Leptospirosis in cattle

Leptospirosis is a disease caused by the bacterium *Leptospira hardjo*. Infections with the *L. hardjo* can manifest in a sudden drop in milk production, increased somatic cell count and abnormal milk morphology in one or more quarters. In addition infections with *L. hardjo* may result in abortions. However the infection is often without symptoms. Within a herd, infection spreads primarily by sniffing urine from infected cattle (e.g. introduction of new animals or cows in heat). Also urine contaminated water (tanks) and infected bulls may play a role in spread of the infection.

Leptospirosis is a nasty disease that can lead to production loss and abortion in cows. But most importantly, the disease is a zoonosis and is transferable from animals to humans. All these reasons make it necessary to control the disease.

Symptoms in cattle

Infections in cattle with the *L. hardjo* can manifest in a sudden drop in milk production, increased cell count and abnormal milk morphology in one or more quarters (thickened yogurt-like). An infection with *L. hardjo* may also result in abortion, but most infections are without symptoms.

Cause

Leptospirosis in cattle is caused by the bacterium *Leptospira hardjo* (*L. hardjo*). The *L. hardjo* bacterium penetrates through intact mucous membranes of eye and nose, uterus, damaged skin or orally by infected droplets of urine. The infection is transmitted through direct contact with infected urine, or through water or food contaminated by urine from infected animals and semen of infected bulls. The excretion of the bacterium begins five to ten days after infection. Infected animals can excrete the *L. hardjo* bacterium in the urine for a very long time (sometimes even more than one year). These infected animals are the source of infection for susceptible animals and to humans.

Route of infection

Within a herd, infection spreads primarily by sniffing urine from infected cattle. Also urine contaminated water tanks and contaminated bulls play a role in spreading of the infection.

Like many other infectious diseases, the main cause of (re) infection within herds is contact with infected animals and the introduction of cattle from another herd. So purchase and mixing of cattle are important factors for *L. hardjo* introduction. *L. hardjo* can also be introduced via infected semen and the drinking of contaminated (surface) water.

Damage

Damage occurs due to a decrease in milk production in sick animals and abortions.

Effects on humans

Transmission of bovine leptospirosis to humans is possible through urine of infected cattle (e.g. urine on wounds, inhalation of urine vapour induced by cleaning of milking areas with a pressure washer) and during delivering an aborted foetus. The disease in humans is called in “milkers fever”. The symptoms of milkers fever are non-specific

symptoms, which are most similar to flu. The symptoms of milkers fever include sudden (usually severe) headache, fever, muscle and joint pain, sensitivity to light, nausea and vomiting. Sometimes, liver and kidney disorders are detected (such as jaundice). Unless antibiotics are administered at an early stage of infection, the recovery of milkers fever in humans is slow (up to one and half year). In the Netherlands, L. hardjo infections in cattle and humans are notifiable.

Diagnosis leptospirosis

Cattle
The bacterium *L. hardjo* is difficult to detect, while *L. hardjo* antibodies can be detected easily in blood and milk samples. Clinical symptom in catlle are rare, as most infections are more or less subclinical. The reason for performing lab examinations is usually to determine a *L. hardjo* infection and for leptospirosis-free certification of cattle herds.
The diagnosis of leptospirosis can be made by the detection of the antibodies in blood or (bulk) milk samples by an ELISA.

Control measures
If the infection is present on a cattle farm, these farms need to follow the prescribed approach. Cattle farmers may decide whether they will take control measures if the *L. hardjo* status is known and the herd has been infected. The possibility exists that the infection will stop, but often more and more (new) animals will become infected. Infected animals are a risk to other animals on the same farm and at purchase to other farms. The *L. hardjo* bacterium will remain present for life in the kidney of infected cattle. As in these cattle, the bacterium can be excreted at any moment, it is advised to eradicate animals with antibodies against *L. hardjo*.

Treatment of infected animals
In the eradication of leptospirosis, distinction is made between 'active' and a 'dead end' infection. An active infection occurs in groups with one or more cattle with antibodies against *L. hardjo*. The infection is a dead end in case of a clear and sharp separation between groups of cattle with and without antibodies against *L. hardjo*.
A herd treatment is advised in case of an active infection. This means that the whole herd, from the youngest calf to the oldest cow, is treated once with dihydrostreptomycin on the same day. In case of a dead end infection, all animals with *L. hardjo* antibodies need to be treated once with dihydrostreptomycin.

Certification programs
There are two certification programs. On dairy farms, the programs are named “leptospirosis-free” and “leptospirosis treated”. For other cattle farms only the program “leptospirosis-free” is available.

1. Leptospirosis-free certification of dairy farms
Leptospirosis is a disease that can lead to milk production loss and abortion in cows. But most importantly, the disease is a zoonosis and is transferable from animals to humans. The Dutch dairy association has included in its quality guidelines that milk must come from leptospirosis-free cattle.

How is your herd certified?

At the start of the *L. hardjo* program, blood samples are collected for antibody detection. If animals are introduced into the herd in the past 4 weeks, the blood test will be postponed for several weeks until the last introduced animal is on the farm for at least four weeks. Blood samples will be collected of all female animals older than 1 year and all bulls.
If cattle, younger than 1 year, are introduced from non-free farms in the last year, all calves younger than 1 year are sampled too. If all blood tests results are free off *L. hardjo* antibodies, the farm will immediately receive its free-certificate.

In case in one or a few animals *L. hardjo* antibodies are detected, there are three options:

1. Animals with antibodies will be culled within eight weeks. Four to eight weeks later the bulk milk is tested to examine whether the herd is free from leptospirosis.
2. In case many animals are infected with *L. hardjo* => eradication is not an option. After consulting a veterinarian, a treatment can be given. The farm steps into the control program " treated leptospirosis'
3. Doing nothing. The value of the intake investigation expires (not valid).

Monitoring leptospirosis-free status
On dairy farms, bulk milk is tested three times per year to establish whether the herd is free of antibodies. Blood from aborting cows is examined for leptospirosis.

Leptospirosis-free certification
GD Animal Health ltd and the dairy associations record the status of the participating farms and ensures that the management of blood and bulk milk testing is carried out on time. GD Animal Health ltd also checks whether the purchased animals originate from leptospirosis-free farms. In case these animals originate from non-certified farms, the leptospirosis-free status is suspended.
When the purchased animals are examined (within 4-8 weeks after arrival) and these animals are free of *L. hardjo* antibodies, the free status is granted again.
For more information see the Certification Rules Leptospira hardjo in cattle – 2002.

2. Leptospirosis-free certification non-dairy herds

Cattle breeders opt for certification based on preventive considerations. They want to save on medical expenses (abortion / weak-born calves) and to trade in free-animals. In addition, cattle breeders do not want to take the risk to introduce leptospirosis by contact with infected cattle.

How is your herd certified?
At the start of the program, blood samples are collected for *L. hardjo* antibodies. Blood samples are collected from all female bovine animals older than 1 year and bulls.
In case, the farm has introduced cattle younger than one year of non-free farms within the last year, calves younger than one year are sampled too. If all blood samples are free of *L. hardjo* antibodies the farm will immediately receive the free-certificate.

In case in one or a few animals *L. hardjo* antibodies are detected, there are three options:

1. Animals with antibodies will be culled within eight weeks. After four to eight weeks, blood samples are collected from at least three animals per couple to examine whether the herd is free from leptospirosis.
2. In case many animals are infected with *L. hardjo* => culling is not an option. After consulting a veterinarian, a treatment can be given. The farm steps into the control program " treated leptospirosis"
3. Doing nothing. The value of the intake investigation expires (not valid).

Monitoring leptospirosis-free status

In the non-milk producing farms, blood samples are taken at the slaughterhouse to establish whether the herd is free from *L. hardjo* antibodies. The number of samples/animals is matched to the number of cattle on the farm, the purchase and/or sale of animals and the slaughter pattern. For farms that slaughter a low number of cattle, additional blood tests may be requested.

Cattle delivery control

GD Animal Health ltd. checks whether purchased animals come from leptospirosis-free farms. In case these animals originate from non-certified farms, the leptospirosis-free status is suspended. If the purchased animals are examined (within 0 - 8 weeks after delivery) and free of *L. hardjo* antibodies, the free status is granted again.
For more information see the Certification Rules Leptospira hardjo in cattle – 2002