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# **A survey of leptospiral infection in dogs and rats in the lower North Island of New Zealand**

A dissertation presented in partial fulfilment (50 points) of the requirements  
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## ABSTRACT

The increasing number of human cases of leptospirosis due to *Leptospira interrogans* serovars *copenhageni*, *ballum* and *tarassovi* has drawn much attention to the epidemiology of the disease in New Zealand.

Although dogs and humans are commonly known to be infected with *Leptospira interrogans* serovar *copenhageni* in the upper half of the North Island of New Zealand, available scientific data indicate infection with this serovar is not common in other parts of the country.

The brown rat (*Rattus norvegicus*) has been incriminated in the natural maintenance of serovars of the Icterohaemorrhagiae serogroup (*icterohaemorrhagiae*, *copenhageni*) overseas and in certain parts of New Zealand. Some veterinary practitioners in the lower North Island region are actively promoting vaccination of dogs against leptospirosis while others think that this is unnecessary. The canine anti-leptospiral vaccine in use in New Zealand is protective only against serovar *copenhageni*.

In an attempt to investigate the above issues, a one-off serological survey of 355 dogs from selected areas of the lower half of the North Island was undertaken, using the microscopic agglutination test (MAT). A minimum dilution of 1:24 was used in this test. The antigens used in the MAT were serovars *copenhageni*, *pomona*, *hardjo*, *ballum*, *tarassovi* and *canicola*. In addition, 24 captured rats (17 ship and 7 brown) from the study area were investigated serologically and the isolation of leptospires attempted.

Of the 355 sera tested, 50 (14%) showed  $\geq 50\%$  agglutination against *copenhageni*, 34 (9.6%) against *ballum*, 60 (16.9%) against *hardjo*, 11 (3.1%) against *pomona*, 107 (30%) against serovar *canicola* and 3 (0.8%) against *tarassovi*. Titres ranged from 24 to 3072 for *copenhageni*, 24 to 384 for *ballum* and *canicola*, 24 to 192 for *pomona* and 24 to 96 for *hardjo*. All reactors to *tarassovi* had a titre of 24.

Twenty one of the 50 sera that reacted to serovar *copenhageni* were collected from recently-vaccinated (7-9 days) dogs. Sera from five other dogs, which were known to be vaccinated, more than 200 days prior to sample collection, did not react to this serovar.

No leptospires were isolated from the rat kidneys after three months of culture in liquid EMJH medium.

Sera from six rats (4 ship and 2 brown) showed reactions of  $\geq 50\%$  agglutination against serovar *ballum*. Titres ranged from 24 to 192. Three animals (2 brown rats and 1 ship rat) showed reactions of  $\geq 50\%$  agglutination at the 1:24 dilution against serovar *canicola*. Only one ship rat had a titre of 384 against serovar *hardjo* and none of them showed a reaction of  $\geq 50\%$  agglutination against serovars *copenhageni*, *pomona* or *tarassovi* at any dilution.

The results of this study provide some evidence that dogs in parts of the lower half of the North Island of New Zealand are being exposed to *Leptospira interrogans* serovar *copenhageni* and that this serovar could be playing an important role in canine leptospirosis. Exposure of dogs to serovars *ballum*, *hardjo* and *pomona* also appears to be common. The significance of the reactions to serovar *canicola* could not be ascertained due to lack of standard serum and ambiguity with respect to the readings of the MAT for this serovar.

The importance of rats as reservoir for serovar *copenhageni* in the study area could not be determined, due to the fact that very few rats were examined. The lack of relevant data on dogs also prevented the identification of risk factors associated with canine leptospirosis.

It is recommended that dog owners be encouraged to vaccinate their dogs against leptospirosis. In addition to serovar *copenhageni*, serovars *ballum*, *pomona* and *hardjo*, should be considered in the differential diagnosis of canine leptospirosis.

It is also recommended that a more detailed longitudinal study of dogs be undertaken to help further understand the infection status as well as risk factors with respect to infection with serovar *copenhageni*, as well as to clarify the situation with serovar *canicola*. It is further recommended that rats and other New Zealand mammals such as mice, hedgehogs and deer be investigated as possible sources of *copenhageni* infection for dogs and humans.

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