

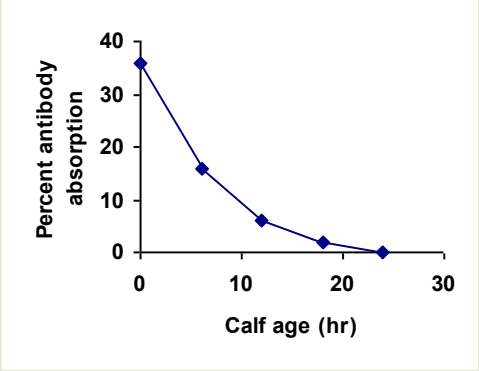
Calf Rearing Fact Sheet: Calf health

Colostrum and immunity

On-Farm Research

Key Points

1. Calves need to get 4 litres of high quality colostrum within 24 hours of birth. The sooner the better.
2. Calves with inadequate immunity are more likely to die, have lower weight gains and poorer feed conversion efficiency than those getting enough early colostrum.
3. Up to 40% of day old calves in NZ herds have had insufficient colostrum.
4. Colostrum is obtained from the first milking of a cow. Subsequent milkings provide transition milk which has a lower concentration of immunoglobulins.
5. A calf should receive 4 litres of first milking colostrum within 24 hours of birth.



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Calf Rearing Fact Sheet 2.1

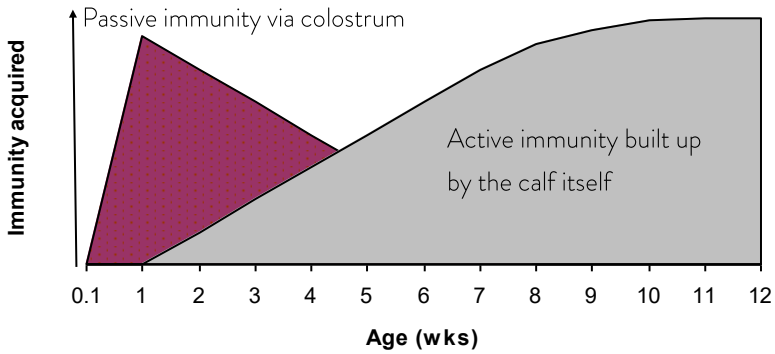
General

- Failure of calves to get sufficient colostrum and acquire early immunity is a world-wide problem. NZ studies have shown 25% of day old calves have had no colostrum and up to 40% have received inadequate colostrum.
- It is critical that a calf gets high quality colostrum within the first 24 hours and preferably within the first 12 hours.
- Calves with inadequate immunity are four times more likely to die and those that survive will have lower weight gains, poorer feed conversion efficiency and a higher incidence of scouring than calves with good levels of immunity gained by feeding colostrum in their first 24 hours.

Development of immunity

- Calves are born with a very immature immune system and immunity is transferred from cow to calf through immunoglobulins in colostrum. These immunoglobulins are large protein molecules which can only move through the calf's intestinal wall in the first 24 hours after birth. At this point the wall of the small intestine matures and these immunoglobulins can no longer pass. In addition, the secretion of digestive enzymes starts 12 hours after birth, meaning more and more immunoglobulins are digested and rendered useless.
- The young calf has no resistance to diseases like E. coli and Salmonella and its only protection in the first few days is from colostrum (this is called passive immunity). A calf with no immunity can get sick when challenged with just 500 Salmonella bacteria, whereas one that has received a good level of passive immunity can withstand 10 billion Salmonella bacteria. By the end of the first week the calf is building up its own immune system and is producing its own antibodies in response to being challenged by pathogens. Within a few weeks the calf is well on its way to being able to fight off disease.

Development of passive and active immunity in the calf



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Why do calves miss out on colostrum from their mothers?

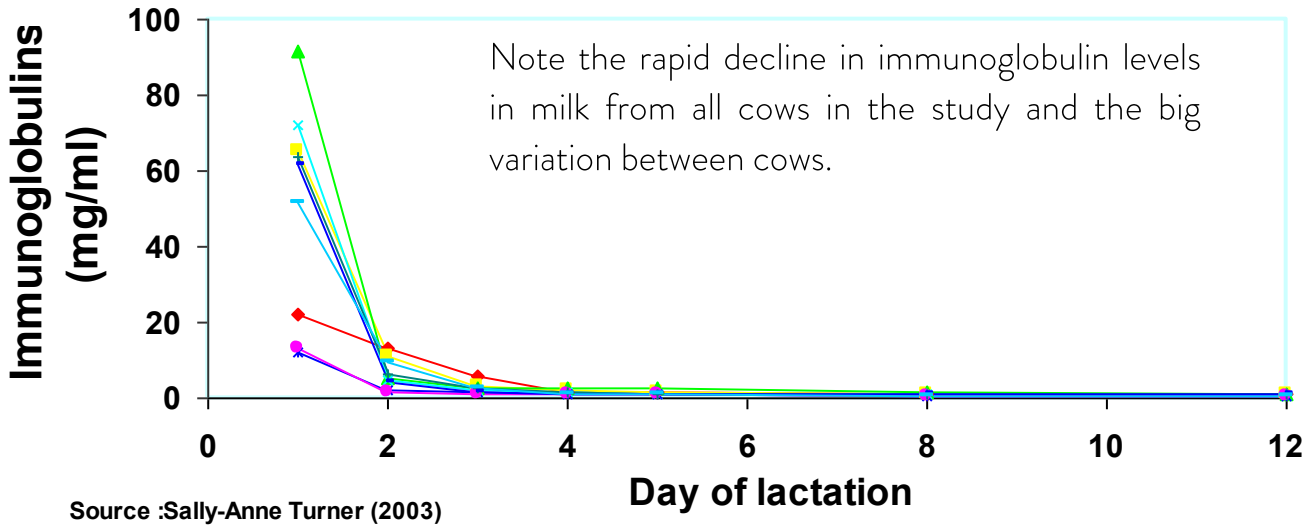
- Many calves do get colostrum from their mothers but a lot don't. The practice of removing calves from dairy cows for generations has undoubtedly reduced mothering instinct in cows. Dairy cows are apt to wander off soon after calving.
- Calves can go under hot wires and be separated from their mother.
- Selection for milk production means that udders are often low and difficult for calves to access.
- Around 25-30% of calves have not suckled 6 hours after birth and 20% have not suckled within 18 hours. Daily calf collection (if not twice daily collection) is the right thing to do - but it cannot be assumed that the calf has had enough colostrum from its mother. New arrivals at the calf shed need to be fed colostrum if there is any doubt as to whether they have had colostrum from their mother. Waiting until the next day when they will be "hungry" is too late. If necessary the calf should be tube fed although this reduces the efficiency of absorption of the antibodies.
- The amount of protection a calf obtains is determined by the amount ingested and the amount that is absorbed. The amount ingested is affected by the volume of colostrum consumed and the concentration of the antibodies in the colostrum.
- The calf should get 5-6% of its bodyweight as colostrum in the first six hours and the same amount 12 hours after birth to ensure that at least 100g of antibodies are consumed. This equates to about 2 litres of colostrum per feed for a 40 kg calf.

Factors affecting the quality of colostrum

- The level of antibodies are highest in the first milk produced after calving and then drop rapidly so colostrum fed to calves in the first 24 hours should be first milking colostrum only.
- Calves appear to be better protected if they are fed better quality colostrum than a larger volume of lower quality colostrum.
- Antibody concentration varies widely between cows. A Dairy NZ study showed an average of 48 g/litre with a range from 20 to 100 g/litre. Ideally a calf should be fed first milking colostrum from a mixed age range of cows—to give the calf a wider range of antibodies. Cows which have been vaccinated (e.g. against Rotavirus) will produce more antibodies. Cow breed and nutrition will also affect quality and volume of antibodies.
- Feeding energy deficient diets prior to calving reduces both production and quality of colostrum. Dairy breeds produce more total immunoglobulins than beef breeds but it is more concentrated in beef breeds.
- Older cows produce more immunoglobulins than heifers as they have been exposed to more diseases.

TAKE HOME MESSAGE -

Ensure new born calves get fresh colostrum as soon as possible.



Source :Sally-Anne Turner (2003)



Calf Rearing Fact Sheet: Calf health

Pre-weaning animal health plan

On-Farm Research

Key Points

1. The 3 P's - Planning, Preparation and Procedures provide the framework for successful calf rearing.
2. "Prevention is better than cure"
3. Preparation of the shed and maintaining hygiene all reduce risk.
4. Know your calves. How do they normally behave?
5. Act quickly as health issues caught early are easier to deal with.
6. Know what to look for and how to treat it.
7. When in doubt, be prepared to ask your vet.



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Calf Rearing Fact Sheet 2.2

Planning

- Have a plan in place for dealing with sick calves including recording of issues.
- Decide how you are going to identify calves that need to be watched e.g. use a range of neck bands with different colours—e.g. white for calf needs to be watched, blue for a calf on a course of antibiotics, yellow for a calf that needs electrolytes. Strips of cloth for tying up plants make ideal neck bands - get a range of colours from a hardware store.
- Set aside an area as a sick bay.
- Talk to your veterinarian about what you should be looking out for.

Calf arrival

- If your calves have travelled a long distance, feed 2 litres of electrolytes on arrival. If your calves are straight out of the paddock they should be fed colostrum for their first feed.
- On arrival at the shed, navels should be sprayed with iodine. Navels should be checked regularly for the first week. Calves with wet or swollen navels should be monitored. If the navel is hot, tender to touch or pus is present then the calf should be treated with antibiotics (penicillin). Early treatment will prevent later problems with things like joint ill.

Signs of a healthy calf

- Nose no discharge, moist and cool.
- Ears alert and responsive.
- Coat shiny, supple (if 'pinch and release' - the tent of skin should return to position fast. If it doesn't the calf needs fluids as it is dehydrated).
- Normal temperature is around 38 °C
- Respiration normal (56 breaths/min 4 days of age and drops to 50 breaths/min by 14 days of age).
- Calves should be alert, active and behaving normally.
- Any change in behaviour, appearance or feeding should be treated as an early sign that something is wrong.

Week 1-3

- During this early period it is essential to get the calf feeding well.
- Careful observation of calves morning and night and quick intervention when a problem arises is critical. Check for wet tails and make sure all calves are drinking well.
- Calves with issues should be recorded or the calf marked so that they can be re-checked at the next feed. Calf scours can kill rapidly and any sick calves should be isolated immediately to make treatment easier and reduce any cross contamination.

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- Calf scours at this age are commonly “nutritional" due to over feeding or a change of diet (e.g. milk to milk powder). Nutritional scours don't last long but can affect a large number of calves at one time. Take the calves off milk and feed electrolytes for 24 hours. It is important that electrolytes are fed in large volumes as a scouring calf can dehydrate rapidly. If calves are active, electrolytes should be freely available for the calves to help themselves outside the feeding period.
- Infectious scours (caused by microbes) can be difficult to manage. Most commonly they are caused by Rotavirus, Salmonella, or Cryptosporidia. Large numbers of calves are progressively affected, and they require significant nursing care to prevent deaths. With infectious scours, milk and electrolytes are fed alternately. Electrolytes should be fed at least 4 hours after a milk feed. It is important to keep up the fluid intakes of calves to avoid dehydration.
- Isolate sick calves in an isolated sick bay and have separate equipment for healthy and sick calves. Rearers should make sure boots and clothes are clean and disinfected when moving between the two groups of calves. Do not return recovered calves to their pen mates as they will still be shedding the pathogens (bugs) that cause the scours and will remain infectious to other calves.
- Dehydration is the main cause of calf death. It occurs because too much water and electrolytes are lost from the body in the scour. Sick calves need large volumes of a high quality electrolyte replacer in the first 24 hours (6-10 litres depending on the degree of dehydration). This may require tubing with a calf feeder.
- Remove the top layer of dirty bedding as often as possible, or spread clean fresh sawdust on top daily. Spray all surfaces of all calf pens at least daily with disinfectant. Managing a calf scours outbreak is time consuming, stressful and can be heart-breaking. It requires professional support. Develop a working relationship with your veterinarian.
- If the calves are placed outside ensure they have access to good shelter and that they are all feeding well.

Week 3-5

- If calves are kept inside, build up of ammonia from the calf urine can cause pneumonia. Ensuring the shed is well ventilated and adding fresh layers of bedding regularly will reduce this risk. Signs include lethargy, rapid breathing, rise in body temperature and coughing. Early recognition and treatment with antibiotics will help prevent losses due to deaths and reduced growth rates.
- Watch out for any signs of arthritis, ear tag infections and abscesses particularly around the mouth.
- Castration after 6 months requires a local anaesthetic.

Dehorning

- Should either be done with a dehorning paste at 4 days of age or with gas disbudders at 4 to 6 weeks of age.
- A local anaesthetic is required for dehorning/ disbudding.



Vaccination

- This is to prevent clostridrial diseases like blood poisoning and tetanus. Inject the calf with a 5 in 1 injection at 6 to 8 weeks of age followed by a booster 4 to 6 weeks later.

Colic

- Often the result of rapid drinking - the calf shows signs of distress within an hour of feeding - kicking its stomach and even falling over. Monitor teat flow rate. If caused by over-eating grain - give sodium bicarbonate dissolved in water.

Weaning

- Time of weaning off milk will depend on the feeding system used. Ensure calves that are being weaned are up to target weights and are fit and healthy. Keep feeding them meal/pellets and or good quality green leafy grass.



Calf Rearing Fact Sheet: Calf health

Nutritional scours

On-Farm Research

Key Points

1. Nutritional scours are related to stress, over feeding or a change in feed.
2. Early detection and treatment are important to minimize negative impact.
3. Problems are dehydration and acid imbalance
4. Take off milk for 24 hours and feed large volumes of electrolytes.
5. If calves are alert, leave electrolytes in a feeder in the pen between feeds.
6. If calves are unable to drink administer electrolytes with a tube feeder (below).



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Introduction

- Calf scours (diarrhoea) is the single most important cause of death in milk-fed calves. Scours can be classified into two types: nutritional and infectious. Nutritional scours is usually caused by stress to the calf due to a change in management routines. Nutritional scours can progress to an infectious scour. Depending on the severity of the scours, rearers will see some or all of the following:
  - bright yellow or white faeces
  - depressed calves which are reluctant to feed or suck
  - lack of energy and lethargy
  - dry muzzle
  - wet under the tail
  - calves with sunken eyes and/or a temperature
  - dehydration

Nutritional and stress scours

- The initial digestion of milk occurs in the abomasum (or fourth stomach) and then in the intestines.
- Nutritional scours is due to an inadequate milk digestion in the abomasum due to overfeeding, stress, too rapid change in diet or the milk not curding. This means the milk leaves the abomasum too early and overloads the intestine with lactose. This results in a watery scour and the fluid loss results in a very dehydrated calf.
- Environmental stress can also cause scours - e.g. over-crowding, a sudden change in the weather or cold, damp, draughty or humid conditions inside calf sheds.
- Even changes in staff and hygiene can increase the likelihood of scours. The stress of transporting calves from the sale yards or from one farm to another may be sufficient to lead to scours if calves are offered milk on arrival. Newly arrived calves should be fed an electrolyte solution.

Symptoms

- Scouring calves can lose up to 5 litres of fluid each day including minerals salts essential for normal body function. With most scours, it is the dehydration and acidosis, that kills the calf. With nutritional scours, a calf may still look healthy and have a good appetite so early detection is critical.

Treatment

- Stop feeding milk to calves with nutritional or stress scours for 24 hours.
- Feed electrolytes instead of milk. The more dehydrated a calf is the more electrolytes it needs. For example if a 40 kg calf has lost 10% of its body weight it will need 4 litres of electrolytes to replace it. A dehydrated calf may need 6-10 litres.
- Feed at least three times a day. If a calf will not drink, feed electrolytes using a tube feeder.

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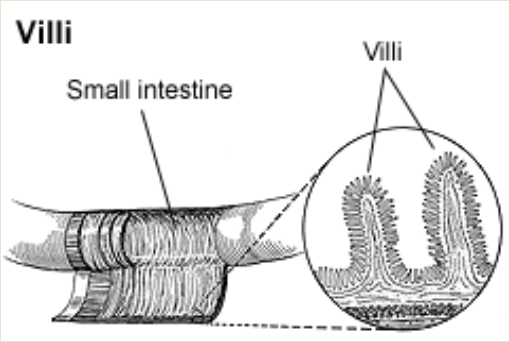
Calf Rearing Fact Sheet: Calf health

Rotavirus

On-Farm Research

Key Points

1. Rotavirus is spread via faeces and can even be airborne. Infected calves scour out huge numbers of virus particles and the level of contamination may increase very rapidly.
2. It cannot be controlled by antibiotics.
3. Control strategies involve vaccinating cows, ensuring calves get colostrum and maintaining good spraying regimes and hygiene within the shed.
4. Critical to identify and start treatment early. Signs include a pale yellow scour and reluctance to feed.
5. Isolate sick calves if possible. Feed milk and electrolytes with at least two hours between a milk feed and feeding electrolytes. If necessary tube feed electrolytes.
6. Disinfect pens regularly.



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Calf Rearing Fact Sheet 2.4

General

- Rotavirus is the biggest animal health issue facing calf rearers with some experiencing death rates as high as 30%. It can be devastating and demoralising.
- Rotavirus is persistent in the environment, and can remain infectious for many months at room temperature. It can withstand low temperatures and high humidity on non-porous surfaces like plastic and concrete.

What is it and how does it kill calves?

- Rotavirus infects and destroys mature cells from the tip of the 'villi', which are the tiny, finger like projections on the surface of the small intestine that help absorb nutrients.
- Absorption of milk and electrolytes is reduced and the damage to the intestinal cells means that fluid is lost from the intestine, further compounding the dehydration. It is this dehydration that generally kills the calf.
- Scouring continues until the villi inside the small intestine are again covered with mature cells that allow normal digestive-absorptive processes to resume.
- Rotavirus also increases the concentration of calcium in the intestinal cells which acts like a toxin and leads to the characteristic pale yellow scour of Rotavirus.

How is it spread and what are the signs?

- Rotavirus usually affects calves less than 3 weeks old and is primarily spread by infected calves shedding large quantities of the virus. Other calves ingest faecal matter or inhale virus particles. Incubation time depends on the level of environmental challenge the calf is exposed to but is typically between 24 - 48 hours.
- The most obvious sign of Rotavirus in calves is a pale yellow scour, often rancid smelling. This scouring leads to fluid loss, electrolyte loss and dehydration.
- Initially Rotavirus will need to be confirmed with a lab diagnosis but experienced rearers generally make a diagnosis very quickly. The key to managing an outbreak is early identification of infected calves so that they can be isolated and treated promptly with electrolytes.
- During each feed it is important to cast an eye over each calf to identify any potential signs of illness. These may include-
    - Hanging back from the feeder/reluctance to come in and feed
    - Reluctant to drink, fussing with teat, coming off teat
    - Drinking slower than normal
    - Wet tail
    - Pale yellow scour – can sometimes be watery and/or bloody.

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- Most calves that die, do so from loss of water and electrolytes, rather than from direct action of rotavirus itself. This means rapid treatment with electrolytes is critical.
- Animals may continue to shed the virus in their faeces even if they are not showing clinical signs.
- Calves do not become "immune to rotavirus" so they can get re-infected. However, because calves are older, the second infection is usually less severe.

Treatment

- Treatment with large volumes of electrolytes is labour intensive and time consuming- and not always effective particularly with younger calves. Even if the animals do recover, they will still shed large numbers of virus particles into the environment, potentially infecting healthy calves. Recovered calves may have slower growth rates and be more susceptible to other diseases.
- Feed large volumes of electrolytes but don't stop feeding milk as it is important to keep the calf's energy levels up. Many electrolytes contain sodium bicarbonate that alter the pH in the digestive tract and adversely affect milk absorption, so milk and electrolytes should be fed at least two hours apart.
- As a general rule, calves in the sick pen need as much electrolytes as you have time to get into them.
- While only small numbers of calves are infected isolate the calves being careful to disinfect any equipment used with sick calves. Don't go straight from the pens with sick calves to pens with healthy calves – clean boots and overalls.
- Spray pens with a virucide if sick calves have been removed. This should help protect the remaining calves in that pen.

How do we prevent Rotavirus?

- Unfortunately there is no silver bullet although vaccinating cows against rotavirus and then feeding calves with colostrum and milk from these cows certainly helps. The risk period for the incidence of Rotavirus infection generally occurs between 5 and 14 days of age when the passive immunity from the dam is wearing off and the calves own immune system has not fully developed. Antibodies in colostrum can continue to provide limited local immunity in the gut (even though they can't be absorbed through the calf's gut) so feeding of colostrum from vaccinated cows will help prevent the development of rotavirus.
- The timing of rotavirus on dairy farms often coincides with stored colostrum running out.
- Ensure the shed is thoroughly cleaned out at the end of each season and sprayed with a virucide solution. To reduce the virus contamination to a minimum, spray the shed every 3-4 days with a virucide solution throughout the risk period (i.e. until the youngest calves are at least two weeks of age).
- Many solutions are suitable for spraying over calves. Maintain a high standard of cleanliness in the shed and thoroughly clean and disinfect equipment such as feeders, especially equipment used in the sick pen.
- Avoid visitors to the calf shed. If calves are coming from a number of sources, pen calves from the same farms together and group calves according to age.

Our experiences

- One year we experienced a rotavirus outbreak on the 13th August. There were 435 calves in the shed ranging in age from new arrivals to calves which had been in the shed for 21 days. Within 3 days of the first case of rotavirus being diagnosed it had spread through the shed, with calves in all pens affected. Younger calves were hit the hardest but even the oldest calves were affected. However, older calves recovered and we had no deaths in the calves aged two weeks or older.
- In total, 46% of the calves were affected and at the peak we were treating over 80 calves.
- The shed was so contaminated that it became impossible to isolate calves so we stopped trying and concentrated on dealing with the problem. Most calves were on once a day milk feeding and we continued to feed milk in the mornings. At the morning feed, any suspect calf received a coloured neck band which meant it needed close monitoring. Any calf that had a wet tail got a different coloured neck band and was fed electrolytes in the evening from a bottle. In some cases, most calves in a pen had coloured bands and it was just as easy to feed electrolyte to all the calves in those pens. Any calf that was wobbly or couldn't feed received a different neck band and was taken to the sick pen. In total, 8% of calves were relocated to the sick pen and overall shed mortality was 5.4%. Calves in the sick pen were fed milk in the mornings and electrolytes at midday and in the evening (either by tube or bottle).
- Within 10 days we had worked our way through the worst of the outbreak but any new calves which were brought into the shed still went down within 48 hours in spite of regular spraying of the shed. We felt that we had a level of contamination within the shed which was even swamping good healthy calves.
- The only solution was to put new arrivals into a completely different shed.
- It is worth noting that in the same year we had 3 outbreaks of Salmonella. This was quickly recognised as being a different disease. Affected calves were treated with antibiotics and there were no Salmonella related deaths.



Calf Rearing Fact Sheet: Calf health

Salmonella

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Key Points

1. Salmonella is caused by a gram negative bacteria that causes acute intestine infections in the calf and humans.
2. The bacteria can survive in the calf shed environment for a long time.
3. Predisposing factors for calves are stress and poor immunity in intensive rearing units.
4. Prevention ensures calves get colostrum, minimising stress and maintaining good hygiene and spraying regimes within the shed.
5. Salmonella can appear in calves from 2-12 weeks of age. Younger calves are much more vulnerable than those older than 12 weeks.
6. Speed of treatment is critical to survival of the individual calf and to stop the spread of the disease through the shed.
7. Treatment of clinical cases involves antibiotics and aggressive electrolyte replacement.

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Calf Rearing Fact Sheet 2.5

General

- Salmonella is a gram negative, non spore forming bacteria that causes acute intestinal infection in both humans and animals. In extreme cases, calf rearing facilities can experience high levels of morbidity (sickness) and death. Because it can spread to humans, care needs to be taken when handling sick animals.
- The Salmonella bacteria can remain infectious for many months in semi-dried faecal material that frequently gets left behind when calf sheds are not cleaned out properly. However Salmonella bacteria are susceptible to drying and sunlight.
- The main varieties are S. *typhimurium* and S. *brandenburg*. S. *brandenburg* was identified in New Zealand in 1999 and is a particularly aggressive variant which is infective at much smaller doses and spreads more rapidly than S. *typhimurium*.
- Salmonellosis is increasing in New Zealand, largely as a result of intensification. The disease is usually endemic with sporadic outbreaks. Stress on the calf and low levels of maternal antibodies (inadequate colostrum) are factors that lead to outbreaks of the disease.
- Diagnosis of the disease is by laboratory analysis of faecal samples (from at least 5-6 calves) and is important in establishing an effective treatment and management plan.

How is it spread and why does it kill the calf ?

- Salmonella usually affects calves from 2-12 weeks old and is mainly spread when infected calves ingest bacteria present in the environment, or in feed or water. After ingesting the bacteria, incubation time is typically 1-5 days.
- The Salmonella bacteria produce enterotoxins that are very invasive and damaging to the gut lining. This damage causes severe loss of fluids and electrolytes into the gut lumen resulting in dehydration and death.
- The enterotoxins create inflammatory changes which also result in the bacteria entering the bloodstream and circulating through the body. This results in septicaemia which allows bacteria to lodge in other organs of the body like the brain, bone, lungs and liver causing blood poisoning and death.
- Scouring causes fluid and electrolyte loss and severe dehydration resulting in death. Initially Salmonella will need to be confirmed with a lab diagnosis to determine the treatment plan with your veterinarian. The key to managing an outbreak is early identification of infected calves so that they can be treated promptly with parenteral antibiotics and supportive fluid replacement.The disease is aggressive and calves die from dehydration. Mortality rates are high and intensive care and treatment is needed to prevent losses.

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What are the signs of the disease?

- During each feed it is important to cast an eye over each calf to identify any potential signs of illness. These may include-
    - Hanging back from the feeder/reluctance to come in and feed
    - Reluctance to drink, fussing with teat, coming off teat
    - Drinking slower than normal
    - Wet tail
    - Pale yellow scour – can sometimes be watery and bloody.
- Septicaemia can occur in newborn calves that are >1 week of age. The illness can be very sudden in onset and calves are often found dead in the pen. Calves have a marked depression in appetite. A lack of enthusiasm to suckle is often one of the first symptoms. Calves can have a high temperature (40.5-41.5°C) with death occurring in 24-48 hours. The faeces may range from profuse to moderate diarrhoea. Central nervous signs, ocular lesions and poly-arthritis may be seen and these animals may also suffer from pneumonia. Mortality rates may reach 100%.
- Acute enteritis is the most common form of the disease in older calves (2-6 weeks of age). Initially there is a fever (40.4 - 41.5°C), followed by a brown pasty scour that leads to a severe watery diarrhoea. The temperature often returns to normal at the onset of diarrhoea and can be subnormal at the time of checking. The calf is anorexic and depressed. The faeces have a putrid, foul odour and may contain shreds of mucous membrane and clots of blood. The calf may be hunched with abdominal pain and straining. Affected calves rapidly become dehydrated, quickly lose condition and become weak and emaciated. Calves that die do so within 2-5 days, become more and more dehydrated.
- In less severe cases or chronic enteritis, the faeces may merely become a pasty consistency, yellowish-grey in colour but with little evidence of the dramatic changes that accompany the acute form of the disease. These animals commonly grow slowly and potentially become carriers by shedding the bacteria in the faeces.

What are post-mortem findings?

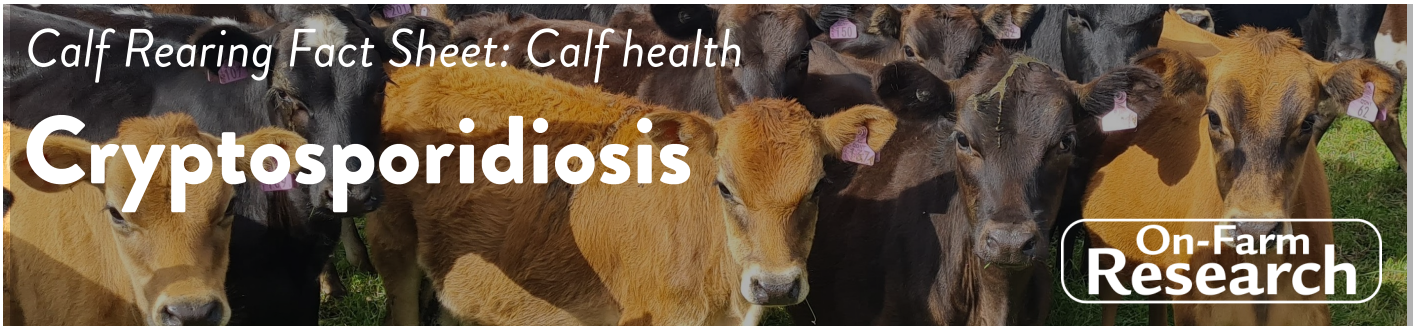
- Post-mortem examination can be important in diagnosing Salmonella. Most animals exhibit marked haemorrhagic enteritis, often accompanied by severe necrosis of the ileum and large intestine. Gut contents are smelly, watery and contain mucous or blood. There is often a pseudo-membrane in the lumen of the intestine. The lymph nodes around the mesentery are congested, enlarged and may be haemorrhagic.

What is the prognosis and treatment?

- Definitive diagnosis is the presence of salmonella in a bacterial culture of the faeces. However in calves, excretion of the bacteria is often intermittent, even in those animals that show symptons. This means it is advisable to sample the faeces from 5-6 sick animals to obtain a good diagnosis.
- The key to managing an outbreak is early identification of infected calves so that they can be treated promptly with antibiotics and electrolytes. Delays result in irreversible damage to the gut and the animal becoming severely dehydrated. At this stage death can occur even with appropriate antibiotic and fluid therapy. Antibiotic treatment is usually sufficient provided it is initiated at an early stage.
- Salmonellosis is aggressive and mortality rates can be high if antibiotic treatment is not initiated early. Intensive care and feeding with quality electrolytes are needed to reduce losses.

How do we prevent it?

- Ensure the shed is thoroughly cleaned out at the end of each season and sprayed regularly with a disinfectant.
- Maintain a high standard of hygiene in the shed and thoroughly clean and disinfect equipment such as feeders, especially equipment used in the sick pen.
- Minimise all stress on the calves especially during transport.
- Avoid overcrowding during transport and in calf sheds.
- Ensure calves have received adequate quality colostrum soon after birth.
- Vaccination of cows, 8 and 3 weeks before calving will help protect the calves via their mothers' colostrum.



Calf Rearing Fact Sheet: Calf health

Cryptosporidiosis

On-Farm Research

Key Points

1. "Crypto" is a small protozoa parasite which causes diarrhoea in young calves.
2. The disease can be quickly controlled with aggressive oral rehydration. Tube feed with electrolytes.
3. Rapid rehydration avoids complications with secondary intestinal infections and reduced growth rates.
4. The protozoa is not host specific and can infect humans, especially children. It results in abdominal pain and cramping with watery diarrhoea, nausea, loss of appetite and weight loss.



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What is "Crypto"?

- "Crypto" can be a major problem in the calf shed causing diarrhoea in young calves usually seen between 4-28 days of age.
- *Cryptosporidia* are very small parasites called protozoa. The main problem species are *C. parvum* which infects the small intestine and *C. muris* which damages the abomasum.
- Infected oocysts are excreted in the faeces of infected calves. The parasite has a complex life cycle and persistent infections can be established in the calf. Infection spreads rapidly between animals and persists in the environment.
- The intensity of the infection increases as the calf season progresses due to increased contamination of the environment. Cryptosporidiosis usually originates from a point of infection (maybe one calf) and rapidly spreads to susceptible animals. Initially the incidence is low and peaks within 2-3 weeks.
- Morbidity (sickness) is very high but mortality (deaths) are usually low. The calf can get other infections (viral and bacterial) at the same time and this can result in severe illness and increased death rates.

What does it look like ?

- The parasite causes cell destruction and atrophy of the villi (lining of the small intestine and abomasum) resulting in reduced digestion and absorption of milk and fluids. The resulting diarrhoea can last from 4-13 days.
- Calves may be hunched and reluctant to suckle milk due to gastric discomfort.
- Faeces may be watery and yellow resembling rotavirus infection or may be mucoid, grey and slimy.
- Growth rates can be markedly impaired depending on the amount of damage to the villi. Poor growth rates are common for several weeks following recovery.

How common is Crypto ?

- Crypto is present on about 30% of dairy farms.
- Over 30% of calf scour samples are positive for Crypto
- The death rate from affected scouring calves is typically 10% in uncomplicated infections, but may be as high as 30% in septicaemic (dehydration, shock, and hypothermia) calves with secondary infections.

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How can I tell if my calves have Crypto ?

- It is very difficult to distinguish it from other causes without lab testing of faecal samples.
- Many calves with Cryptosporidia, Rotavirus and Salmonella scours lose their appetite.
- Scours from combined infections have a more severe effect.
- Typically scouring is 5-6 days but can be up to 12 days.
- There are now tests which are available for use on-farm. Consult your vet on how to interpret any results.
- Alternatively, ask your vet for sample pottles, and take samples from a minimum of 4 scouring calves. Ask your vet to test to identify crypto, and also test to exclude Rotavirus, Coronavirus, *E coli* and Salmonella.
- Many calves will have multiple infectious agents so veterinary advice will be important.

How do my calves get infected?

- From cows on infected farms. Some cows (typically 15%) may be shedding crypto at the time of calving (winter only).
- Calves are infected via contaminated faecal matter. This can be on tractor trays used to carry calves, calf rearing sheds, implements used to feed calves.
- Anything calves may find to lick or suckle may help to spread Crypto.

Are all calves at risk of developing Crypto scours?

- Typically, Crypto scours will only occur up to about 25 days of age but this is much the same with other causes of calf scours.
- Most calves show signs from 6 - 21 days with the highest numbers showing signs of scours about 8 -10 days.
- Many calves will become infected without scouring. An outbreak of Crypto will typically affect up to 30% of the calves being reared.

What is the treatment?

- Remove from milk and feed electrolytes for 24 hours. Continued feeding of electrolytes between milk feeding is often required for a few days to support the calf. This allows the damaged gut to heal and helps hydrate the calf and restore the electrolyte balance.
- Halocur can be used to prevent and manage outbreaks of Cryptosporidiosis by reducing the number of oocysts excreted in the faeces.
- The use of high quality electrolytes enhanced with the carbohydrate- betacyclodextrin (Kryptade) have been shown to reduce the convalescence period.
- Hygiene and cleaning of equipment, feeders and people (clothing, boots, hands) is very important.
- Spraying the calf shed with disinfectants can help reduce the level of infection.

What are the actual costs of Crypto?

- Many costs cannot be identified easily. We do know that experienced calf rearers work under tight time and budgets constraints and hospital mobs take a disproportionate amount of calf rearers' time.
- Because scouring continues for a number of days, and younger calves seem to take longer to recover, treatment is extremely time consuming. This process is really tough on calf rearers.
- The delay in reaching weaning weight targets means the number of calves being fed increases, further increasing staff work loads.
- Crypto infections by themselves are not associated with high mortality rates, only prolonged recovery periods from scours.
- When calves have mixed infections e.g. crypto and rotavirus, mortality rates can climb alarmingly to 25-30% of calves being reared. This is particularly the case in calves who have had inadequate colostrum. These calves can make up 75% to 80% of the total calf deaths, primarily due to bacterial infections leading to blood borne infections. This group may get significant benefit from antibiotic treatment.



Calf Rearing Fact Sheet: Calf health

Post-weaning animal health plan

On-Farm Research

Key Points

1. Keep monitoring your calves after weaning.
2. Vaccinate calves and monitor parasites.
3. Know what the risks are in your area for facial eczema and copper deficiency.
4. Be proactive and act fast when issues arise.



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Calf Rearing Fact Sheet 2.7

General

- It is still important to monitor calves after weaning. The earlier health issues are detected, the less effect they will have on live weight gain.

Post-weaning diseases

- Internal parasites: Once calves have been on pasture for about 4 weeks they can become vulnerable to gastro-intestinal parasites. Cooperia is the main parasite at this age and causes scouring. The best treatment is a combination oral drench.
- Lice can appear from six weeks of age. Treatment usually involves a pour-on but consult your vet. Oral drenches do not contain an endectocide for lice.
- Pink eye: This is a highly contagious bacterial infection of the eye. The first sign is a discharge from the eye, the eye becomes reddened, an ulcer develops and finally the eyeball looks white. Most affected animals recover with treatment. See your Vet for remedies.
- Coccidiosis: This is caused by a protozoa (coccidian) and causes scouring and can result in rapid weight loss. It is generally seen in calves that have been taken off meal suddenly. Calves need to be put back on meal and weaned off gradually to allow for gradual exposure to the pathogen and for immunity to develop.
- Clostridial diseases: Prevention is the best option. Vaccinate with a 5 in 1 injection at 6-8 weeks of age and give a 2nd booster injection 4–6 weeks later.
- Hair loss can occur for a number of reasons– ring worm, facial eczema or eczema. Ring worm is seen as small circles of lost hair. Facial eczema usually occurs in autumn and is caused by a fungal toxin on the grass causing liver damage and results in areas of hair loss/sunburn. Spring eczema is similar in appearance to facial eczema and appears to occur in calves with well developed rumens that are transitioning to high quality forage.
- Polio-encephalomalia (polio, vitamin B1 or thiamine deficiency): This is seen as a sudden onset of a nervous condition - initially showing up as blindness and/or lack of coordination. Animals can "fit" and die if left untreated. Cattle normally produce sufficient vitamin B1 and the reason why this process is disrupted in calves is unknown. The disease is most common in late spring or early summer after weaning. Early treatment with a vitamin B1 injection is needed.
- Ryegrass staggers: Occurs in summer and is caused by a fungal toxin in perennial ryegrass. The symptoms are staggering and lack of coordination similar to polio except that develops more slowly and more calves are affected. Symptoms tend to disappear when the calf is relaxed. It is not life threatening. Move calves slowly, remove hazards like electric fences and move onto non ryegrass paddocks or feed hay or other supplements.
- Copper deficiencies: In areas of deficiency calves often benefit from copper supplementation between 3 and 6 months of age. One symptom is a rough coat but confirmation should be through a blood test or liver biopsy

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Calf Rearing Fact Sheet: Calf health

Internal parasites

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Key Points

1. Larvae are ingested in pasture and as adults attach themselves to the intestinal wall and cause tissue damage.
2. Calves are susceptible to worms after weaning and the damage they cause to the wall of the intestine means that calves can have significantly reduced weight gains. Usually shows up on calves as a dirty backside. Can be mistaken for Coccidiosis (see Fact Sheet 2.9).
3. Drench before faecal egg counts get too high.
4. Oral combination drenches are generally the most effective in young calves.
5. Ensure you know how to drench effectively and when you should be drenching to avoid resistance.
6. Minimise worm burdens by feeding well, grazing good covers and graze clean pasture.



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Calf Rearing Fact Sheet 2.8

Introduction

Gastro-intestinal parasites (worms) are common in cattle and typically include Ostertagia, Trichostrongylus and Cooperia. Females lay thousands of eggs which are excreted in the faeces. When environmental conditions are favourable eggs hatch into the L3 stage. L3 larvae are ingested with pasture, and develop into adult worms which attach themselves to the wall of the intestine. Damage to the intestinal wall can be measured in the blood by the amount of pepsinogen present. Adult worms start the cycle again by laying eggs which are excreted in faeces. Optimum conditions for hatching are moist grass with temperatures above 10 ^{0}C The highest contamination levels on pasture generally occur between October and May. Once calves start eating pasture they can ingest larvae but parasite worm burdens tend to remain low until after weaning. Younger animals are more susceptible to worm burdens than older animals. The more larvae present on the pasture the greater the problems. Ideally calves should be grazed on pasture that is fresh and has not been recently grazed by other calves. Even low levels of infection can reduce growth rates in calves.

Symptoms

- Low appetite, weight loss or reduced weight gain
- Watery diarrhoea
- Dehydration and dull coat
- Low energy
- Faecal egg counts (FEC) above 1000 epg (eggs per gram of faeces) indicate significant adult worms
- In calves, plasma pepsinogen concentrations above 1 IU/ml indicate infestation

Treatment

- Reduce exposure to parasite burdens by moving calves onto paddocks that have not been grazed for a long period. Avoid too much grazing pressure – higher pasture covers reduce the number of larvae consumed as most larvae live close to the ground. Calves which are healthy and well fed will be less susceptible to gastro-intestinal parasites than weaker calves. Grazing paddocks with adult cattle or sheep after calves will reduce the larvae load on the pastures.
- Calves need to be drenched before worm burdens get too high. Can be administered as a pour on, oral or injection. Oral combination drenches tend to be the most effective drench in young calves.
- Talk to your vet re avoiding drench resistance - factors include using the correct dose, returning treated stock to contaminated pastures, not treating healthier animals, only drenching when necessary based on faecal egg counts (FEC) and symptoms.
- Make sure that the volume of drench administered is based on the size of the largest calves being treated as under-drenching increases the potential for drench resistance. Provided resistance is not present, drenching should result in a rapid cessation of the diarrhoea.

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Calf Rearing Fact Sheet: Calf health

Coccidiosis

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Key Points

1. Coccidiosis is an increasingly common disease that affects animals from 4 weeks to 8 months. It is often associated with the end of meal feeding.
2. The parasite causes severe intestinal damage and affected animals can take a long time to resume normal growth rates.
3. Infection is by ingestion of oocysts which survive well in moist conditions.
4. Clinical signs include dysentery containing mucous and blood and faecal staining of the hind quarters.
5. Definitive diagnosis is difficult from faecal oocysts as the association between onset of diarrhoea and shedding is not consistent.
6. Response to treatment is the common method of diagnosis.
7. Best prevention is gradual weaning off concentrates (containing rumensin) —alternate day feeding of concentrates and then once-weekly feeding coupled with rotational grazing to prevent oocyst build up.

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Calf Rearing Fact Sheet 2.9

General

- Coccidiosis is an intestinal disease caused by a protozoa which occurs primarily in young calves aged 3-8 months of age. In heavily contaminated environments calves may show clinical signs as early as 4 weeks of age.
- Typically Coccidiosis has high morbidity (sickness) and moderate mortality with long term affects on production in animals which survive. The incidence of this disease is increasing and the detrimental effect on dairy beef performance is considered significant.
- This condition can be controlled by inclusion of a coccidiostat in the rations and strategic grazing management.

What is Coccidiosis?

- Coccidia are intracellular, protozoan parasites which co-exist in the intestinal tract of cattle. *Eimeria zuernii* and *Eimeria bovis* are host specific and infect the ileum and large intestine. The life cycle is complex, including both asexual and sexual reproduction. Sexual reproduction results in the formation of oocysts which are passed in the faeces.
- The source of infection is faeces of infected animals. The calves ingest oocysts from contaminated pasture, feed and water or by grooming each other.
- Dry conditions and high temperatures in pasture will destroy oocysts within a few weeks. However under moist conditions they can survive for up to 2 years.
- Clinical disease occurs when there is damage from heavy infestations or the calves have lowered resistance through stress, poor nutrition or other diseases.
- The gut mucosa becomes denuded and stripped of villi which results in severe haemorrhage and impaired water absorption. This leads to diarrhoea, dehydration and death. In lighter infections, mal-absorption is a consequence of villi atrophy resulting in poor growth rates and ill-thrift.

What circumstances influence the disease?

- Initially, there is a build up of infection on the pasture that the calves are grazing. This is often caused by continual use of the same "calf paddocks" each year. Seasons that are mild and moist speed up the contamination .
- The cessation of meal feeding is also often associated with coccidiosis. Calves that have had lots of meal have been protected by the coccidiostat (often rumensin) in their feed and so haven't had the need or opportunity to build up immunity against the parasite.
- The incubation time is 2-4 weeks and then Coccidiosis appears as a sudden onset of diarrhoea, usually in many animals in the group.

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What are the presenting signs?

- The incidence and severity of this disease ranges from low grade to acute, severe and often fatal. This is directly related to the level of stress the animals are under.
- Animals often appear unhappy and uncomfortable and may exhibit severe unproductive straining while defecating. Temperature is mildly elevated (39.0-39.5 degrees °C). Dehydration and lack of appetite are common.
- The passage of blood and mucous stained faeces is often the first sign of disease. Faecal staining of the tail, hind quarters and hocks is a strong indication of the presence of Coccidiosis. This is known as the "Coccidiosis flag" or "windscreen wiper" effect.
- Affected calves rapidly lose condition. Because parasites damage the gut lining, regaining condition takes a long time. Severely affected calves typically undergo a convalescence of many weeks, during which feed intake and weight gains are reduced. Animals can become un-thrifty.
- Mild and chronic cases show up as weight loss, anaemia and mild or no diarrhoea. Calves appear weak and listless with droopy ears and rough coats. There is a continuous re-infection in a heavily contaminated environment together with a partial immune response struggling to hold the parasite in check.

How do I know it is Coccidiosis?

- Laboratory tests for Coccidia oocysts use a salt flotation method. Oocysts counts > 5,000/g are significant. The interpretation of results is complicated by non-pathogenic oocysts which can also be present in large numbers. Likewise, diarrhoea can also occur before the oocysts are shed in the faeces, thus false negative results may occur. Also oocysts numbers may be under-estimated because of the dilution effect of watery faeces.
- Blood tests are of limited value, though they may confirm a calf is anaemic.
- A definitive diagnosis can only be made at post-mortem examination by collating gross findings with histology and impression smears.
- The best diagnosis is often a rapid recovery from treatment.

What is the treatment and how do I control the problem?

- In an outbreak the sick animals should be isolated and given supportive oral fluid therapy and treated with coccidiocidal drugs. Preferential feeding may be needed to improve growth rates. Severe cases may not recover.
- The remainder of the animals should be removed from the infected pasture and the stocking rate reduced. Place calves back on meal containing a coccidiostat and then gradually remove the meal from the diet. This allows the calf to build up its immunity gradually.
- Minimise stressful procedures during an outbreak.

What is the prevention?

- Gradually weaning calves from concentrate feeds containing a Coccidiostat to 100% pasture allows a calf time to build up its own resistance to the protozoa. Feeding the concentrate with Coccidiostat on alternate days, progressing to once weekly feeding is beneficial.
- Rotational grazing during the post weaning period prevents levels of infection building up whilst the calf is still building up immunity.
- Supplementation with a concentrate containing a coccidiostat can be strategically effective in breaking a cycle of infection when the challenge is high, especially in warm moist climatic conditions.
- Regularly clean and move feed and water troughs.



Calf Rearing Fact Sheet: Calf health

Skin diseases

On-Farm Research

Key Points

1. Lice in young calves may indicate underlying stress or poor nutrition.
2. Ringworm is a Zoonosis which means it can be transmitted to humans. Animals usually recover without treatment.
3. Spring eczema usually occurs when calves with well developed rumens are transitioned onto grass and by application of pour -on treatments at this time.
4. Facial eczema occurs in late summer and autumn and results from liver damage caused by a fungal toxin in pasture. Monitor spore counts and prevent with zinc treatment.



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Calf Rearing Fact Sheet 2.10

Lice

- Lice are biting ecto-parasites that live on the skin of calves.
- Lice populations tend to be lower in summer. Calves that are poorly fed or under stress may become heavily infested with lice.
- Biting lice cause intense irritation leading to rubbing and hair loss
- Lice can be seen on the skin and eggs appear as white specks attached to the hair shaft. Examine the areas around the neck, shoulders and tail.
- Treatments for lice are usually a pour-on insecticide to the animal's back.

Ringworm

- Dermatophytosis or "ringworm" is very common in young cattle. It is a highly infectious and contagious fungal disease caused by *Tricophyton verrucosum*. The disease is more prevalent in warm and humid climates.
- Lesions occur anywhere on the body but are most common on the head especially around the eyes. They are thick, round, greyish, crusty areas several centimetres in diameter and raised above the skin surface.
- Spontaneous recovery usually occurs so treatment is not normally undertaken. The lesions may persist for 1-4 months.
- Ringworm is a zoonosis so is transmittable to humans. Take care handling infected calves and wash hands with an iodine based soap.



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Spring eczema

- Spring eczema is a well recognised problem that occurs in recently weaned calves. Most cases occur in calves that have been reared intensively on grain and low milk diets to promote early rumen development.
- These calves have a large rumen capacity and their liver is not able to cope with the enormous supply of chlorophyll and it's metabolite, phytoporphyrin. This accumulates in the bloodstream and skin. The reaction with sunlight results in an acute photosensitisation producing sunburn-like lesions.
- Treatment with chemicals to combat lice and worms at this critical time (i.e. when calves are introduced to pasture) can predispose calves to this condition. This is because metabolising the drug places additional demands on the liver.
- Calves develop a swelled, reddened, flaky or scabby skin on the white areas of the skin, usually along the back. This can become thick and leathery which eventually peels and leaves red, inflamed tissue underneath.
- Affected calves should be housed out of direct sunlight or have access to shade. Allowing them to graze at night helps to prevent further damage to the skin.
- Treatment with anti-inflammatory drugs and anti-histamines can be beneficial. Application of zinc based ointments (Filtabac) can be used to block out the effects of the sun.



Facial eczema

- Facial eczema is caused by the ingestion of a toxin (sporidesmin) which is contained in the spores of the fungus *Pithomyces chartarum*.
- This fungus grows and produces large numbers of toxic spores in conditions of high humidity and warm over-night temperatures in late summer and autumn. The fungus grows on the dead litter of pastures, with highest concentrations of spores in the base of the sward.
- The disease tends to be associated with perennial ryegrass because of its ability to produce dead litter. Clover, kikuyu, paspalum and tall fescue pastures are safer than ryegrass dominant pastures.
- The toxin causes damage to the liver resulting in an obstructive jaundice. Phytoporphyrin accumulates in the bloodstream and skin and results in photosensitisation. This photosensitisation tends to occur 2 weeks after exposure to the toxin and is characterised by irritation, reddening and swelling of exposed hairless (eyes/ears/nose/inside hind legs) and non-pigmented skin. The calves rub the affected area on branches or posts and large areas of skin may fall off.
- Most calves are affected sub-clinically and have poor growth rates. Diagnosis is made by blood tests for elevated liver enzymes indicating liver damage.
- The control of facial eczema involves monitoring spore counts on grasses to identify danger periods; spraying pasture with fungicides to prevent growth of the fungus, grazing management to avoid high risk pastures; administering zinc as a preventative to minimise the toxic effect of sporidesmin on the liver.