



Massey University



**Institute of Veterinary,
Animal & Biomedical
Sciences**



**JOHNE'S DISEASE
RESEARCH CONSORTIUM**

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Livestock Survey about Johne's disease and Leptospirosis

- Preliminary Results -

Under the umbrella of the Johne's Disease Research Consortium (JDRC), researchers at Massey University, collaborating with 28 veterinary practices across New Zealand, have mailed out around 8,000 surveys to cattle, sheep and/or deer farmers about the occurrence and economic effects of clinical Johne's disease (JD) and leptospirosis in Waikato, Wairarapa, Hawkes Bay, Manawatu-Wanganui, Marlborough, Canterbury and Southland. A total of 1,865 surveys have been returned representing a response rate of 23.3%. This is the first report about initial survey results describing the frequencies of JD and leptospirosis in different species on the responding farms.

Table 1. Farm livestock composition categories

Farm type	Farms	(%)
Beef, sheep	808	43.3%
Dairy	393	21.1%
Sheep	135	7.2%
Beef, sheep, deer	115	6.2%
Dairy, beef, sheep	104	5.6%
Beef only	92	4.9%
Dairy, sheep	47	2.5%
Dairy, beef	45	2.4%
Beef, deer	43	2.3%
Deer	40	2.2%
Deer, sheep	19	1.0%
Dairy, beef, sheep, deer	12	0.7%
Dairy, deer	5	0.3%
Dairy, sheep, deer	5	0.3%
Dairy, beef, deer	2	0.1%

Table 2. Response by region

Region	Farms	(%)
Manawatu-Wanganui	526	28.3%
Canterbury	463	24.9%
Hawkes Bay	211	11.4%
Southland	201	10.8%
Waikato	145	7.8%
Wairarapa	127	6.8%
Otago	124	6.7%
Marlborough	28	1.5%
East Coast	23	1.2%
Taranaki	6	0.3%
Bay of Plenty	2	0.1%
West Coast	2	0.1%

Tables 1 and 2 show respondents by farm type and region: most respondents were either sheep/beef (43%) or dairy farmers (21%), these are the most frequent farm types in New Zealand. Relatively few dairy farms also grazed other livestock. Most respondents were from Manawatu/Wanganui (28%) and Canterbury (25%). However,

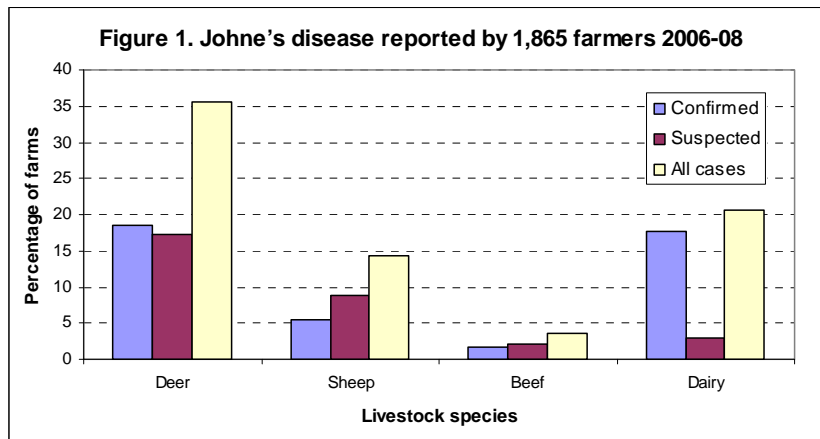
other areas were also represented resulting in a reasonable cross-section of New Zealand commercial farms. The next step is to select farms for blood and faecal sampling from this database to determine the infection status. All farm types and major regions will be represented.

High awareness: 97.3% farmers knew about Johne's disease and 96.7% were aware of Leptospirosis. This implies either that almost every farmer in New Zealand is aware of the two diseases, or that farmers who had experienced them on-farm were more likely to respond. If response was triggered by prior experience, the research might be biased towards such 'special' farmers. However, inquiring about two different diseases at the same time probably reduced that bias somewhat, as only 19 (1%) farmers reported both JD and leptospirosis occurring on their farm in clinical form. Conversely, 1,439/1,865 (77%) had not seen any sign of these two diseases, 374 (20%) reported JD alone, and 33 (2%) leptospirosis alone, in their livestock from 2006 to 2008.

Livestock species	Number of farms	Farms with confirmed cases	Farms with suspected cases	Total
Deer	237	18.1%	16.9%	35.0%
Sheep	1,257	5.4%	8.8%	14.2%
Beef Cattle	1,265	1.7%	2.1%	3.7%
Dairy Cattle	614	18.7%	3.1%	21.8%

Johne's disease (JD)

Both deer and dairy farms reported a similar occurrence of laboratory- or vet-confirmed JD whereas an additional number of deer farmers suspected that JD had occurred based on the signs described in the survey. Assuming that JD is a long lasting farm problem, the proportion of farms with clinical expression of JD would appear to be about 18-22% on dairy and 18-35% on deer farms (Table 3; Fig.1).

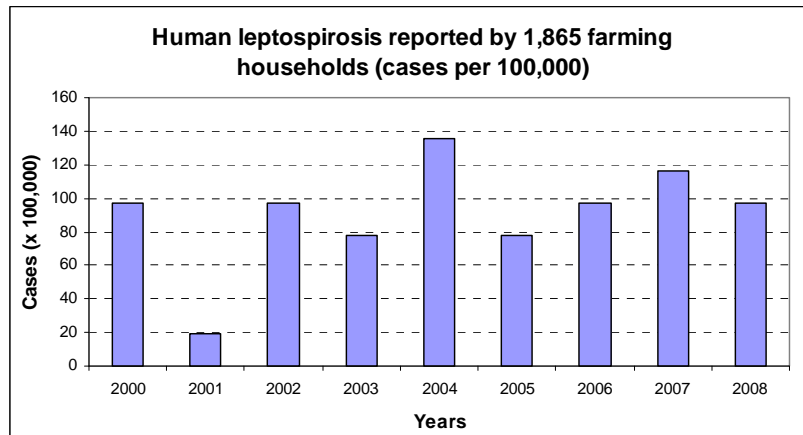


As previous estimates of JD in sheep were around 1% per year, a frequency of 5.4% of farms confirmed JD indicates that the disease might be more common in sheep than previously thought of. This survey inquired the observation over the past 3 years, thus the 5.4% covers 3 years. However, an annual frequency might not be much lower as JD tends to cause repeated clinical loss in successive years. Adding suspected JD, some 5-14% commercial sheep farmers in New Zealand might experience clinical loss from JD. In contrast, clinical JD was rarely confirmed or suspected on beef farms. A higher reporting frequency in dairy than beef farms may reflect the higher value of dairy cows, and therefore not necessarily mean that JD occurs more often on dairy farms. Whether the low reported occurrence of clinical JD on beef farms was due to poorer observation and detection, or truly a lower prevalence will be explored in the course of further research.

Leptospirosis

Humans: 1,865 farmers responding to questions about leptospirosis constituted a total population at risk for leptospirosis of 5,164 persons. This included owners/managers, their family and workers who were in contact with livestock (average 2.8 individuals/farm). Assuming a constant population at risk for the last nine years (2000 – 2008), an average of 98 cases per 100,000 persons was reported to have confirmed clinical leptospirosis (Figure 2). This estimate is similar to official surveillance rates (1990-98) of notified cases of leptospirosis in New Zealand farmers (92/100,000). All laboratory confirmed leptospirosis must be reported to the New Zealand public health service. Given the official rates of 1990-98 remained constant over the survey period,

reproducing the official rates may be taken as an indication that the survey achieved a good coverage of the New Zealand farming population.



Livestock: The proportion of farms reporting confirmed or suspected leptospirosis in livestock in the last three years was considerably lower than those reporting JD. The highest proportion (5.1%) was observed on deer farms, including 4.6% of cases confirmed by laboratory diagnosis (Table 4). A low occurrence was reported by dairy farmers. This was expected since most dairy farmers in New Zealand are believed to vaccinate their stock against leptospirosis. Sheep and beef farms reported 1.3-2.1% leptospirosis, usually from confirmed events. We believe that most reported leptospirosis was from farms experiencing clinical outbreaks, and that these were associated with economic loss, representing the ‘tip of the iceberg’. The majority of beef and deer farms may only be blood test positive without severe clinical loss, but possibly suffer subtle, sub-clinical effects such as reduced weight gain and reproductive performance as observed in previous research in commercial deer herds.

Table 4. Leptospirosis occurrences in livestock reported by 1,865 farmers 2006-2008

Livestock species	Number of farms	Confirmed	Suspected	Total
Deer	237	4.6%	0.4%	5.1%
Sheep	1,257	1.1%	0.2%	1.3%
Beef Cattle	1,265	1.8%	0.2%	2.1%
Dairy Cattle	614	0.2%	0.7%	0.8%

Future Work: One of the survey aims was to look for transmission of the bacterium causing JD (*Mycobacterium avium* subtype *paratuberculosis* (MAP)) and *Leptospira*

serovars across livestock species. Additionally, production performance will be compared between farms with and without disease to explore economic impacts of clinical leptospirosis or JD. Finally, we will evaluate whether co-grazing different species is associated with the occurrence of clinical disease.

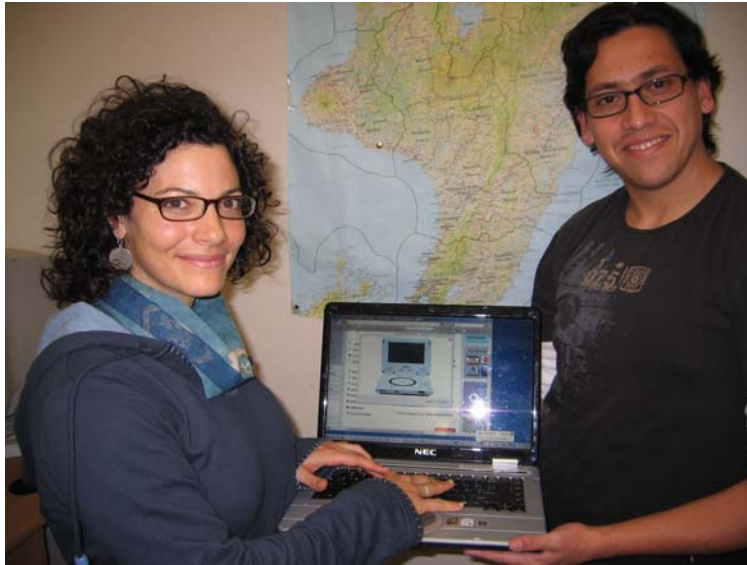
The next step

Calling for farmer's support! The occurrence of infection and its inter-species association will be the main objective for sampling sheep, beef and deer on up to 300 respondent farms over the next 2-4 months. MAP culture isolates will be typed to try tracing back an infection to the species and farm of origin. Analysing strains of the bacterium in different species of the same farm will indicate whether transmission has taken place. A similar exercise will be undertaken for leptospirosis. However, sourcing *Leptospira* isolates requires access to slaughter carcasses and is technically more challenging.

Survey respondent prize draw:

Finally, the research team would like to congratulate the three winners of a portable DVD player: Mr. Murray Bell from Canterbury, Mr. George Scott from Southland and Mr. Vern McDonald from Manawatu-Wanganui. The prize was included in the survey to encourage farmers to respond.

Much more so, we would like to express our sincere gratitude to ALL farmers who responded to the survey and also extend that gratitude to each veterinary practice for their help and collaboration with this research.



Dr. Anou Dreyfus (left) and Dr. Cristobal Verdugo during their computer-aided draw of the 3 lucky winners of a portable DVD player. The winners were informed by phone.