

Leptospirosis in Livestock

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Definition

Leptospirosis is an infectious disease of mammals and poikilotherms, caused by spirochetes of the genus *Leptospira*. The organisms localize in the kidney, reproductive tract and central nervous system. Transmission occurs by infected urine contacting mucous membranes or conjunctiva of a susceptible host, or contaminating moist environment which then becomes a source of infection by the oral or cutaneous route. Leptospirosis in Canadian livestock is characterized by abortion, stillbirth, neonatal death, atypical mastitis in cattle, fatal hematuria in weanling calves and ophthalmitis in horses.

Distribution

Leptospirosis occurs in the western, eastern and maritime provinces of Canada. Infections due to serovars *pomona* and *hardjo* predominate and these agents have been isolated from clinically affected cattle and swine and from normal animals. Antibodies to serovars *icterohaemorrhagiae*, *grippityphosa* and *bratislava* occur in cattle, swine, sheep and horses, but verification of infection by these serovars awaits their isolation and typing.

A current survey of Alberta cattle for leptospiral antibodies, based on culled cow sampling in relation to population and herd density in 69 management areas has produced the following results. *Hardjo* antibodies were found in 1390 (8%) of 18,010 cattle, in 801 (24%) of 3377 herds represented. Infection was distributed throughout the province, but the preva-

lence varied markedly and was highest in northern areas. *Pomona* antibodies were much less prevalent and less widely distributed than *hardjo*. They were found in only 0.5% (85) of the total cattle tested. Reactor cattle came from 67 (2%) of 3377 herds, principally south of Calgary.

Comparison of antibody prevalence rates in 17 areas surveyed in 1980-82 and 1984-85 showed twofold to tenfold increases in the number of *hardjo* positive herds and cattle in 14 areas.

Impact of Leptospirosis

Pomona infection in piggeries and cattle herds in Canada causes storms of abortions and stillbirths, also severe and fatal hemolytic icterus in calves. Human beings are at risk of infection from contact with urine and placental membranes and with kidneys and urine at slaughter (1,2). *Pomona* has a broad host range and tends to persist in a locality where pigs and skunks act as reservoir hosts (3). *Hardjo* infection is associated with bovine abortion and leptospire can be demonstrated in aborted fetuses and stillborn calves (4,5). Lactating cows in the septicemic stage of *hardjo* or *pomona* infection develop flaccid mastitis with greatly reduced milk production for about ten days, during which time leptospire are passed in the milk (6).

Bulls and boars which develop antibody to *pomona* or *hardjo* infection are barred from entry into artificial insemination units. Treatment with dihydrostreptomycin reduces or clears renal infection (7). *Pomona* antibody levels usually fall in two to

four months, permitting certification. *Hardjo* antibodies frequently persist for many months in bulls, possibly due to leptospire which are detectable in cerebrospinal fluid for at least a year after onset of infection (8). Reexposure of treated animals may cause an anamnestic response, elevating antibody levels again.

Human infection with *pomona* or *hardjo*, as well as with other serovars, causes severe, debilitating disease with serious sequelae in man. Leptospirosis has become recognized as a major occupational hazard in the livestock industry in New Zealand, Great Britain and elsewhere. *Pomona* and presumptively *icterohaemorrhagiae* infections were diagnosed recently in two Alberta veterinarians. Reduction of leptospiral infection in livestock and hence the risk of human exposure is a social responsibility of veterinarians.

Treatment and Control

Leptospiral vaccination reduces the susceptible population and thereby damps down transmission, although it will not terminate an established infection. Vaccinal protection can be overwhelmed by massive exposure (9,10). Therefore actively infected animals should be treated to reduce leptospiruria and thereby lessen exposure of susceptible hosts to infection. Vaccination can be practiced on all animals not destined for certification testing within three to four months. *Hardjo* vaccination titers are usually low and brief, whereas antibody titers in response to infection may persist at a significant level for years. Owners

should be urged to avoid introduction of infection through purchased stock, embryo recipients and cattle exposed on community pastures. Immunization with vaccine against the infecting serovar and parenteral treatment with dihydrostreptomycin (7) (25 mg/kg body weight, once) or medication of swine feed for eight days with chlortetracycline (11) (800 g per ton of feed) effectively combat leptospirosis, if the clinician applies these measures with full awareness of their limitations.

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ABSTRACT/RÉSUMÉ

MORRISON R.B., PIJOAN C., HILLEY H.D., RAPP V. Microorganisms associated with pneumonia in slaughter weight swine. *Canadian Journal of Comparative Medicine* 1985; 49: 129-137. (Dept Large Anim Clin Studies, Univ Minnesota, St. Paul, Minnesota 55108).

The lungs of 334 pigs were obtained from two slaughter plants in Minnesota and examined in detail. Macroscopic and microscopic evaluation, direct fluorescence for *Mycoplasma hyopneumoniae* and bacterial culture were done on all of them and a subsample of 50 were selected for virus culture.

Mycoplasma hyopneumoniae, *Pasteurella multocida* and *Haemophilus* spp. were detected in 24.0%, 34.1% and 27.0% of the lungs, commonly in con-

junction with each other. One isolate of *Haemophilus pleuropneumoniae* serotype 2 was detected and this represents the first report of its presence in the United States. No virus was detected in any of the lungs.

Lungs with both *M. hyopneumoniae* and *Pasteurella multocida* had the greatest amount of macroscopic pneumonia (9.8% of the lung). Lungs with *M. hyopneumoniae* or *P. multocida* alone had 4.9% and 5.2% of the lung involved with pneumonia respectively. Lungs with *Haemophilus* sp. Taxon "minor group" had 3.8% of the lung involved which was not significantly different from lungs with none of these organisms being detected (1.6%). There was a positive correlation between the extent of *M. hyopneumoniae* infection, as scored by FAT and the amount of macroscopic

pneumonia present ($r = 0.46$; $P < 0.001$). Likewise, there was a positive correlation between the estimated concentration of *P. multocida* present, as scored by the relative number of colonies on blood agar and the amount of macroscopic pneumonia present ($r = 0.60$; $P < 0.001$).

Microscopically, the amount of lymphoreticular proliferation, polymorphonuclear cells and alveolar macrophages were evaluated. Lungs with no isolations had the lowest scores of all three components and lungs with *M. hyopneumoniae* combined with *P. multocida* had the highest. *Haemophilus* sp. Taxon "minor group" was associated with significantly more lymphoreticular proliferation and alveolar macrophages than sections with no isolations.

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