

The application of immunological assays for the
monitoring and diagnosis of selected infectious diseases,
with particular emphasis on neosporosis

by

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Dedicated to Kristin, Robin and Tim: for their patience

“ELISAs for Parasitologists: or Lies, Damned Lies and ELISAs”

(P. Venkatesan and D. Wakelin, *Parasitology Today* **9**, 228-232)

CERTIFICATE OF AUTHORSHIP & ORIGINALITY

I certify that the work in this thesis has not been previously submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged in the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Signed

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ABSTRACT

The 16 publications presented in this thesis summarise the author's contribution to sero-epidemiological approaches for the diagnosis and monitoring of animal diseases of importance to New Zealand.

The first four publications not only contribute to the above in relation to three important animal pathogens, namely *Brucella ovis*, *Mycobacterium avium* spp. *paratuberculosis* and Bovine Leukaemia Virus but also give an insight into more general consideration associated with the optimisation and validation of serological assays, namely regarding the definition and choice of gold standard reference sera, the determination of the cut-off threshold and discrimination between negative and positive reference populations. Two further publications deal with the establishment and validation of serological assays for the diagnosis of *Neospora caninum* infection and abortion in New Zealand. Then, baseline data were obtained for the sero-prevalence of the infection in dog and cattle populations in New Zealand. Three case studies provided initially information about the kinetics of serological responses after a *N caninum* abortion outbreak, and information about the usefulness of herd-based techniques rather than individual cow-based abortion diagnoses. A further study provided some early information about the mode of transmission seemingly predominating in New Zealand, which tends to be mainly via post-natal infection, in contrast to evidence provided by overseas researchers. A final case study, a longitudinal study of serological and other responses over a period of three years also provided data on the production effects of *N caninum*. The dissertation is completed by a number of reviews on sero-diagnosis of *N caninum* infection, its presence in Australasia and suggests finally control options, based on the present state of knowledge.