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A STUDY OF MYCOPLASMAS OF THE OVINE LUNG AND THEIR
RELATIONSHIP TO CHRONIC NON-PROGRESSIVE PNEUMONIA OF SHEEP
IN NEW ZEALAND

A thesis presented in partial fulfilment of the
requirements for the degree of
Master of Science in Microbiology
at Massey University, New Zealand.

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1980

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ABSTRACT

The relationship of mycoplasmas to diseases of the lower respiratory tract in a variety of animals was reviewed and investigations were undertaken to determine the role of micro-organisms, with particular reference to mycoplasmas, in the aetiology of ovine chronic non-progressive pneumonia (CNP).

A survey of the prevalence of mycoplasmas in pneumonic sheep lungs revealed that Mycoplasma ovipneumoniae was present in 98% of the lungs tested, whereas Mycoplasma arginini was present in 4%. Ureaplasmas were not detected in any lungs.

To facilitate further investigations into the significance of M. arginini in ovine CNP, the in-vitro growth of the organism was investigated and its ultrastructure was determined and compared with that of M. ovipneumoniae. Although ultrastructural differences between M. arginini and M. ovipneumoniae were found, these would probably not allow all cells of each of the two species to be unequivocally identified in thin sections of lung material.

M. ovipneumoniae, M. arginini and parainfluenza type 3 virus were shown to be sensitive to digitonin when suspended in either conventional laboratory medium, or in lung homogenate. Furthermore, treatment of pneumonic lung homogenate with 10 mg/cm³ digitonin destroyed its ability to transmit ovine CNP. Viruses (in particular PI3 virus) were not detected in aliquots of the pool of lung homogenate used to transmit CNP so it is likely that the necessary digitonin-sensitive component is a mycoplasma. Since M. arginini has a consistently low prevalence in pneumonic lesions, whereas M. ovipneumoniae is found in the vast majority of such lesions, it was concluded that M. ovipneumoniae is responsible for initiating primary lesions of the disease. This however does not imply that M. ovipneumoniae on its own is capable of causing lesions comparable in severity to the fully developed "field" cases.

The inactivation of M. ovipneumoniae by formalin, with a view to making a vaccine, was investigated.

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