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# **THE EPIDEMIOLOGICAL INVESTIGATION OF PIG DISEASES**

**A thesis presented in partial fulfilment of the requirement for the  
Degree of Doctor of Philosophy at Massey University**

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## Abstract

A series of epidemiological studies was carried out to identify methods of improving productivity of New Zealand and Thai pig herds. Disease surveillance at slaughter of 2,807 finisher pigs from 3 piggeries in the North Island of New Zealand was conducted over a 13 month period. This was used to establish and apply procedures suited to New Zealand conditions, for monitoring the subclinical status of 8 production-limiting diseases and 1 zoonotic disease. Enzootic pneumonia, sarcoptic mange and oesophagogastric ulcer were the most commonly observed lesions. Seasonal patterns were found for enzootic pneumonia, pleurisy and ascariasis lesions. Seasonal effects were found to be associated in part with temperature variation.

The effectiveness of simultaneous administration of commercial *Mycoplasma hyopneumoniae* and *Actinobacillus pleuropneumoniae* vaccines was assessed in 380 pigs from an indoor commercial piggery. These vaccines produced significant improvement of growth rate during the high risk period for clinical pneumonia, and increased slaughter weight. Enzootic pneumonia lesions were significantly reduced by more than 50%, but pleurisy and pleuropneumonia lesions were not significantly reduced. No evidence of synergy between the vaccines in influencing lesion severity for pleuropneumonia was detected.

A longitudinal study of thirty cohort pigs was conducted within the vaccination trial, to describe the epidemiological pattern of subclinical *A. pleuropneumoniae* infection of healthy pigs. *A. pleuropneumoniae* was first isolated at 4 weeks of age from one vaccinated pig. The incidence of *A. pleuropneumoniae* infection reached a maximum of 54% and 40% at 11 weeks of age in vaccinated and control pigs. No evidence was found to support the hypothesis that infection with *M. hyopneumoniae* increases susceptibility to *A. pleuropneumoniae* infection.

Pig production data from 16 Thai and 18 New Zealand pig herds for 1991, and from 14 Thai and 16 New Zealand herds for 1992 were analysed to define opportunities for improving productivity in temperate and tropical environments. In Thailand, potential areas for improving productivity are particularly through increasing total litter size and improved management of breeding procedures. In New Zealand, potential areas for improvement are particularly reduction of stillbirths and pre-weaning mortality, and reduction of sow mortality. A new method of graphical presentation of important productivity parameters was used to clearly demonstrate differences in performance between the two countries.

PigFIX, a fertility investigation expert system linked to a computer-based herd recording system, was developed to provide diagnostic guidance on likely causes of fertility problems and offer guidance on possible corrective action. A novel approach was used in developing the method by which PigFIX assessed reproductive performance. Graphical and text-based reports were developed to show the user what conclusions had been drawn in the analysis. PigFIX was shown in verification studies on six herds to produce conclusions which agreed with a human expert on identification of major reproductive problems.

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