

**Dogs, Humans and Gastrointestinal Parasites: Unravelling
Epidemiological and Zoonotic Relationships in an endemic
Tea-Growing Community in Northeast India**

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This thesis is presented for the degree of Doctor of Philosophy of Murdoch University

2003

I declare that this thesis is my own account of my research and contains as its main content work which has not been previously been submitted for a degree at any other tertiary educational institution.

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Abstract

A simultaneous survey of canine and human gastrointestinal (GI) parasites was conducted in three socioeconomically disadvantaged, tea-growing communities in Assam, India. The aims of this study were to determine the epidemiology of GI parasites of zoonotic significance in dogs and geohelminth infection in humans using a combination of molecular biological and classical parasitological and epidemiological tools.

A total of 328 and 101 dogs participated in the study. The prevalence of GI parasites in dogs was 99%. Parasitic stages presumed to be host-specific for humans such as *Ascaris* spp., *Trichuris trichiura* and *Isospora belli* were also encountered in dog faeces. A polymerase chain reaction - linked restriction fragment length polymorphism (PCR-RFLP) was developed to identify the species of *Ascaris* eggs in dog faeces. The results supported the dog's role as a significant disseminator and environmental contaminator of *Ascaris lumbricoides*, in communities where promiscuous defecation by humans exist.

The prevalence, intensity and associated risk factors for infection with *Ascaris*, hookworms and *Trichuris* were also determined among the human population. The overall prevalence of *Ascaris* was 38% and 43% for both hookworms and *Trichuris*. The strongest predictors for the intensity of geohelminths included socioeconomic status, age, household crowding, level of education and lack of footwear when outdoors.

The zoonotic potential of canine *Giardia* was investigated by genetically characterising *G. duodenalis* isolates recovered from humans and dogs at three different loci. Phylogenetic analysis placed canine *Giardia* isolates within the genetic groupings of human isolates. Further evidence for zoonotic transmission was supported by strong epidemiological data.

A highly sensitive and specific PCR-RFLP based test was developed to detect and differentiate the species of canine hookworms directly from eggs in faeces. Thirty-six percent of dogs were found to harbour single infections with *A. caninum*, 24% single infections with *A. braziliense* and 38% mixed infections with both species. This newly

developed PCR-based test provided a rapid, highly sensitive and specific tool for the epidemiological screening of canine *Ancylostoma* species in a community.

A combination of canine population management, effective anthelmintic regimes and improvements in health education and sanitation is recommended for the control of canine and human gastrointestinal parasites in these communities.

Publications

Refereed journal articles:

- Traub, R.J., Robertson, I.D., Irwin, P., Mencke, N., Thompson, R.C.A. (2002). The role of dogs in transmission of gastrointestinal parasites in a remote tea-growing community in northeastern India. *The American Journal of Tropical Medicine and Hygiene*, 67, 539-545.
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Acknowledgements

I would firstly like to thank my supervisors Andrew Thompson, Ian Robertson and Peter Irwin for all their optimism, support and advice, through both the ups and downs. For allowing me the freedom and independence to express my own ideas and passions, and having faith in their ultimate fruition.

I would also like to express my deepest gratitude and respect for Dr Norbert Mencke, whose strong support, trust and faith in my abilities allowed me to obtain financial assistance from Bayer Animal Health, Leverkusen, Germany and funding for all related travel expenses to conferences. His commitment and enthusiasm for supporting “unconventional” zoonoses-related studies amongst underprivileged communities is commendable.

To Mr B.M. Khaitan, Chairman of Williamson Magor & Co., thank you for permission for allowing the fieldwork and research to be conducted at the tea estates in Assam. To all the managerial and medical staff at Phulbari and Addabarie Tea Estates, especially Drs Mahanta, Drs. Phukan. Thank you for your warmth, generosity and hospitality and for making me feel like part of the official tea-garden team.

My sincere thanks and appreciation to Aileen Elliot and Russle Hobbs for always being there to help me identify those exotic parasite stages and sharing my awe and excitement of having found them! To my close friends and office buddies, Peter Adams, Joyce Eade, Jill Meinema, Sze How Bong and Chee Kin Low. Thank you for listening to me moan and groan through the tough times, for giving me laughter, a social life and plenty of distractions. I would have definitely not made it this far and sane if it weren't for you.

Finally, to my parents George and Patience and close friends Aunty Nellie and Ratha. Your moral support, encouragement and belief in me was the reason I kept pushing forward. Dad, for personally setting me an example of professional excellence and for helping me set up this project in Assam. Mum, for giving me so much strength and love, even when it meant cleaning up leaky test tubes full of s**t in our bath-tub in Calcutta!

You are an inspiration and the best Mum any daughter could wish for. Aunty Nellie thank you for teaching me how to dream and always believing in my capabilities.

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