

Leptospirosis in cattle herds

Richard Zelski

State Residue Coordinator, Animal & Plant Biosecurity, Paterson (Tocal)

What is leptospirosis, or 'lepto'?

Leptospirosis is a contagious disease which infects both animals and humans. It is caused by bacteria called *Leptospira*. There are over 200 different strains of *Leptospira* found worldwide, with infections being most prominent in areas that have a hot and humid climate. Leptospirosis is considered an occupational hazard for many people who work outdoors or with cattle, for example farmers, veterinarians, abattoir workers, sewer workers etc.

In NSW, there are two strains of *Leptospira* that are frequently identified in dairy and beef cattle:

- *Leptospira hardjobovis*
- *Leptospira pomona*.

Both the strains may also cause severe illness in humans.

How is leptospirosis spread?

Leptospira bacteria have been found in all farm animals, rodents and wild animals. They colonise the kidneys of infected animals and, in females, they also colonise the reproductive tract.

- Infected animals can carry the bacteria for long periods, shedding them in urine and at birth or abortion, thus contaminating the animals' environment.
- Leptospirosis is also spread in contaminated water supplies, food, pastures and soil.
- Many infected animals do not display any illness. These apparently healthy carriers are the main source of infection for other cattle as well as for humans.
- The bacteria can live for a long time in surface fresh water, damp soil, vegetation and mud, but are very quickly killed on dry soil or by sunlight.

- Flooding after heavy rainfall can spread the bacteria to previously uninfected farms. Outbreaks of leptospirosis infection are therefore more common in wet years. Even closed herds are not completely safe, as water from other properties could carry *Leptospira* organisms onto the farm.
- The bacteria may infect animals and humans through damaged skin or through the membranes lining the nose, eyes or mouth.

Signs of the disease in cattle

Although many infections may pass unnoticed, severe outbreaks do occur. The most severe outbreaks are usually due to the introduction of an infected animal to a previously unexposed and unvaccinated herd.

Signs of disease in adult cattle differ, depending on the infecting strain.

1. Infection with *L. hardjobovis*

The most characteristic signs of *L. hardjobovis* infection are one or more of the following.

- in both beef and dairy herds – a 'storm' of abortion in cows more than 5 months pregnant. The abortions may often occur several weeks after exposure to leptospirosis. The abortion 'storm' usually only occurs in herds where the disease has only recently been introduced;
- in dairy herds – a sharp drop in milk production; and/or
- there could be changes in the milk and udder of diseased animals, these symptoms being indicative of mastitis. The milk may become thick and yellow and may contain clots but there is no swelling or extra heat in the udder. Milk production returns to normal in 10–14 days, even in the absence of treatment. However, cows in late lactation may dry off.

2. Infection with *L. pomona*

The other strain, *L. pomona*, is carried by pigs, including feral pigs, and is often introduced to cattle



herds following the animals' exposure to effluent from a piggery or the introduction of infected pigs onto the property. Infection with *L. pomona* can cause:

- abortion in cows which are more than 5 months pregnant;
- in calves, high fever, jaundice and reddish-brown discolouration of urine, hence the name 'red water' for the disease.

Outbreaks of this form of leptospirosis in calves can be very severe, and many may die if treatment and control measures are not promptly implemented. The outbreaks in calves are seen more commonly in dairy herds than in beef herds, because calves in dairy herds are kept under more intensive conditions, allowing the infection to spread more easily.

Immune response to leptospirosis infection

Animals exposed to leptospirosis will develop immunity (even if they do not show signs of the disease) but only to the particular strain to which they have been exposed; that is, animals immune to *L. hardjobovis* will still be susceptible to *L. pomona*, and vice versa.

As the disease spreads through an unvaccinated herd, the immunity of the herd increases and the incidence of disease decreases. Once most animals are immune, exposure decreases and therefore immunity will start to wane (unless the herd is vaccinated). This allows cattle to become infected again, either by carriers or by some other fresh exposure to infection. In herds where leptospirosis is endemic, this cycle will continue to repeat itself.

Calves reared by previously infected or vaccinated cows are protected by colostral antibodies for up to 6 months before becoming susceptible to the infection again.

Diagnosis of leptospirosis in cattle

Several diseases can produce similar signs to those of leptospirosis. Only 'red water' in calves infected with *L. pomona* is a distinctive sign of the disease, and this does not always occur. The most practical means of confirming leptospirosis diagnosis is demonstration of significant levels of antibodies to leptospirosis in blood samples from cattle that have recovered from infection. Hence a proper veterinary examination is necessary for a correct diagnosis.

A laboratory confirmation of leptospirosis can also be made in the following ways:

- investigation of blood samples collected from a number of animals (10–15) in a herd;

- examination of fresh and preserved aborted calves and afterbirth;
- microscopic examination of a culture of leptospirosis bacteria from urine or organs taken at post-mortem; this is not usually very successful, as the organism is difficult to culture.

Economic loss due to leptospirosis

In individual herds leptospirosis can cause severe economic loss:

- On dairy farms this can be due to outbreaks of mastitis and a significant decrease in milk production.
- In both dairy and beef herds, decreased calving percentage due to abortions and high death rate in calves may constitute a considerable loss.
- There is a further cost if a farmer, a family member or a farm worker is infected with the disease. The considerable time spent off work and the medical expenses incurred during recovery from leptospirosis add to the economic losses in animal production.

Prevention of leptospirosis in cattle herds

Because of the nature of the disease, leptospirosis should not be considered as a problem of the individual animal but as a problem of the herd. Cattle herds can be protected against leptospirosis by combination of an effective leptospirosis vaccination program and proper management procedures. The cost of leptospirosis preventative vaccination is affordable insurance – even a saving of only 1% of calves on average will cover the cost of vaccinating the whole beef or dairy herd.

When formulating a vaccination program keep the following points in mind.

- If a herd has not previously been vaccinated, every animal should receive the initial two doses of leptospirosis vaccine, with the second dose administered 4–6 weeks after the first. To maintain a high level of immunity within the herd, an annual booster (one injection of vaccine) is given to all previously vaccinated cattle.
- It is desirable that all cattle (beef and dairy) used for breeding purposes be vaccinated during early pregnancy to provide the highest degree of protection during the last trimester of pregnancy. This will also provide a high level of protection to calves born from the vaccinated cattle.
- The vaccinations of young calves should be carried out before young cattle become infected. When the calves are from cows vaccinated in late pregnancy, vaccination should commence at about 3 months of age. Otherwise calves can be vaccinated from 1 month. To obtain a high level of protection, the first injection of leptospirosis

vaccine should be followed with a second dose 4–6 weeks later. If a calf is selected to be kept as a breeder, a booster dose (third injection) should be given between the ages of 6 and 9 months, followed by the annual booster injection along with the remaining animals of the herd.

- If unvaccinated stock are brought onto the property, they should be vaccinated on arrival with two injections of leptospirosis vaccine 4–6 weeks apart, followed by an annual booster.
- The vaccine is always injected under the skin and can be administered to lactating cattle. Follow the vaccine manufacturer's recommendations printed on the label of the pack.
- Vaccination will prevent leptospirosis infection and clinical disease in cattle but may not eliminate the bacteria in all carriers. Most commercially produced vaccines combine protection against both the *L. hardjobovis* and *L. pomona* strains and may be produced in combination with vaccines against other diseases, like clostridial diseases. All the vaccines offer excellent protection against the listed diseases. Some vaccines will reduce or even eliminate shedding of leptospirosis organisms in urine.
- While the general recommendation is to revaccinate cattle herds every 12 months, some herds which may be at a high risk of becoming infected should be vaccinated more frequently – every 6 months. Consult your local veterinary practitioner for guidance on the vaccination program that will be suitable for your herd.

Signs of the disease in humans

Leptospirosis is a debilitating disease that can be transferred from animals to humans. It therefore belongs to the group of diseases called zoonoses. Often the first sign of leptospirosis in a herd may be infection of the farmer.

- The disease commences as a severe attack of a flu-like illness with high fever, severe headache, sore throat, muscle pain and chills.
- Occasionally the disease may result in nervous symptoms, limb shakes, and difficulty with simple tasks like balancing and walking.
- The illness may last for weeks, forcing the affected person to take considerable time off work. Relapses are common, with a 'washed out' feeling which may persist for months.
- Leptospirosis infection can cause serious problems for pregnant women and can prove fatal to a human foetus.
- If you suspect leptospirosis infection, seek medical attention without delay. Mention to your

doctor that you have had contact with cattle and that leptospirosis is a possibility.

How do humans get leptospirosis?

Humans can become infected:

- after direct contact with the infected animal;
- indirectly via water, food or soil contaminated with *Leptospira* bacteria;
- when bacteria penetrate abraded skin or intact mucous membranes of the mouth, nose or eyes;
- by drinking unboiled or unpasteurised milk from cows which are ill with leptospirosis;
- by handling of an aborted foetus or afterbirth membranes, and assisting during calving, without proper personal protection.

In a dairy shed, the urine splashes and close contact between dairy cows and milkers is a very favourable environment for the infection to occur. The leptospirosis organism can also be shed in milk when cows are ill with leptospirosis. For these reasons it is considered that dairy farmers, their families and people working on dairy farms are subjected to the greatest risk of contracting leptospirosis infection.

Public health aspects

The infection is an important and continuing public health problem in rural areas. Beef and dairy producers and people employed on farms are at risk of contracting leptospirosis during normal cattle handling activities.

Leptospirosis in humans is a notifiable disease in Australia. There were over 70 human cases reported to the NSW Public Health Units in 2001, and approximately 40 human cases reported in each of 2003 and 2004. (The downward trend could be associated with the exceptionally dry years and with increased farmer awareness of leptospirosis risk.) However, it is considered that the true number of humans infected with leptospirosis is much greater than the number of cases reported, because many sufferers do not seek medical attention or the infection is misdiagnosed as flu.

In NSW, occupational health and safety (OH&S) regulations require that farmers provide a safe environment for their employees.

The safety of a farmer's family and people visiting the farm should also be considered.

Prevention of leptospirosis in humans

The most effective way of protecting humans is to regularly vaccinate all milking cows. The risk of people who work with cattle contracting

leptospirosis can be greatly reduced by preventing infectious material from coming into contact with the human body. To achieve this, take the following precautions:

- Wear full-body protective clothing, including waterproof gloves, aprons and boots, when handling cattle (especially in dairy shed situations) or aborted material.
- Apply barriers in dairy sheds such as splashguards, and cover urine drainage channels. Move away from urinating animals.
- Drink only pasteurised milk.
- Keep children away from dairy sheds and cattle yards.
- Always wash thoroughly after contact with cattle.
- Drain or fence off low-lying, swampy areas.
- Control rodents and feral pigs.
- Separate cattle from pigs, piggeries, piggery effluent and wildlife.

Further information

For further information on leptospirosis in cattle herds, contact:

- your local veterinary practitioner;
- the District Veterinarian at your local Rural Lands Protection Board.

For further information about leptospirosis in humans:

- see the public health fact sheet on leptospirosis by visiting www.health.nsw.gov.au;
- contact your doctor or local public health unit.

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