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STUDIES ON THE OCCURRENCE OF
ANTHELMINTIC RESISTANCE IN GOAT
PARASITES IN NEW ZEALAND

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2010

STUDIES ON THE OCCURRENCE OF
ANTHELMINTIC RESISTANCE IN GOAT
PARASITES IN NEW ZEALAND

A thesis presented in partial fulfilment of
the requirements for the degree of

MASTER OF VETERINARY STUDIES
IN
PARASITOLOGY

AT MASSEY UNIVERSITY, PALMERSTON NORTH,
NEW ZEALAND.

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2010

ABSTRACT

Two studies were conducted to investigate anthelmintic resistance in goat parasites in New Zealand. In Study 1 parasites from goats on a farm with a long history of problems with anthelmintic efficacy were used to infect sheep for a controlled slaughter study. Nineteen lambs were acquired, effectively drenched and housed. Each was infected with a mixture of larvae comprising *Haemonchus contortus*, *Teladorsagia circumcincta*, *Trichostrongylus colubriformis* and *Oesophagostomum venulosum*. After 28 days lambs were restrictively randomised into 3 groups based on faecal egg counts. Group 1 was left untreated (n=6), Group 2 (n=6) was given a single dose of abamectin (0.2mg/kg) + levamisole HCL (8mg/kg) + oxfendazole (4.5mg/kg) (“Matrix Oral Drench for Sheep”[®], Ancare, New Zealand) and Group 3 (n=7) was treated at twice the dose rate of Group 2. Fourteen days after treatment all animals were killed for total worm counts. The mean burdens of *T. circumcincta* in Group 1 was 337, in Group 2 was 68 (efficacy 80%) and in Group 3 was 10 (efficacy 97%). The mean burdens of *T. colubriformis* in Group 1 was 375, in Group 2 was 220 (efficacy 41%) and in Group 3 was 81 (efficacy 78%). Although the worm burdens in these lambs were low, all animals were infected with each of these two species except for *T. circumcincta* in Group 3 where only 3 lambs were infected. Efficacy against other species was 100%. These results clearly indicate that a single dose of a combination drench was ineffective against two species and even when a double dose was used the efficacy against *T. colubriformis* was only 78%. In Study 2 a survey of drench efficacy was conducted on 17 goat farms using the DrenchRite[®] larval development assay. Evidence of concurrent resistance to benzimidazoles, levamisole and ivermectin was detected in *T. colubriformis* and *T. circumcincta* on 11/17 and 3/14 respectively. Only 5 of 14 farms had previously undertaken some form of testing for drench resistance prior to this survey. Evidence from these two studies suggests that severe anthelmintic resistance is common on goat farms in New Zealand.

ACKNOWLEDGEMENTS

It has been a great opportunity for me to study for my Master of Veterinary Studies degree in Parasitology at Massey University, which at the same time, has increased my veterinary interest in ovine and anthelmintic resistance. I would like to say:

Special thanks to the Vice-Chancellor of Universiti Putra Malaysia and the Dean of the Faculty of Agriculture and Food Sciences for having confidence in me and allowing me to pursue my studies in New Zealand.

I am greatly indebted to the Malaysian Government for funding throughout the duration of my studies. Without this help, it would have been impossible for me to be here.

Thank you very much to my enthusiastic and understanding supervisor, Prof Bill Pomroy, who has provided me with parasitology nous and for his guidance from when I started my postgraduate diploma until the end of my master thesis. He has always been there to meet with me, discuss problems during my study and to ask me good questions in order to develop my critical thinking.

Many thanks also go to my co-supervisor, Dr Ian Scott, for his advice and assistance during my study time.

Besides my supervisors, I want to particularly thank our parasitology ‘anchor women’, Barbara and Anne, for their technical assistance as well as for their friendship since I am here. It was a great pleasure working in the laboratory and in the field with both of you, and you were fun to be with.

Thanks also to AgResearch staff, Tania Waghorn and Lawrie for helping me in running the larval development assay (LDAs) protocol.

‘Thank you guys’ to all my friends; Bae, Ben, Bornwell, Cath, Doris, Guillaume, Mazidah and Sha (note the alphabetical order) for the friendship and encouragement

during my study. Memories of our friendship will always be in my heart and I hope we are able to get in touch in the future.

Last but not least, I greatly thank my beloved parents; Kamaludeen and Aminah, my brothers and sisters, especially Uda, and my special friend Hakim and his family for their love and moral support when I was miles away from home. Without their encouragement and advice it would have been hard for me to finish my study. I love you all very much.

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GLOSSARY OF ABBREVIATION

AAD	Amino-acetonitrile derivative
ACH	Acetylcholine
BZ	Benzimidazole
cm	Centimetres
DR	DrenchRite
EC ₅₀	Effective concentration ₅₀
EC ₉₀	Effective concentration ₉₀
ED ₅₀	Effective dose ₉₀
EHT	Egg hatch test
epg	Egg per gram
FEC	Faecal egg count
FECRT	Faecal egg count reduction test
g	Grams
GABA	Gamma-aminobutyric acid
ha	Hectare
HCL	Hydrochloride
hr	Hour
IVM	Ivermectin
kg	Kilograms
L	Litres
L ₁	First larval stage
L ₂	Second larval stage
L ₃	Third larval stage
L ₄	Fourth larval stage
L ₅	Fifth larval stage
LDA	Larval development assay
LEV	Levamisole
LP	Larval paralysis
ML	Macrocyclic lactone
mg	Milligrams
ml	Millilitres

MUAEC	Massey University Animal Ethics Committee
nAChRs	Neuronal acetylcholine receptors
NaCl	Sodium chloride
PPP	Pre-patent periods
R ²	Coefficient of Determination
RR	Resistance ratio
SOP	Standard operational procedure
U.S.A	United States of America
WAAVP	World Association for Advanced Veterinary Parasitology
WC	Worm count
μl	Microlitres
μm	Micrometres
μM	Micromoles
nM	Nanomoles
°C	Temperature in degrees centigrade
+	Positive