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COCCIDIA (PROTOZOA:SPOROZOASIDA) OF  
CATS AND DOGS

A thesis presented in partial fulfilment  
of the requirements for the degree of  
Master of Philosophy in Veterinary Science  
at Massey University

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November 1978

## ABSTRACT

Studies were undertaken to establish for the first time the identity and prevalence of coccidian parasites of New Zealand cats and dogs and to determine the effect of various factors on the activation of *Isospora felis* and *Isospora rivolta* sporozoites. The associations between these protozoa and such organisms as *Toxoplasma*, *Sarcocystis*, *Besnoitia* and other related genera are examined and the literature concerning their life cycles, nomenclature and general biology reviewed.

Examination of faecal samples from 508 cats and 481 dogs from North Island localities revealed that 155 (30.5%) and 307 (63.8%) respectively, contained coccidia. The majority of infected samples were found to contain a single coccidian but in total four valid coccidians from cats and four from dogs, as well as several pseudoparasitic coccidia, were recorded and described. The identities and prevalences of these valid coccidians were:

(a) Cats :	<i>Isospora felis</i>	(17.5%)	<i>Isospora rivolta</i>	( 2.2%)
	<i>Toxoplasma gondii</i>	( 0.98%)	<i>Sarcocystis</i> sp.	(16.9%)
(b) Dogs :	<i>Isospora canis</i>	( 4.0%)	<i>Isospora ohioensis</i>	( 9.2%)
	<i>Hammondia heydorni</i>	( 2.7%)	<i>Sarcocystis</i> sp.	(58.8%)

The sex of the host had no significant effect on the prevalence of infection. The effect of other factors, such as season, host age and host origin, however, was found to vary from coccidian to coccidian and appeared to be explicable in terms of differences in routes of transmission, host immunity and intermediate host specificity.

Levels of sporocyst shedding in cats and dogs naturally infected with *Sarcocystis* sp. tended to be low with the majority excreting 200 sporocysts per gram of faeces or less. The specific identities of such sporocysts are unknown but at least some from cats were demonstrated, by mouse infection, to be those of *S. muris*. Attempts to induce similar

*Sarcocystis* infection in mice, using isolates of *I. felis* recovered from the faeces of naturally infected cats were unsuccessful.

After completion of the main survey, a further coccidian showing similarities to *Besnoitia wallacei* was recovered from the faeces of one of five feral cats. The feeding of sporulated oocysts of this coccidian to mice, rats, rabbits and guinea pigs resulted in the formation of typical *Besnoitia* cysts in all hosts except the last.

Studies on the activation of *I. felis* and *I. rivolta* sporozoites revealed that, although some differences were apparent between the two, both were capable of activation over a wide range of conditions.

Activation of both species was observed to take place in trypsin and bile between temperatures of 21° and 43°C (the range tested) and to occur rapidly at 39°C. While the presence of bile appeared to be essential for this process that of trypsin did not. In general, neither the concentration of bile (above 5%) nor the type of bile was found to have any marked effect on the level of activation attained while hydrogen ion concentration (pH range 5.0 to 10.0) also appeared to have little influence.

Unlike many species of coccidia which have been studied, pretreatment of oocysts before exposure to trypsin and bile was found not to be an essential prerequisite for the activation of *I. felis* and *I. rivolta*. However, higher levels of activation were attained when pretreatment was used than when it was not although for *I. rivolta* at least, the level of activation appeared to be less dependent on pretreatment for oocysts stored in sulphuric acid than for those stored in potassium dichromate.

The process of activation and excystation of both species was observed to be essentially similar to that described for other species of coccidia which also lack either sporocyst stieda bodies or oocyst micropyles. Sporozoites escaped following the collapse of the sporocyst wall and were observed to complete excystation through indentations and fractures at one or both ends of the oocyst.

## ACKNOWLEDGEMENTS

The present thesis could not have been completed without the help and assistance of numerous people. Of these, some require special mention. These include; my supervisor, Dr W.A.G. Charleston of the Veterinary Faculty of this university, for his ever helpful advice and continuous encouragement throughout the course of this study; Dr R.E. Harris of the Veterinary Faculty for his advice on statistical analyses and Mr G.H. Collins of the same Faculty for permission to quote unpublished findings from his own work.

Special thanks are also due to the former and present Superintendents of the Palmerston North Animal Health Laboratory, Drs D.E. Gardner and B.H. Simpson, for their tolerance and understanding of my preoccupation with this thesis, particularly over the last two years. Others to whom special thanks are due include Ms. B.G. Wiens and Mr T.G. Law of the Veterinary Faculty, for their unstinting assistance in the printing of all photographic plates and graphs and to Mrs J.L. Simpson for the preparation of Figure 1.3. I would also like to express my gratitude to Mrs C.R. Whitcombe, Mrs J. Shore, Miss A. Punch and Mr M. Southern, who all, at various times, assisted with the care and maintenance of experimental animals. I also gratefully acknowledge the assistance of people, too numerous to mention, who provided me with faecal samples from cats and dogs, in particular Professor D.K. Blackmore of the Veterinary Faculty for providing samples from feral cats and Mrs E.M. Husband and staff of the Palmerston North S.P.C.A. who were totally co-operative at all times. The co-operation of Mr R.W. Moffitt, Supervising Meat Inspector, and staff of the Manawatu Abattoir, Feilding is also appreciated.

Others to whom my thanks are due include the typists of the Ministry of Agriculture and Fisheries, Palmerston North, for preparation of the initial draft of this thesis and to Mrs F.S. Wicherts for her most efficient and expert typing of the final draft. Finally I would like to express my appreciation and gratitude to the Director of the Animal Health Division, Ministry of Agriculture and Fisheries, for permission to undertake this course of study.

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