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STUDIES ON *Mycoplasma ovipneumoniae* IN NEW ZEALAND SHEEP: EPIDEMIOLOGY AND COMPARISON OF ISOLATES

A THESIS PRESENTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE IN MICROBIOLOGY AT
MASSEY UNIVERSITY, NEW ZEALAND.

GEORGE IONAS

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ABSTRACT

As part of a larger study to examine the role of *M. ovipneumoniae* in chronic non-progressive pneumonia (CNP) of sheep, the colonisation of the respiratory tract by mycoplasmas was examined in two flocks of lambs over a nine month period.

In both farms *M. ovipneumoniae* was detected in the ewes at the time of first swabbing of the lambs. The two flocks of lambs differed in the time when the nasal cavity first became colonised by *M. ovipneumoniae*: thus in Flock 2 *M. ovipneumoniae* was detected in the nasal cavity relatively early and also became disseminated throughout the flock some months earlier than occurred in Flock 1. Nevertheless, *M. ovipneumoniae* was widespread in both flocks of lambs by March i.e. at or before peak seasonal prevalence of CNP. At slaughter in May, Flock 2 (colonised early) had a much higher prevalence of CNP than Flock 1.

These findings are consistant with the hypothesis that *M. ovipneumoniae* colonises the nasal tract of lambs and subsequently invades the lung possibly in response to the stress of exposure to hot dry weather.

The second part of this thesis is concerned with the adaptation of Sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) to distinguish strains of *M. ovipneumoniae* with the ultimate objective of comparing *M. ovipneumoniae* strains isolated from pneumonic lungs to nasal isolates and isolates from apparently normal lungs.

Isolates from different sources were heterogeneous when examined by SDS-PAGE, but comparisons were made difficult

because of the excessive number of protein bands. In response to this problem fractions of *M. ovipneumoniae* were examined. Membrane preparations conserved the unique protein bands which in principle allow discrimination between strains, but because the number of protein bands was still excessive we examined surface proteins by labelling intact cells with Fluorescein isothiocyanate (FITC). This approach still gave gels with too many protein bands for convenient comparisons to be made, but had the advantage of allowing the identification of surface proteins, some of which were unique to individual isolates.

This encouraged us to combine SDS-PAGE with a classic immunological approach to strain identification i.e. we investigated the possibility of excising protein bands from gels for subsequent use as immunising antigens. One common protein band was excised, it was found to be antigenic and the antisera crossreacted with a single line of identity in gel precipititin tests with all the strains tested. While within the time limit available we have examined only one common protein band, the result suggests that the excision of individual strain-specific protein bands from SDS-PAGE for use as immunising antigens will provide strain-specific antisera which should allow the development of a simple approach to strain identification.

ACKNOWLEDGEMENTS

I am indebted to the Department of Microbiology and Genetics, for providing the opportunity and facilities for these studies.

Department of Microbiology and Genetics

In particular, I would like to thank: My supervisor Dr J.K. Clarke for his excellent guidance and advice throughout the course of this study.

Professor D.F. Bacon, Dr E. Terzaghi, Mr P.C. Calder, Mr R.H. Tucker, Mrs A.J. Mew, Ms A. Lee and all other members of the academic and technical staff.

Department of Veterinary Pathology and Public Health

I would like to thank Dr M.R. Alley for the collection of specimens and pathological examination of the sheep lungs.

I would like also to thank:

The staff at the engineering workshop for the construction of the gel apparatus.

The staff of the Central Photographic Unit.

Mrs V. Fieldsend for the excellent typing of this thesis.

And finally, my parents for their encouragement throughout this project.

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