Helminth parasites of dogs from two resource-limited communities in South Africa

W N Minnaar[a], R C Krecek[a] and J I Rajput[b]

ABSTRACT

Biological samples were collected from dogs in resource-limited communities in the North-West and Gauteng Provinces of South Africa to assess the prevalence of helminth parasitism. These samples included adhesive tape peri-anal skin swabs and fresh faecal samples for helminth examination, and thick and thin blood films (smears) and whole-blood samples in anticoagulant for examination of filarial nematode microfilariae and haemoprotozoa. The eggs of *Ancylostoma caninum, Toxocara canis, Toxascaris leonina, Dipylidium caninum* and taeniids were identified. None of the blood samples and smears tested positive for microfilariae of *Dirofilaria immitis* or *Dipetalonema* spp. or for haemoprotozoa. The adhesive tape swabs were negative for cestode eggs and segments. Most of the helminth parasites identified in this study are zoonotic and consequently are regarded as a public health hazard.

Key words: dogs, Gauteng Province, helminth parasites, North-West Province, resource-limited communities.

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INTRODUCTION

Previous studies on the occurrence of helminths in dogs in South Africa include those by Ortlepp[8] in Pretoria and surrounding areas, and Verster[14] in other parts of the country. As far as can be ascertained, these studies were conducted in higher-income areas rather than in resource-limited communities. The objective of the current study was primarily to determine the occurrence of helminth parasites in live dogs from 2 resource-limited communities in South Africa as well as some basic demographics of the dogs and their owners, who were interviewed; the latter results will be reported elsewhere.

MATERIALS AND METHODS

The 2 study areas were Jericho and the surrounding villages, west of Pretoria in the North-West Province, which are considered rural, and Zuurbekom and surrounding townships southwest of Johannesburg in the Gauteng Province, which are peri-urban (Fig. 1). The Jericho veterinary needs appraisal (VNA) was conducted on 11–14 March 1997 and the Zuurbekom VNA on 19–22 January 1998.

Dogs and dog-owners were not selected *per se,* but chosen with intent (*i.e.* for the purpose of sampling every dog seen and interviewing every dog-owner encountered, instead of selecting certain individuals, which is not a random procedure in itself) rather than randomly[6], using a flexible approach and conscious judgement.

Biological samples collected from dogs were adhesive tape swabs[2] placed on the skin and hairs of the peri-anal region and then examined for cestode eggs and segments, fresh faecal samples[11,12] collected per rectum to detect the presence of helminth eggs using the qualitative faecal flotation method[10] and thick and thin blood smears as well as blood samples in anti-coagulant (ethylene-diamine tetraacetic acid) for detection of haemoprotozoa and microfilariae of filarial nematodes[11]. Faecal samples (in this case referring to fresh faecal samples and peri-anal adhesive tape swabs) were processed 'per case' (*i.e.* only one of either needed to be positive to confirm the presence of helminths in any specific dog).

Samples were not collected from dogs on which the procedure could have had a negative influence. For example, blood samples were not collected from dogs that showed clinical anaemia or from young puppies. Complete sets of samples were collected from as many dogs as possible (76 in total), but in some cases only blood samples and tape swabs (10), faeces and tape swabs (14), tape swabs (2) or faeces (1) could be collected.

RESULTS

The villages visited, numbers of owners interviewed, dogs examined and parasitological samples collected in the 2 areas are summarised in Table 1. The helminth

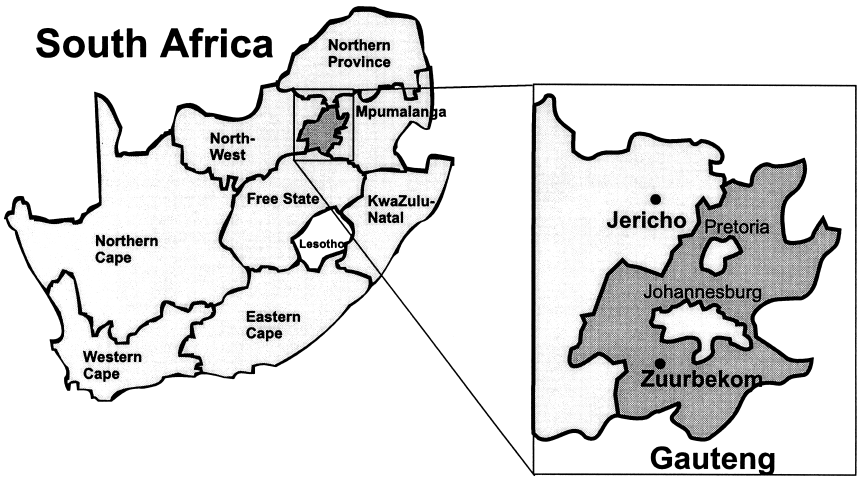

Fig. 1: **Map of South Africa showing the location of Jericho and Zuurbekom.**

[a]Department of Veterinary Tropical Diseases, Faculty of Veterinary Science, University of Pretoria, Private Bag X04, Onderstepoort, 0110 South Africa.

[b]Department of Companion Animal Medicine and Surgery, Faculty of Veterinary Science, Medical University of South Africa, P.O. Box 160, Medunsa, 0204 South Africa.

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Table 1: **Dates when villages were visited, numbers of owners interviewed and dogs sampled in the Jericho and Zuurbekom areas.**

Date sampled	Village	Owners (*n*)	Dogs sampled (*n*)
Jericho			
11 March 1997	Fafung	7	18
11 March 1997	Sephai	2	3
12 March 1997	Legonyane	10	20
13 March 1997	Rooiwal	5	8
13 March 1997	Vaalbos	4	9
14 March 1997	Waterval	3	3
14 March 1997	Jericho	3	6
Total		34	67
Zuurbekom			
19 January 1998	Doornkop	2	4
19 January 1998	Zuurbekom	4	9
20 January 1998	Vereeniging	4	7
21 January 1998	Elandsfontein	4	10
22 January 1998	Rietfontein	5	9
Total		19	39

parasite results of the faecal sample analyses are presented in Table 2. All 53 and 33 blood samples and smears collected in the Jericho and Zuurbekom areas, respectively, were negative for microfilariae of filarial nematodes and haemoprotozoa.

Only a small number of owners (14 from a total of 53) were aware that helminth parasites may be present in dogs and their remedy of choice for these was Bob Martin (Martin and Martin) tablets. Some also used Wormol (Milborrow) as a deworming remedy. One owner also regularly treated his dog by dissolving potassium permanganate ($KMnO_4$) in its drinking water to reduce worm burdens.

DISCUSSION

The VNA[4,5] provides a rapid means of assessing the socioeconomic needs and health status of animals within human communities. Point prevalence of diseases such as those caused by helminths can be quantified during a VNA.

The eggs of *Ancylostoma* spp. were identified in 93 % of faecal samples from both study areas (Table 2). Ortlepp[8] found that only 20 % of 25 dogs necropsied were infected with *Ancylostoma caninum,* while Verster[14] reported that 69 % were infected with *Ancylostoma* spp. Ortlepp's and Verster's studies were undertaken in the Pretoria municipal area, and differences in the incidence of parasitism may be ascribed to temporal differences, geographical factors, social standing of residents in the sample areas and sample size; in the study by Verster 260 dogs were necropsied[14]. One cannot differentiate between eggs of *A. caninum* and *A. braziliense* microscopically, and although *A. braziliense* is regarded as a more important zoonosis by the medical profession in South Africa[3] (J J Joubert, University of Stellenbosch, pers. comm., 1998), both these nematodes are able to infect humans[9,10].

A survey of patent gastrointestinal parasites of stray dogs in the Bulawayo, Zimbabwe, urban area[7] revealed 38 % *Ancylostoma* spp. as compared to 93 % in our study. The higher percentage may be attributed to the environment (rural and peri-urban) of the dogs in the South African study compared to the urban environment of the Zimbabwean study. Another difference is the presence of *Spirocerca lupi* in the Zimbabwean study and the absence in ours. This nematode is transmitted by intermediate hosts such as dung beetles when ingested by the dog[10]. This occurrence in Zimbabwe may be attributable to a higher density or availability of dung beetles, parasite or differences between the laboratory methods used to determine the presence of the endoparasite eggs. Little information has been published about the occurrence of this nematode in southern Africa, although frequent reports are received from veterinary practitioners in both countries about widespread occurrence[1,10].

Toxocara canis eggs were not identified in faecal samples from Jericho. The incidence of 19 % eggs obtained in samples from Zuurbekom may be attributable to the greater number of pups (39.5 %), compared to Jericho (11.1 %). During Ortlepp's study, the incidence of *T. canis* was 44 %, and Verster found 32 % of dogs to be infected with this parasite[8,14]. Pups tend to carry heavier burdens of *T. canis,* because the nematode larvae are passed from the dam to her offspring both *in utero* and *via* the milk, while only some adults carry patent infections[3].

The absence of *Dipetalonema* spp. in the study areas cannot be explained, because it is the most common microfilarial parasite in the blood of dogs in South Africa. The absence of *Dirofilaria immitis* is in accordance with other reports[13,15] and should be carefully monitored. Introduction and subsequent establishment in South Africa is possible, as genera of suitable intermediate hosts occur locally[13,15].

Cestode eggs were identified only in faecal samples after flotation, and not by the tape method. Only small numbers of cestode eggs were recovered (Table 2). Since the eggs of the various *Taenia* spp. cannot be distinguished microscopically from one another or from those of *Echinococcus* spp., other diagnostic procedures should be employed. Ortlepp obtained his samples from necropsied dogs, and Verster from necropsies as well as purgation with arecoline hydrobromide, which in both studies resulted in recovery of whole worms, hence the accurate identification[8,14]. In this study, tapeworm eggs were termed 'taeniid eggs'.

The high incidence of nematode eggs (especially *A. caninum*) in faecal flotations originating from these 2 areas, including the samples from dogs of owners who claimed to use anthelmintic remedies, is alarming. It suggests that the remedies are ineffective, used at the wrong dosage, or applied at too long intervals to have any beneficial effects. That potassium permanganate has an anthelmintic effect is not supported in the literature, and certainly not proven by this study.

Table 2: **Eggs of helminth parasites identified in the faeces of dogs at Jericho and Zuurbekom.**

	Jericho		Zuurbekom	
	(*n*)	%	(*n*)	%
Number of dogs sampled	60	100	31	100
Ancylostoma spp.	56	93	28	90
Toxocara canis	—	0	6	19
Toxascaris leonina	1	2	2	6
Dipylidium caninum	2	3	—	0
Taeniid	1	2	—	0

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