI or PI infected animals
- PI animals maintain infection and can develop MD and die
- TI animals recover after short illness but can produce PI calves if infected before day 120 of pregnancy

Pink Eye

Pink eye is a very contagious infection of the eye by the bacterium Moraxella bovis. Calves initially have a watery discharge from the eye. The eye becomes inflamed with reddening of the conjunctival tissues, then the cornea becomes ulcerated and changes from clear, to a bluish and then white colour. In very severe cases the eyeball can rupture. Antibiotics are needed to clear the infection.

Thiamine Deficiency

Thiamine deficiency, also known as polio-encephalomalacia or vitamin B1 deficiency, occurs in calves often in the late spring or early summer. Animals show sudden onset nervous signs such as blindness, lack of co-ordination and can have 'fits' and die if not treated. Affected calves should be given vitamin B1 by injection as soon as possible. Calves can also be given thiamine as a supplement mixed with meal to prevent further cases.

Ryegrass Staggers

Can be seen during the summertime due to a fungal toxin found in perennial ryegrass.

Symptoms are similar to thiamine deficiency but develop more slowly. Calves show staggering and are uncoordinated with signs worsening under stress. Calves should be slowly moved off affected pastures onto non-ryegrass pastures or fed hay/silage and placed in 'safe' paddocks to avoid misadventure while they recover.



LEFT: Severe photosensitisation due to facial eczema.

RIGHT: Hair loss and thickened, crusty skin due to ringworm.

Facial Eczema

Facial eczema is caused by ingestion of sporidesmin which is a toxin in the spores of the fungus *Pithomyces chartarum*. This fungus thrives in humid conditions and warm temperatures seen during late summer and autumn. The fungus grows on dead leaf litter at the base of the sward. Sporidesmin causes liver damage allowing phytoporphyrin to accumulate in the body and skin which results in photosensitisation. Non pigmented areas (ie white skin) are affected and become reddened, swollen and irritated. Affected skin can slough leaving raw and scabby areas. Subclinical infection is also common along with reduced growth rates. Blood tests can be performed to check for liver damage. Spore counts should be monitored regularly.

A sample of grass can be taken from a paddock and the spore count checked in clinic.

Zinc boluses can be given to help prevent damage to the liver by the toxin before exposure.

Ringworm

Ringworm which is also called dermatophytosis is common and caused by the fungus *Trichophyton verrucosum*. Ringworm is very contagious and is zoonotic so can spread to people, so care needs to be taken when handling affected calves.

Lesions are commonly seen around the eyes and on the head but can be present anywhere on the body.

Lesions appear as raised, thickened, round and crusty areas. Most calves will recover over time without treatment with resolution usually seen in 1-4 months.

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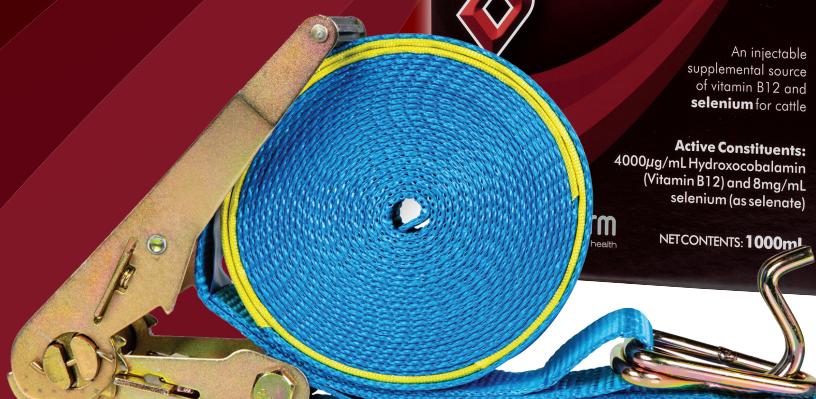
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