

Leptospirosis: different strains affecting cattle

Author : DI BENDALL

Categories : [Vets](#)

Date : February 18, 2008

DI BENDALL explains how leptospirosis may be a major risk to herds and the humans in contact with them

LEPTOSPIROSIS occurs throughout the world and is instigated by around 200 pathogenic serovars of the bacteria *Leptospira*.

In any country, only a few different serovars exist, each affecting specific hosts. In the UK, the predominant pathogenic strains have been classified as *L borgpetersenii* serovar *hardjo* and *L interrogans* serovar *hardjo*. These strains were previously classified as *L serovar hardjo bovis* and *L serovar hardjo prajitno* respectively. *L borgpetersenii hardjo* is currently the most common strain affecting cattle in the UK. These strains are members of the same serovar, *hardjo*, and are, therefore, indistinguishable by routine serology.

However, differences in their genetic make-up allows them to be distinguished by PCR. Routine testing in UK labs is by microagglutination and enzyme-linked immunosorbent assay, so there is little data available to accurately state the current UK incidence of these two strains.

Despite not being distinguishable on standard serology, the importance of the different strains is one of pathogenicity.

Studies recovering UK leptospires from bovine kidneys in abattoirs and from clinical material have shown interesting results. While *L interrogans* serovar *hardjo* is found at low incidence in non-clinical samples, it is the predominant isolate from clinical material¹. This would suggest that, although *L borgpetersenii hardjo* infections are more prevalent, it is the less common strain, *L*

interrogans serovar *hardjo*, that has the most pathogenic significance in the UK.

Evidence suggests *L saxkoebing*, a leptospire in the same serogroup as the bovine pathogens but usually carried by wildlife and sheep, may be carried asymptotically by a small number of cattle in the UK.

Its significance is unlikely to extend beyond causing false-positive titres to *hardjo* on serology. Figures state that at least 65 per cent of UK herds have been, or are, infected with lepto.

Colonisation

Leptospire colonise the kidneys and reproductive tract of infected animals and cause the bacteria to be shed in urine and reproductive discharges.

Carrier status develops following infection, allowing shed shedding to continue for up to two years. The classic “milk drop” syndrome once associated with acute lepto infections is now uncommon and, certainly in my years in practice, I have seen a shift in the behaviour of this disease. The major impact of pathogenic leptospire affecting cattle is now on reproductive performance. Some studies suggest the effect of leptospiral infection can be a 40-day extension in calving to conception interval and an additional 1.3 services per conception. At £3 a day and £20 a service, the resulting financial loss would be £146 per cow per year, or about 1.8p a litre, based on an 8,000 litre yield². The potential for leptospirosis associated losses could be much greater in some herds.

Correlation between seropositivity to *hardjo* and poor conception rates in UK dairy cattle has been shown to occur³, and this appears to be unrelated to differences in herd management. This will have particular impact in chronically infected, unvaccinated herds, where the perception is often that a high level of natural antibody and an apparently low incidence of clinical disease means that lepto is not affecting herd health or profit.

Lepto seems to have slipped out of the disease limelight of late. In fact, VLA data from July to September 2007 found lepto responsible in only 12 clinical incidents, out of 6,657 submissions identifying nonnotifiable zoonoses⁵, and it was identified as a cause of only 0.2 per cent of bovine abortions in 2006, compared to two per cent in 2005, although changes to case definition and diagnostics may be responsible for the drop. However, lepto has not gone away - bulk milk testing ([Table 1](#)) clearly shows that in some unvaccinated herds, a significant number of cows have been exposed and others remain unprotected from bought-in carriers and other sources of infection.

A phenomenon created by the low milk price of recent years has been the effect of lapsed vaccination in previously vaccinating herds. This occurred because of the absence of disease and the desire to save cost. However, two or three years down the line, replacement heifers are unprotected and potentially uninfected. This leaves naïve animals exposed to infection. It is a

dangerous game to play, when older animals may still be shedding leptospires in their urine.

These herds may potentially be worse off in terms of the impact of clinical leptospirosis than in herds that have never been vaccinated. Herd J ([Table 2](#)), demonstrates active *L hardjo* infection in the herd in late 2007. The bulling heifer group in [Table 3](#) showed a higher prevalence of seropositivity than the older group of heifers. The latter group was at extremely high risk, as these animals were about to enter a milking herd where recent exposure had been demonstrated through bulk milk sampling ([Table 2](#)). Antibody titres peak around 10-20 days post-infection of an individual and may wane in as little as 100 days later, so it is possible to have a seronegative animal that is still shedding leptospires in its urine. Vaccination was implemented immediately in herd J. However, it is too soon to accurately measure the impact of the challenge in terms of clinical disease and sub-fertility. The protection of a herd against lepto, while possible, is difficult without vaccination because of the challenge of having complete control over some of the major risk factors. Natural antibodies are protective, but it doesn't eliminate long-term shedding from the kidneys and transfer of infection to in contact naïve animals. Two vaccines are currently available in the UK that provide protection against leptospirosis: Spirovac (Pfizer Animal Health) and Leptavoid (Schering-Plough).

Zoonosis

For the 10 years (almost) I have been in cattle practice, I have been warning clients of the zoonotic risk of bovine leptospirosis and, recently, one of them was unfortunate enough to get it. Typical of many a farmer, he asked his vet, rather than his doctor, for advice about the severe headache he just couldn't shift with paracetamol. I strongly advised him to make a medical appointment and tell the doctor he may have been exposed to leptospirosis. The doctor was not familiar with bovine leptospirosis, but looked it up on the internet, put him on appropriate treatment just in case and took some bloods, which went on to test positive. The farmer made a good recovery.

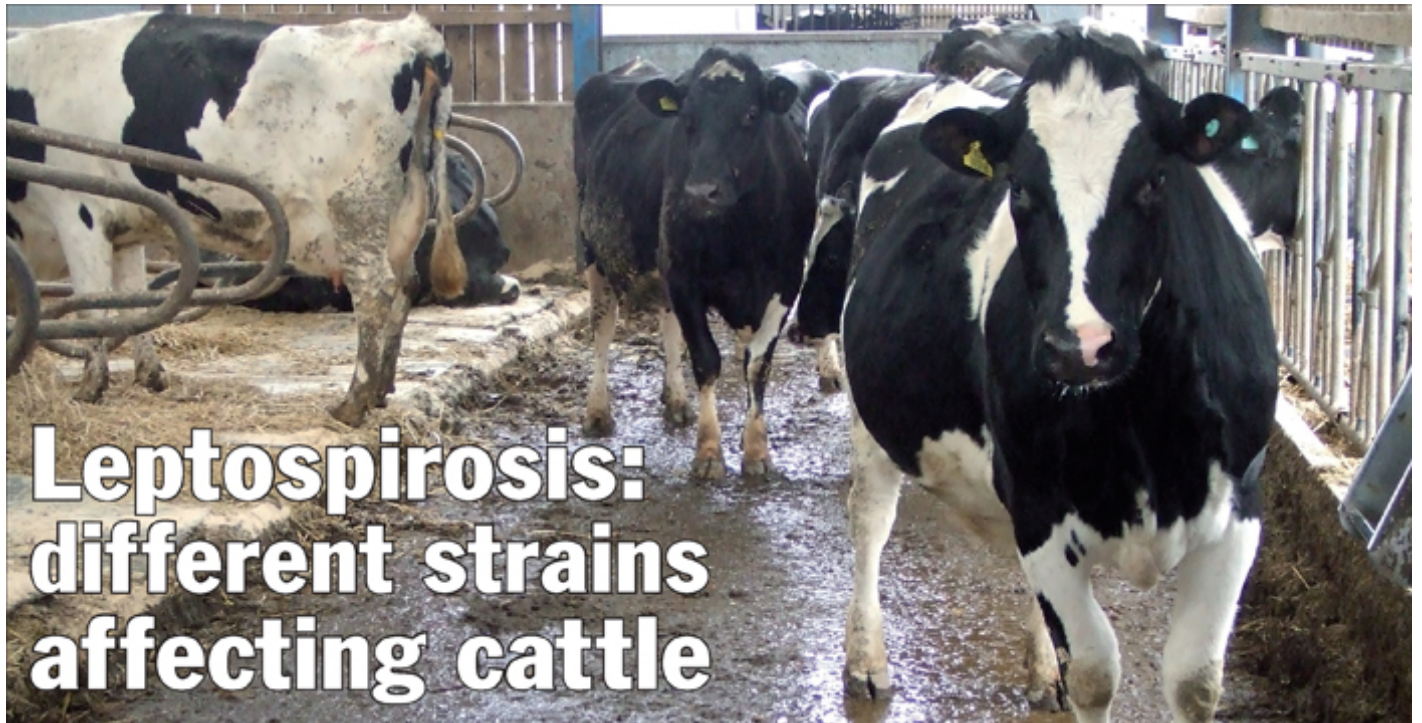
Interestingly, the Health Protection Agency reported 76 cases of leptospirosis in humans in 2006, two of which were fatal (2007 data not yet available). Of those 76 cases, a source was not always identifiable, but in those cases where it was, one in four of those affected were farmers. Strain data is available from only 34 of these cases - the major pathogenic bovine strain *L hardjo* was responsible for only three of them. With approximately 70 per cent of the UK dairy herd unvaccinated for lepto⁴, coupled with dairy cows having ample opportunity to pee on the UK's dairy farmers, it is maybe surprising that there are not more human cases - especially as cases in people occur at high incidences (between 200 and 400 each year) in New Zealand where, like in the UK, the predominant strain is *L borgpetersenii hardjo*. Perhaps other pastimes, particularly those involving water courses, pose a higher risk to human health than dairy farming. However, it remains essential to remember the health and safety aspects whenever lepto is identified on a farm.

Risk factors

- Introduction of infected carriers. Don't forget the risk posed by bulls, particularly hired ones.
- Access to watercourses, especially where there is a risk of contamination by urine.
- Co-grazing with sheep, as sheep are significant carriers of leptospirosis, with around 18 per cent being seropositive.
- Rearing heifers away from home locations.

References

- 1. Guitian J, Thurmond M C and Hietala S K (1999). Infertility and abortion among first-lactation dairy cows seropositive or seronegative for *Leptospira interrogans* serovar *hardjo*, *JAVMA* **215**(4): 515-518.
- 2. Pfizer Animal Health British Dairying December 2007.
- 3. Dhaliwal G S, Murray R D, Dobson H, Montgomery J and Ellis W A (1996). Reduced conception rates in dairy cattle associated with serological evidence of *Leptospira interrogans* serovar *hardjo* infection, *The Veterinary Record* **139**(5): 110-114.
- 4. DEFRA Zoonoses Report (2006).
www.defra.gov.uk/animalh/diseases/zoonoses/reports.htm (accessed on January 31 2008).
- 5. VLA data www.DEFRA.gov.uk





Leptospirosis can result in abortions.

Farm	Lepto antibody titre by ELISA (% Positive)
A	22
B	24
C	38
D*	158
E**	4
F	29
G	18
H	54
I	33
J*	119
K	49

TABLE 1. Bulk milk lepto titres for different farms in November 2007* Denotes lapsed vaccinator of less than three years.** Denotes closed herd. Interpretation of titres >60: infected or vaccinated; 60-60: mixture of seropositive and sero negative animals suggesting infection or partial vaccination;