

CHAPTER 7

Sheep diseases associated with drought



Intensively feeding sheep can produce a range of disease risks that are not usually apparent in pasture-fed sheep. This chapter describes the diseases caused by dietary imbalances, those associated with grain feeding, intensive management and some that may occur when sheep are not grazing pastures for long periods. Diseases that may occur once the drought breaks are covered, along with recommendations to limit the risk of these diseases.

Key messages

- **Most diseases experienced during droughts are associated with high levels of grain feeding leading to acidosis and/or mineral imbalances.**
- **Ensure the ration fed is balanced for energy, protein, fibre and calcium and sodium. Include vitamins A and E if a long period of feeding is anticipated.**
- **Sheep to be containment-fed need to be well trained to full rations, healthy, and vaccinated against pulpy kidney.**
- **Monitor sheep for signs of illness or under-performance such as standing apart, lethargy, lameness, reduced feed intake, or changes in faecal colour or consistency, along with anything else unusual.**
- **If you see signs that concern you, act quickly as early intervention can stop a problem from escalating. Talk to an animal health officer or your local veterinarian.**
- **Any animals that appear unwell or sick must be immediately moved to a separate hospital pen and treated or humanely killed.**
- **Sheep maintained in good condition will be less at risk of diseases caused by short-term feed restrictions, such as shearing and/or cold conditions.**
- **After the drought breaks, monitor stock for worms and maintaining calcium supplements for lambing ewes may be necessary. Avoid letting hungry sheep onto pastures that may cause problems such as nitrate poisoning, phalaris or other toxicities.**

Many sheep are managed through drought and other intensive feeding scenarios with few issues. If sheep remain in good condition during a drought they will experience very little disease. Addressing their requirements beyond energy and protein becomes more important when most of their diet is from supplements. Acidosis, from high starch levels in cereals, and hypocalcaemia (low calcium) are the most common diseases on grain diets. When sheep are fed intensively, as in containment, they can be more susceptible to diseases spreading quickly (e.g. pink eye, ovine Johne's disease). When sheep are maintained at minimal targets, they will more susceptible to stresses such as worms and cold weather when the drought breaks.

Diseases associated with feeding cereal grains

Acidosis

Cereal grains contain large amounts of readily digested starches and low levels of fibre, which can lead to acidosis. Even in the best-managed intensive feeding systems, some sheep get acidosis. It is the most widely reported disease for stock fed in containment. It is particularly common during the introduction phase, as sheep are adjusting to the starch-rich diet.

Starch is rapidly converted to D-lactic acid in the rumen, producing a drop in rumen pH that can have devastating effects on the rumen flora and rumen lining. The acid that is produced crosses the rumen wall and can overwhelm the sheep's buffering systems, leading to catastrophic disruption of normal cellular function.

The natural buffer to the acid produced in the rumen is the bicarbonate in sheep's saliva. Feeding fibre stimulates saliva production.

Provision of sodium bicarbonate to sheep in containment may be beneficial in reducing the incidence of acidosis.

Clinical signs/symptoms

In mild cases sheep are off their feed, appear unhappy and have a watery scour. In severe cases the sheep will be recumbent, depressed and die soon afterwards.

When you see sheep with symptoms, there are likely to be others suffering the effects of too much acid, reducing their performance without necessarily making them obviously sick.

Diagnosis

This can be achieved by clinical examination or assessing the signs with the risk factors. Squashing faecal pellets to see if they have a grey, loose consistency is a useful way to detect if any sheep in the pen have acidosis. Veterinarians can collect samples of rumen fluid for laboratory testing to confirm the diagnosis.

Treatment

Frequent drenches of bicarbonate of soda (1/4 cup dissolved in water) at 2–4 hour intervals may help save some of the least-affected animals. Those that appear a little 'dopey' can be moved to the hospital pen and offered good hay.

Prevention

The introductory phase is the key to prevention (Chapter 4 - Feeding sheep - how much and how often). Providing fibre in the ration of sheep fed cereal grain will help control the disease, but continuous monitoring (especially during the introductory phase) is necessary. Providing sodium bicarbonate to intensively fed sheep has reduced or removed the incidence in trials.



Figure 7.1: Autopsy of weaner sheep showing the rumen full of grain. The weaner had died from acidosis.

Enterotoxaemia – 'Pulpy kidney'

Enterotoxaemia, 'pulpy kidney', is caused by *Clostridia perfringens* type D and occurs when sheep have access to starch-rich diets, such as in containment feeding or on lush spring pasture. When the consumption of carbohydrate is high, the bacteria over-grows and produces a toxin (epsilon) that leads to oedema (swelling) of the brain and the rapid onset of neurological signs. Sheep that are either in very good or very poor condition can be more susceptible to pulpy kidney on lush green feeds or high grain/concentrated diets.

Clinical signs/symptoms

Affected animals are often just found dead, but sometimes are seen thrashing about on their side with their head back. Some sheep can recover, only to develop blindness and an unusual head posture several months later – a condition called focal symmetrical encephalomalacia (FSE).

Diagnosis

Veterinarians can collect samples of the brain and gut for laboratory testing to confirm the diagnosis.

Prevention

Pulpy kidney can be easily prevented by using a clostridial vaccine (e.g. 5-in-1). Ensure all sheep entering a stock containment area have had their first two vaccinations against pulpy kidney, with the second one 2–4 weeks before entry. If it has been longer than 3 months since the last vaccination, give a booster shot.

Providing adequate fibre in the cereal grain rations will help control the disease.

Polioencephalomalacia (PEM)

Polioencephalomalacia (PEM) occurs when excess starch in the diet interrupts the normal production of vitamin B1 (thiamine) in the rumen.

Clinical signs/symptoms

This disease affects the brain, leading to sheep staggering, with tremors and their head thrown back ('star gazing'). They will die in several hours if not treated.

Diagnosis

Veterinarians can collect samples of brain for laboratory testing to confirm the diagnosis, but the response to treatment with vitamin B1 injections is also useful to reach an on-farm diagnosis.

Treatment

Treat affected sheep with vitamin B1 by injection. Drenching the remainder of the mob with thiamine powder will stop further cases.

Prevention

Ensure sufficient fibre in sheep diets and make sure there has been a gradual transition onto the cereal grain ration.

Salmonellosis

Salmonellosis is a bacterial gut infection that causes a foul-smelling, blood-stained or dark scour and can kill sheep quickly. It is commonly seen when sheep are fed cereal grain rations, especially among the 'shy feeders' or those with suffering acidosis.

Clinical signs/symptoms

The signs include acute diarrhoea, fever, lethargy, dullness, sunken eyes and dehydration. Affected sheep will appear sick, tucked up and may grind their teeth.

Diagnosis

Veterinarians can collect samples of gut and faeces for laboratory testing to confirm the diagnosis.

Treatment

Antibiotic treatment of affected animals may be recommended on the advice of a veterinarian. Remove affected animals to the hospital pen and offer hay.

Prevention

Prevent feed and water troughs being contaminated with sheep faeces, as there are always some sheep carrying the disease in their gut. Clean dirty feed and water troughs. Ensure sheep are eating well, are receiving sufficient roughage (fibre) and stress is minimised.

Urinary calculi – bladder stones

Urinary calculi lead to the condition recognised as 'water belly', which occurs in wethers and rams due to the longer, narrower urethra (connection from bladder to the outside) in males. They are caused by the formation of 'stones' within the bladder, which can then block the urethra. Water belly occurs when the blockage in the urethra causes sufficient swelling of the bladder that it bursts.

Clinical signs/symptoms

In the early stages, affected sheep are uncomfortable and straining, which is often confused with constipation. A swelling may develop under the belly if the blockage has caused a rupture of the urethra in this area. The sheep becomes progressively more dull over several days, until showing some relief for a day or two after their bladder ruptures, before they finally die.

Diagnosis

Diagnosis is usually made at necropsy performed by a veterinarian. A critical part of the diagnosis is laboratory testing of the stones in the blockage to guide dietary changes to prevent the disease in more sheep. A mineral analysis of the ration should be conducted as well.

Treatment

Seek veterinary advice. Treatment is usually from surgical relief of the obstruction, however this may be expensive. You may consider salvage slaughter of the pen-mates. In some cases, the blockage can be relieved if the stone is in the urethral process at the end of the penis, but there are likely to be more formed behind it in the bladder.

Prevention

Ensure that the Ca:P ratio is correct when starting on supplementary feed. Ensure the diet has sufficient salt (1 per cent) to encourage water intake, which dilutes the urine and limits stone formation. Sheep must have access to adequate fresh, clean water.

Mineral analysis of the stones will assist in adjusting the diet to prevent further cases. The mineral balance of the ration needs to be corrected to avoid excesses of phosphorus and magnesium. An excess of protein and silica should also be avoided.

Diseases of intensively fed sheep

Hypocalcaemia

Hypocalcaemia (or 'milk fever') frequently occurs in ewes at or about the point-of-lambing; but also in a number of other situations when sheep are stressed, such as during transport or when holding sheep off feed for shearing.

The signs come on over a period of a few hours and affected sheep go down. The key difference between hypocalcaemia and pregnancy toxaemia (which also occurs in ewes near lambing time) is the response to treatment: sheep affected with hypocalcaemia usually recover within a few hours of treatment.

Cause

Cereal grains have a reverse ratio of calcium to phosphorous to what sheep require for health: these grains are calcium deficient. Calcium is stored in sheep's bones, and when sheep are fed for long periods on a calcium-deficient diet the bone stores become depleted, with a range of consequences:

- hypocalcaemia
- rickets or osteoporosis
- poor growth
- risk to production in future years.

Stressing sheep with low calcium levels (such as a cold weather event, mustering, holding in yards and transport) can induce an outbreak of hypocalcaemia, with many sheep affected, across all classes of sheep. Hypocalcaemia is occasionally seen when sheep are released from the containment feeding area and hit with a cold autumn weather snap.

Clinical signs/symptoms

Early in the condition sheep may show symptoms of staggering and muscles tremors. Then, as the disease progresses, sheep will become recumbent with a dull, depressed demeanour.

Diagnosis

The clinical signs, along with the risk factors and response to treatment, are often how a diagnosis is made. The on-farm diagnosis can be made when downer sheep respond within a few hours to treatment. Veterinarians can collect samples for laboratory testing to confirm the diagnosis in untreated animals, even after death.

Treatment

Warm solutions of calcium borogluconate, such as 4-in-1, to body temperature and give 60 mL by injection under the skin of affected animals. More than one dose may be necessary over the day.

Prevention

The inclusion of limestone in the grain ration at 2 per cent ensures that sheep are being fed the correct amount of calcium in the right ratio with phosphorus. Legume hays have good calcium: phosphorus ratios. If using a loose lick, limestone is unpalatable so the addition of salt will encourage sheep to consume it.

Keeping stress events to a minimum is also important. If mustering and yarding necessary, ensure time off feed is limited.



Figure 7.2: Recumbent ewe with calcium deficiency.

Hypovitaminosis A

Green pasture provides sufficient vitamin A for sheep, but within about two months on dry feed sheep can develop a deficiency of vitamin A, leading to ill thrift and possibly blindness.

Clinical signs/symptoms

Ill thrift, night or low light blindness.

Diagnosis

Veterinarians can collect samples of liver for laboratory testing to confirm the diagnosis.

Treatment and prevention

Vitamin A can be administered as a drench, or by injection of Vitamin ADE to affected animals, and provides protection for a further 2–3 months. Seek veterinary advice on treatment options.

Prevention

Access to green pick or green hay will correct and prevent vitamin A deficiency. Treatment with Vitamins A, D and E prior to entry may be beneficial, especially for spring drop lambs, if an extended dry period is expected.

Hypovitaminosis E

Green pasture provides sufficient vitamin E for sheep, but within 2–3 months on dry feed sheep (especially weaners) can develop a deficiency, leading to ill thrift and muscle weakness.

Clinical signs/symptoms

Staggers, muscle weakness and recumbency, often triggered by exercise such as mustering, yarding or transport.

Diagnosis

Veterinarians can collect samples of liver, muscle or blood for laboratory testing to confirm the diagnosis.

Treatment and prevention

Vitamin E can be administered as a drench or injection to affected animals and provides protection for 2–3 months. Seek veterinary advice for treatment options.

Access to green pick will correct the deficiency. Treatment with Vitamins A, D and E prior to entry may be beneficial, especially for spring drop lambs, if an extended dry period is expected.

'Shy' feeders

The term 'shy' feeder is given to sheep that are reluctant to eat the supplementary feed provided, usually grain or pellets. This may affect up to 20 per cent of sheep in feedlots. Shy feeders will visit the feed trough, although they are more likely to do so when the main mob is not there, and so may not be easily identified as staying away. Most animals will eventually start to consume feed, but prolonged non-consumption may lead to reduced productivity, increased disease susceptibility and, in some cases, result in starvation.

Clinical signs/symptoms

The identification of shy feeders requires careful observation by the producer. The key sign is an animal that stays back and doesn't push to get to the feed on offer. They will tend to eat only when most of the mob have finished and left the trail.

They may show signs of hollow flanks and weight loss to the point of emaciation.

Diagnosis

Closely watch the sheep at feeding times and monitor body condition. At necropsy, there will be little food in the gut and intestines. Your veterinarian can collect samples to confirm the diagnosis.

Treatment

Remove shy feeders from the containment area and provide other fodder to enable them to access adequate feed.

Prevention

Maternal influences on learning is the most effective way to reduce reluctance to eat both unfamiliar plants and hand-fed rations ('neophobia') in young sheep, so exposing lambs to unfamiliar feed before weaning is beneficial. This becomes more significant in drought conditions, where the adjustment of early weaned or light lambs onto supplementary feed is critical to increase the likelihood of survival. Other factors such as keeping the delivery method of the feed consistent and providing enough trough space to limit competition also increase the uptake of a novel food.

Further considerations are the group size, age, sex and production status.

Other diseases

These diseases are sometimes encountered in sheep fed intensively, perhaps more commonly than in sheep at pasture.

Abortion

There are a number of causes of abortion in sheep, including bacterial, viral, parasitic, toxins and congenital issues. Some causes are zoonotic (transmissible to humans) so it is important to wear gloves when handling the affected sheep or aborted foetus or membranes.

Clinical signs/symptoms

Aborted foetus or membranes will be found in the paddock or containment area. Ewes may be seen with staining around the vulva.

Diagnosis

Contact your veterinarian if you notice abortions occurring. Collect the foetus and membranes and place into a plastic bag and refrigerate. Testing these will assist in getting a diagnosis.

Treatment

Your veterinarian will advise of any treatments.

Prevention

Immediately separate ewes with signs of abortion to the hospital pen. Minimise stress, ensure any feed stuffs are free from contamination or mould and keep feed troughs clean. Consider putting the rest of the mob back onto pasture, to limit ongoing exposure.

Coccidiosis

Coccidia are a protozoan parasite that infects the intestine. Sheep are usually exposed as young animals and develop a good immunity without signs of disease. However, the right conditions, such as wet weather and stressful environments, may increase the occurrence of disease.

Clinical signs/symptoms

Clinical signs of the disease are diarrhoea with straining and fresh blood may be seen in the diarrhoea. The sheep will be tucked up, off their food, dehydrate and strain when defecating.

Diagnosis

Conduct a worm egg count (WEC). The protozoal oocytes will be seen and counted. A very high count along with disease will form the diagnosis of coccidiosis. A veterinarian can also conduct a necropsy and collect intestinal samples for confirmation.

Treatment

Treatment is in the form of a drench or injection. You must contact your veterinarian to obtain it.

Prevention

Monitor young animals in containment for signs and minimise stress by keeping the sheep well fed, protected from extreme of weather. Keep feed troughs clean and free from faecal spoilage.

Copper toxicity

Sheep are very sensitive to too much copper in their diet, and should not be fed cow or pig pellets. Over time, the excessive copper accumulates in the liver until it reaches the point where it is suddenly released, breaking red blood cells. At this point, the affected sheep die quickly.

Clinical signs/symptoms

Affected sheep are usually found dead. Observant managers may detect a yellowing of the eyes in sheep about to die.

Diagnosis

Veterinarians can collect samples of liver for laboratory testing to confirm the diagnosis. The liver and kidneys are dark in colour, as is the urine. The carcass may be jaundiced (yellow). Feed should be tested to check on the levels of copper, molybdenum and sulphur.

Treatment

Ensure the sheep with high copper levels are kept stress free. Seek veterinary advice for treatment options.

Prevention

Ensure that the ration does not contain excess copper, and limit prior access to weeds such as heliotrope or Paterson's curse.

Internal parasites – worms

Although internal parasites ('worms') are associated with pasture-fed sheep, it is wise to make sure that their presence isn't limiting the performance of intensively fed sheep. Sheep that are stressed for any reason may have reduced immunity and may show effects of a worm burden.

Drought or containment feeding systems are often employed from the end of spring, so it is an appropriate time to administer the first summer drench (conduct a worm egg count [WEC] first). Make sure you use an effective drench and do a 'drench-check' WEC 10 days later to confirm it has worked.

Containing sheep to intensively feed them means that the only worms remaining at the end of the feeding period are those that survived the entry drench (i.e. the worms resistant to the drench), which promotes drench resistance. Seek veterinary advice or consult www.paraboss.com.au on tactics to prevent this issue.

If the aim is production feeding, such as grain finishing of lambs, it is important to remove any worms. Be cautious of any withholding periods that apply to the product used – always check the

label and follow directions. Record the use of the drench and advice on the NVD when selling.

Listeriosis

Listeriosis is a sporadic bacterial disease often associated with feeding of silage or possibly associated with close intense grazing.

Clinical signs/symptoms

There are two conditions caused by *Listeria*, the first is neurological and the second is abortions.

Sheep suffering from the neurological condition show signs of incoordination, head tilt, walking in circles and can become recumbent and die after a couple of days. The bacteria cause inflammation of the membranes surrounding the brain.

Diagnosis

Diagnosis is made at necropsy by your veterinarian. Laboratory confirmation is required to confirm the diagnosis.

Treatment

Treatment is rarely successful. Consult your veterinarian.

Prevention

Avoid feeding spoiled silage.

Liver fluke

The same advice – treat to remove – applies in the case of liver fluke as worms. If you are in 'flukey' country or are feeding sheep that have originated in those areas, make sure fluke are not dragging your sheep down.

Contact your veterinarian about simple tests that can confirm if a treatment is needed.

Ovine Johne's disease

Johne's disease is a bacterial infection of the gut and is a fatal condition. Many sheep are carriers and may not show any signs of disease but will be shedding the bacteria in their faeces.

Clinical signs/symptoms

The bacteria invades the lining of the intestines and leads to the malabsorption of nutrients and ultimately results in wasting and diarrhoea. The most common sign is a 'tail' to the mob, meaning a percentage of skinny sheep, some with diarrhoea stains on their hocks.

Diagnosis

Diagnosis is based on the tail or skinny animals in the mob and unexplained wasting. Your veterinarian can test samples to confirm the diagnosis.

Treatment

There is no treatment available for affected sheep.

Prevention

A vaccine called Gudair® will control the disease. Containment feed sheep that are either vaccinated or from known disease-free areas.

Pinkeye

Pink eye is a bacterial infection of the eye, caused by a range of bacteria. For disease to occur there needs to be a combination of irritation of the eye (dust) and the causative bacteria. A number of predisposing factors lead to the disease developing, such as crowding, hot, dry and dust conditions, feedstuffs that are abrasive (grass seeds, stubbles, straw) and stressful situations (such as under-nutrition, excessive handling).

Clinical signs/symptoms

One or both eyes may be affected. The eyes will be red, weepy, often closed and sore. The surface of the eye or cornea will be initially red and then will go cloudy (and change colours from red, blue and then to white).

Diagnosis

It is important to check the eye for foreign bodies such as grass seeds that can cause severe eye issues.

Treatment

Often cases of pink eye will resolve without treatment and are self-limiting. However, if treatment is necessary, consult your veterinarian. Sometimes mustering/catching animals for treatment causes more animals to be affected.

Prevention

Prevention is focused on reducing the predisposing factors such as keeping dust levels low, reducing exposure to grass seeds or stinky straw, and minimising handling, overcrowding and under-nutrition.

Pneumonia and pleurisy

Pneumonia is inflammation of the lung tissue and pleurisy is inflammation of the membrane covering the lungs and chest wall. These conditions are caused by a number of bacteria and viruses, and some non-infectious causes such as lung worm or inhalation/aspiration of drenches.

Clinical signs/symptoms

The most commonly affected are young sheep that are exposed to a number of stresses such as transport, mixing with new sheep, crowding, dust and extreme weather events.

Clinical signs include sudden death, reduced appetite, fever, depression, lethargy, increased respiratory effort and rate, coughing or nasal discharge, and deaths in the worst affected animals.

Diagnosis

Diagnosis is made by your veterinarian conducting a necropsy and collecting various samples, or during abattoir surveillance.

Treatment

Consult your veterinarian for advice on treatment. Treatment of sick animals is required and preventative measure put into place for the

remaining animals. Severely affected animals should be humanely killed.

Prevention

Prevention is focused on reducing stressors. Ensure animals are well fed/watered, set appropriate stock densities, reduce dust and provide protection from extremes of weather. Avoid mustering sheep in hot conditions or in dusty yards.

Poisonings

A wide range of potential poisons are encountered in droughts when poor-quality or unusual feeds may be used or when hungry sheep eat plants they normally wouldn't. Using contaminated feed sources is a risk whenever sheep's natural ability to select their preferred feeds is limited, as in a containment feeding system.

Clinical signs/symptoms

Always have unknown or unexplained symptoms or deaths investigated by a veterinarian.

Diagnosis

Diagnosis can be made at necropsy by your veterinarian, often with laboratory confirmation, and after consideration of access to potential sources of the toxin involved.

Treatment

The success of any treatment depends on the toxin involved. Your veterinarian can advise.

Prevention

Avoid feeding spoiled or contaminated fodder, and access to unusual plants.

Pregnancy toxaemia ('twin lamb disease')

Pregnancy toxaemia occurs when heavily pregnant ewes, especially those with multiple lambs, are not getting sufficient energy to feed themselves and their lambs, and the ewe begins to break down her body fat. A common disease when there is insufficient pasture, it can occur in intensively fed sheep if the food supply is stopped for some reason or if the ewes get stressed in late pregnancy (putting them off feed).

Clinical signs/symptoms

Affected ewes become disinterested in feed, separate from the mob and stand around, become lethargic and sometimes will appear staggy or drunk. After several days they will go down and then die.

Diagnosis

Veterinarians can collect samples of blood or eye fluid for laboratory testing to confirm the diagnosis. At necropsy the liver is fat and swollen, and multiple lambs are present.

Treatment

In the early stages (before sheep are down), treatment with mineral solution containing glucose (4-in-1 or a flow pack) and drenching with propylene glycol or products such as Vytrate® may assist some ewes to recover. Euthanasia of advanced cases is advised.

Prevention

Make sure heavily pregnant ewes are receiving the correct ration with sufficient energy to meet their needs, and that there is nothing going to occur to put them off their feed. Keep handling to a minimum and limit time off feed.

Pyrrolizidine alkaloidosis

This is the name for heliotrope or Patterson's curse poisoning, and the affected sheep will have eaten plants containing this toxin sometime before entering the containment feeding area. These plants are common in parts of Victoria and in areas where sheep are confinement fed. Sheep with affected livers are more prone to copper toxicity.

Clinical signs/symptoms

Affected sheep lose weight, will become yellow, and die.

Diagnosis

Veterinarians can collect samples of liver for laboratory testing to confirm the diagnosis. The liver is often misshapen and lumpy, and the carcass yellow.

Treatment

There is no treatment. You may consider salvage slaughter if you suspect that many animals may die before exiting the containment feeding area.

Prevention

Limit access to plants containing these toxins.

Salt poisoning

Salt poisoning is the name for the condition that occurs when sheep that have had no water or restricted access are provided with water. The sheep drink excessively and this leads to swelling of the brain (oedema) resulting in fits and convulsions.

Clinical signs/symptoms

Soon after consuming excessive water, signs such as lethargy, blindness and head pressing will be seen. Ultimately, the animal will go down, start convulsing and die.

Diagnosis

Veterinarians can collect samples of the brain for laboratory testing to confirm the diagnosis.

Treatment

There is no treatment.

Prevention

Don't run out of water and make sure you provide adequate trough space. If water deprivation or restriction does occur, introduce the sheep back to water very, very slowly by only providing a trickle and driving them away and letting others drink.

Scabby mouth

Scabby mouth may become an issue if the virus is introduced into a containment-fed mob that isn't immune to it (e.g. when buying lambs to finish). The virus survives for long periods in the soils and on troughs. Sheep that aren't immune and damage their mouths can then become infected. The scabs make it difficult for the sheep to feed.

Clinical signs/symptoms

Scabs will form around the mouth and sometime around the feet. Usually these are self-limiting and sheep will develop a good immunity. However, if severely affected, these lesions may become very sore and infected and stop the sheep eating.

Diagnosis

Diagnosis is usually made by a clinical examination. Veterinarians can collect samples of the scabs for laboratory testing to confirm the diagnosis.

Treatment

There is no treatment, just provide easily eaten food until the scabs fall off, which they do in 2–3 weeks. In severely affected animals secondary infection may occur and antibiotic treatment may be necessary. Seek veterinary advice.

Prevention

Prevent contamination of the mob if you have no record of it occurring in your lambs. Consider vaccinating at marking time once you are sure the virus is on your property.

Urea poisoning

Consuming excess urea will lead to the opposite effect to acidosis. Sheep drinking the water around urea blocks after rain can be affected.

Clinical signs/symptoms

Sheep are found dead.

Diagnosis

Diagnosis is based on access to excess urea, and measurement of rumen pH.

Treatment

Drenching with vinegar may help.

Prevention

Do not include more than 1 per cent urea in the ration. Shelter urea blocks from the rain.

After the drought

The change to pasture can produce dietary upsets or expose sheep to poisons unexpectedly. After previous droughts there have been reports of:

- nitrate-nitrite poisoning
- phalaris and ryegrass staggers
- hypocalcaemia
- plant poisonings.

Always gradually introduce sheep to 'new' feeds, even if it something that they would remember from the previous year – their digestive tract doesn't remember that long ago!

Test the pasture with a small mob of sheep and monitor their health closely for the first 3–4 days.

Ensure that the sheep are not hungry when let out – feed them plenty of hay beforehand.

Continue to check them daily when they are left in the paddock overnight.

Make sure weaner sheep know where the water is.

Ensure heavily pregnant ewes continue to have access to a limestone and salt lick through lambing.

Internal parasitism

After a prolonged period of intensive feeding, sheep lose the immunity to worms that they built up through the previous winter and spring, through lack of exposure. All sheep can be susceptible to worms in the early winter after a drought.

Prevention

Monitor your mobs for any indications of scouring, and perform WECs 6 weeks after letting sheep out of containment, then at 2–4 week intervals. Your veterinarian can advise on an appropriate monitoring program.

Nitrate/nitrite poisoning

Nitrate/nitrite poisoning has been reported after some droughts. The lack of rain means surface nitrogen isn't leached in the deeper subsoils, so the first plants growing can have high levels of nitrate present. This is converted to nitrite in the sheep's rumen, and when absorbed it affects the ability of red blood cells to carry oxygen.

Clinical signs/symptoms

Affected animals shiver, pant, collapse and die. The clinical course may be as short as 2 hours or as long as 24.

Diagnosis

Diagnosis is made at necropsy by your veterinarian. Laboratory confirmation is required to confirm the diagnosis.

Treatment

Nitrite poisoning can be treated with intravenous injections of the drug methylene blue but needs to be given as soon as possible. If nitrite poisoning is suspected consult your veterinarian immediately.

Treatment with the antidote may be successful.

Prevention

Slowly introduce sheep to fresh pasture, monitoring for the development of these signs.

Perennial ryegrass staggers

Perennial ryegrass staggers is caused by toxins produced by endophytes in the plant. While staggers are the most obvious visual signs, a range of toxins can also cause less obvious responses such as heat stress, increased dagginess and ill thrift. It is mainly associated with naturalised and older perennial ryegrass pastures as many of the newer varieties have been selected for endophytes that are safer on stock. However, unless paddocks have undergone significant renovation and re-sowing to remove the seed bank and plants of older varieties of perennial ryegrass, some of the volunteer plants in the perennial ryegrass pastures may still contain unsafe toxin-producing endophytes.

Clinical signs/symptoms

The severity of symptoms can vary from mild to severe. Symptoms will range from mild muscle trembling to incoordination, head shaking, to being recumbent and convulsing. Sheep can also be suffering from heat stress and have increased thirst. Most deaths occur due to misadventure.

Diagnosis

Diagnosis is based on clinical signs and history of grazing perennial ryegrass pastures.

Treatment

If affected mobs are left to graze quietly, most sheep will have few signs. However, protection from misadventure is advised, such as fencing off dams or providing troughs. Full recovery from staggers occurs within 1–4 weeks of being moved to a safe paddock. Nursing care for affected sheep is required, ensuring access to feed and water.

Consult your veterinarian.

Prevention

Closely monitor sheep grazing perennial ryegrass pastures in summer and autumn and if signs are seen quietly move sheep to a safe pasture. Avoid yarding if possible.

Phalaris toxicity (staggers and sudden death syndrome)

Two separate syndromes can be caused by phalaris toxicity: phalaris staggers and sudden death poisoning.

Phalaris staggers can occur when sheep have long exposure to phalaris-dominant pastures, in cobalt-deficient areas. The phalaris plant contains a toxic alkaloid that causes the staggers.

Sudden death syndrome is caused by compounds in the plant that interfere with normal nitrogen metabolism in the sheep.

Clinical signs/symptoms

Sheep suffering from phalaris staggers will show signs of uncoordination, muscle tremors, head nodding, bunny hopping and a stiff wide gait. If affected sheep are driven they may go down and convulse; if left alone they will recover.

The sudden death syndrome occurs shortly after sheep are exposed to fresh phalaris growth in autumn. Sudden death occurs due to heart failure.

Diagnosis

Diagnosis of phalaris staggers is made at necropsy by your veterinarian, considering the pasture available to the sheep. Laboratory confirmation is required to confirm the diagnosis.

Diagnosis of the sudden death syndrome is made by history of exposure to phalaris pastures; there are no characteristic changes seen at necropsy.

Treatment

There is no treatment or cure for sheep affected by phalaris staggers. Consult your veterinarian for further advice.

Prevention

Monitoring for the development of signs of staggers should continue for several weeks after sheep are let out to pasture. Cobalt can be used to prevent phalaris staggers. Seek veterinary advice on prevention options.

The only prevention for sudden death syndrome is to avoid putting hungry sheep onto short fresh phalaris pastures. Where phalaris pastures have a known history or a suspected of causing sudden death and they have to be grazed, as there are no other options, use a small number of sheep and monitor closely over 3 to 4 days before committing larger mobs to the pasture. Always ensure sheep are full before placing them on these pastures

Humane killing

Where it is necessary to kill a sheep, it must be done promptly, safely and humanely. The killing method must result in rapid loss of consciousness followed by death while unconscious.

A person killing a sheep must have the relevant knowledge, experience and skills to kill the sheep humanely, or be under direct supervision of a person who has the relevant knowledge, experience and skills, unless:

- the sheep is suffering and needs to be killed to prevent undue suffering; and
- there is an unreasonable delay until direct supervision by a person who has the relevant knowledge, experience and skills becomes available.

A person in charge of a sheep suffering from severe distress, disease or injury that cannot be reasonably treated must ensure the sheep is killed at the first reasonable opportunity.

Reasonable actions must be taken to confirm the sheep is dead. See Appendix 1.

The recommended methods of humane killing of sheep and lambs are either the use of close-range firearm or captive bolt to the brain, or lethal injection. Bleeding-out of unconscious (stunned) animals is permitted. A person must only use bleeding out by a neck cut to kill a conscious sheep as a last resort; when there is no firearm, captive bolt or lethal injection reasonably available. This method is done by cutting the main blood vessels in the neck (neck cut) using a suitable sharp knife. The neck cut is the only method to be used where permitted in conscious sheep. When sheep are bled out, it is not necessary to sever spinal cord or to pith.

Further information

Further reading and resources

- Australian Animal Welfare Standards and Guidelines for Sheep (Edition 1) – www.animalwelfarestandards.net.au/
- Australian Animal Welfare Standards and Guidelines – Livestock at Saleyards and Depots (Edition 1) – www.animalwelfarestandards.net.au/livestock-at-saleyards-and-depots/
- Meat and Livestock Australia – Is it fit to load? A national guide to the selection of animals fit to transport – www.mla.com.au/News-and-resources/Publication-details?pubid=5873
- Veterinary Handbook for cattle, sheep and goats – Animal Health information for veterinarians and stock people in the livestock industries – MLA and LiveCorp Available from the AppStore
- Livestock disease in Australia – Disease of cattle, sheep, goats and farm dogs – Tony Brightling BVSC, MVS; 2006, C H Jerram and Associates, Science Publishers. ISBN 095790863
- Merck Veterinary Manual – www.merckvetmanual.com/
- OIE (World Organisation for Animal Health). (2004). Terrestrial Animal Health Code. Paris.

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