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TRANSMISSION OF *CAMPYLOBACTER JEJUNI* IN BROILER CHICKENS

A thesis presented in partial (50%) fulfilment of the requirements for the degree of

Masters of Veterinary Science

in

Veterinary Pathology and Public Health

at Massey University, Palmerston North

New Zealand

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January 2002
ABSTRACT

Investigations were carried out aimed at identifying potential sources of transmission of *Campylobacter jejuni* to broiler chickens, determining whether boots can mechanically transmit *C. jejuni* to susceptible chickens, determining the transmission rate of *C. jejuni* in broiler chickens, and assessing the effect of washing slaughterhouse fomites with chlorinated water on the level of *C. jejuni* contamination during the day.

Bacteriological culture of samples taken in the premises of a broiler slaughterhouse showed that after washing and just before departure for depopulation of broiler farms, 75%, 58.33%, 47.22%, 50%, 54.29%, 66.67%, 31.25%, and 0% of pallets, crates, truck beds, truck wheels, drivers' boots, catchers' boots, forklift wheels, and tractor wheels respectively, were contaminated with *C. jejuni*. Therefore it was concluded that slaughterhouse personnel and fomites could potentially transmit *C. jejuni* during partial depopulation of broiler flocks.

The level of *C. jejuni* in consecutive sample batches of fomites (n = 30) that were collected in six periods of one hour each day (hence six batches), between 0530 and 1230 hrs, over six days, was found to range from 44.83% in the 1st batch and 66.67% in the 5th batch, indicating that washing fomites with pressurized chlorinated water makes no statistically significant difference (p>0.05) in the contamination level. The fomites sampled were pallets, crates, truck bed, truck wheels, and drivers' boots.

Susceptible broiler chickens became colonized with *C. jejuni* after exposure to boots that had been worn in a pen with infected chickens demonstrating that boots can mechanically cause horizontal transmission of the bacterium.

A transmission study conducted by introducing a bird infected with *C. jejuni* to 99 susceptible chickens demonstrated a rapid spread of the infection to all the birds within 48 hours and a transmission rate best represented by a simple epidemic curve. A transmission parameter beta (β), with a value of $2.1 \times 10^{-3} \pm 0.013 \times 10^{-3}$ (mean ±
standard error), was calculated by fitting the data into a simple deterministic epidemic model. The transmission rate in a population of 100 birds, predicted by this model, was very similar to that obtained in the experiment. Therefore, it was concluded that the transmission rate of *C. jejuni* in broilers resembles a simple epidemic.
ACKNOWLEDGEMENTS

This thesis was made possible by the financial assistance of Botswana College of Agriculture, Pacific Vet Ltd (New Zealand), and Inghams Enterprises Pty Ltd (New Zealand). I am grateful for the generosity of these sponsors.

My sincere thanks go to Mr Per Madié (my chief supervisor), Dr Joanne Connolly and Dr Stanley Fenwick (co-supervisors), and Ms Naomi Boxall. I thank Naomi in particular for showing me how to culture and carry out Campylobacter manoeuvres.

While working on this thesis, I received invaluable assistance from the following people all of whom were also patient and friendly: Mr Rowland Ong, Ms Megan Leyland, Mrs Jan Schrama, Mr Peter Wildbore, Mr Don Thomas, Mr Blake Camden, Mr Andrew Rowatt, Mr Bruce Cann, Mr Neil Ward, Mr Mervin Birtles, Mrs Allain Scott, Mrs Lynn Rogers, Dr Anne Midwinter, Mrs Barbara Asmundson, and Ms Kylie Walker.

In appreciation, I would also like to acknowledge the kindness of the following people for sparing their time to help me: Mr Nicholas Lopez-Villalobos, Mr Quentin Roper, Mr Mike Hogan, Mr Slumber Badubi, Dr Gaolatlhe Thobokwe, Dr Bijay Adhikari, and Dr Duncan Hedderly.

I thank the staff of the Department of Veterinary Pathology and Public Health for their support all the time I have been at this institute. I am particularly grateful to associate professor Maurice Alley and his wife Dorothy for their hospitality to my wife and me. Whenever we remember New Zealand, we will remember you too!

To my parents, brothers, sisters, in-laws, and friends in Botswana, I say “Motho ke mothe ka batho. Ha e ne e se ka lona, ke ne ke ka seka ka kgona tiro e”.
Last but by no means least, I am indebted to my dear wife, Onkemetse and my children Bonno and Mogomotsi for the sacrifice of living without me for two years. I hope we can now lead a normal, complete, and happy family life.

I acknowledge the mercy of “He who comes in the name of the Lord” that allowed me to come this far against all the odds that are inherent in postgraduate study.
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