

GASTRO-INTESTINAL HELMINTHS OF DOMESTIC DOGS IN THE REPUBLIC OF SOUTH AFRICA

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ABSTRACT

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Of the gastro-intestinal helminths found in 1 063 dogs from different parts of the country, *Dipylidium caninum*, the most prevalent cestode, occurred in 19,7% of the animals. *Echinococcus granulosus* was present in 10 dogs, 8 of which were from urban areas, and *Taenia hydatigena* in 69 dogs. *Taenia multiceps* was recovered from dogs only in the Cape Province and the Orange Free State. *Toxocara canis* was present in 81 of the necropsies carried out on 253 dogs from the Pretoria municipal area, while *Ancylostoma* spp. were present in 175 dogs. In the Pretoria area *Ancylostoma caninum* (11,9%) was more prevalent than *Ancylostoma braziliense* (6,2%).

Résumé

HELMINTHES GASTRO-INTESTINAUX DU CHIEN DOMESTIQUE EN AFRIQUE DU SUD

Parmi les helminthes gastro-intestinaux trouvés chez 1 063 chiens de différentes régions de la République d'Afrique du Sud, le cestode le plus commun, *Dipylidium caninum*, s'est retrouvé chez 19,7% des animaux. *Echinococcus granulosus* se trouvait chez 10 chiens, dont 8 vivant en zones urbaines, et *Taenia hydatigena* chez 69 chiens. *Taenia multiceps* n'a été observé chez le chien que dans la province du Cap et l'Etat Libre d'Orange. Sur un total de 253 bêtes autopsiées et provenant du territoire municipal de Pretoria, on en a trouvé 81 avec *Toxocara canis* et 175 avec des ankylostomes divers; pour la même région, on a constaté qu'*Ancylostoma caninum* est plus commun (11,9%) qu'*A. braziliense* (6,2%).

INTRODUCTION

The gastro-intestinal helminths of domestic dogs are of both veterinary and medical importance. Some are pathogenic only to dogs, while the larval stages of some cestodes which utilize domestic animals as their intermediate hosts, are also transmissible to man.

Ortlepp (1934) examined 25 dogs from the Pretoria municipal area and recovered gastro-intestinal helminths from 22 (88%) of them. He found *Dipylidium caninum* in 76%, *Echinococcus granulosus* in 20%, *Ancylostoma caninum* in 20%, *Toxascaris leonina* in 28% and *Toxocara canis* in 44% of the animals.

This report records the gastro-intestinal helminths recovered from domestic dogs in the Republic of South Africa from 1960-1977.

MATERIALS AND METHODS

From 1960-December 1977, 1 063 specimens from dogs were examined in various parts of the country. These specimens were of 3 kinds: helminths recovered from 260 dogs at necropsy, 502 faecal specimens collected immediately after purgation with arecoline hydrobromide, and worm eggs identified in 301 stool specimens after centrifugal flotation with glycerine. The localities from which the different specimens originated are indicated in Fig. 1.

The descriptions given by Soulsby (1968) were used to identify all the helminths except *Physaloptera canis* and the *Taenia* spp.; these were identified by reference to Mönnig (1929) and Verster (1969) respectively.

RESULTS

Helminths recovered post-mortem

Helminths were recovered from 194 (74,6%) of the 260 dogs examined (Table 1), of which the vast majority, namely 253, originated from the Pretoria municipal area. Of the 7 dogs which came from elsewhere, one from Louis Trichardt was infested with *Spirocerca lupi*, one from Vereeniging with *D. caninum* and one from Umtata (Transkei) with *Taenia hydatigena*.

TABLE 1 Prevalence of helminth species in necropsies of 260 dogs

Species	Number positive	% positive
Cestoda:		
<i>Dipylidium caninum</i>	88	33,8
<i>Echinococcus granulosus</i>	4	1,5
<i>Taenia hydatigena</i>	20	7,7
<i>Taenia</i> spp.....	4	1,5
Nematoda:		
<i>Ancylostoma braziliense</i>	16	6,2
<i>Ancylostoma caninum</i>	31	11,9
<i>Physaloptera canis</i>	1	0,4
<i>Spirocerca lupi</i>	3	1,2
<i>Toxascaris leonina</i>	32	12,3
<i>Toxocara canis</i>	81	31,2

The most prevalent cestode in this group was *D. caninum* (33,9%), followed by *T. hydatigena* (7,7%), while 4 dogs from the Pretoria municipal area were infested with *E. granulosus*.

T. canis was present in 31,2% of the dogs and *T. leonina* in 12,3%. Hookworms occurred in 18,1%, *A. caninum* in 11,9 and *Ancylostoma braziliense* in 6,2%.

Helminth eggs in stools

A total of 301 stools were examined and helminth eggs identified in 151 (Table 2).

Segments or egg capsules of *D. caninum* were present in 34 (11,3%) and *Taenia* spp. in 12 (4,0%) of the dogs.

Ova of *Ancylostoma* spp. occurred in 24,3% and *T. canis* in 15,0% of the specimens.

Helminths expelled by dogs after arecoline hydrobromide treatment

Stools from 502 dogs were examined and helminths recovered from 240 (47,8%) of them. The prevalence of the helminths recovered in the different geographical regions is summarized in Table 3.



FIG. 1 Origin of the specimens examined

N: Specimens collected at necropsy
 P: Specimens collected after purgation with arecoline hydrobromide
 S: Stools examined for worm eggs

The most prevalent cestode was *D. caninum* (17,3%), followed by *Taenia hydatigena* (9,6%). *Taenia multiceps* occurred in 15 animals, from Calvinia, Colesberg, Hanover, Middelburg, Queenstown and Venterstad in the Cape Province and from De Brug and Fauresmith in the Orange Free State. *E. granulosus*

was present in 4 animals in the Transvaal: Johannesburg (2), Pretoria (1) and Vanderbijlpark (1), and 2 in the Cape Province: Hanover (1) and Queenstown (1).

Ancylostoma spp. occurred in 11% of all the animals examined but was commoner in dogs from the Western Cape, where 16,9% were infested.

TABLE 2 Prevalence of helminth species in stools of 301 dogs

Origin of specimen	Stools examined		Helminth eggs identified				
	Number	Positive	<i>D. caninum</i>	<i>Taenia</i> spp	<i>Ancylostoma</i> spp.	<i>T. leonina</i>	<i>T. canis</i>
Pretoria.....	267	131	31	7	69	6	34
Bloemhof.....	11	8	0	0	3	4	7
Ermelo.....	17	8	2	5	1	1	1
Heidelberg.....	1	1	0	0	0	0	1
Johannesburg.....	5	3	1	0	0	0	2
Number.....	301	151	34	12	73	11	45
%.....	—	50,2	11,3	4,0	24,3	3,7	15,0

TABLE 3 Prevalence of helminths in stools collected after treatment with arecoline hydrobromide

	Geographical region						Prevalence (%) in R.S.A.
	Cape Province			Orange Free State	Natal	Transvaal	
	Western Cape	Karoo	Eastern Cape				
Number examined.....	290	48	12	12	30	110	502
Number positive (%).....	48,9	100	66,5	83,3	76,7	13,6	47,8
Cestoda:							
<i>Dipylidium caninum</i>	66	4	5	0	7	5	17,3
<i>Echinococcus granulosus</i>	0	1	1	0	0	4	1,2
<i>Mesocostoides lineatus</i>	1	0	0	0	0	0	0,2
<i>Taenia hydatigena</i>	6	30	0	6	3	3	9,6
<i>Taenia multiceps</i>	0	14	1	4	0	0	3,8
<i>Taenia pisiformis</i>	0	0	0	0	0	2	0,4
<i>Taenia serialis</i>	0	0	0	0	4	0	0,8
<i>Taenia</i> spp.....	7	1	3	0	2	1	2,8
Nematoda:							
<i>Ancylostoma</i> spp.....	49	0	1	0	0	5	11,0
<i>Toxascaris leonina</i>	9	0	0	0	6	0	3,0
<i>Toxocara canis</i>	4	0	0	0	1	2	1,4

DISCUSSION

The most reliable method of determining the prevalence of gastro-intestinal helminths is their recovery at necropsy but this is, unfortunately, rarely possible. The examination of stools for helminth eggs by centrifugal flotation with glycerine may be used to determine the presence of nematodes such as *Ancylostoma* spp., *T. leonina* and *T. canis*, but not those of *S. lupi*, which require a flotation fluid of high specific gravity. Flotation is also unsatisfactory for the detection of cestode infestations, as the eggs often do not rise to the surface of the glycerine-water mixture. Moreover, it is impossible to differentiate the eggs of the various *Taenia* spp. from one another or from *E. granulosus*. These results confirm the value of arecoline hydrobromide as a taeniafuge in surveys for the diagnosis of cestodes in dogs (Gemmell, 1958; Gregory, 1973). This drug is, however, a powerful parasympathetic stimulant (Jenkins, 1978, personal communication) and cannot be given to young puppies, old dogs, and pregnant or lactating bitches. Although nematodes are sometimes expelled after treatment with arecoline hydrobromide, its efficacy against them is low and many will be unaffected by it.

Dipylidium caninum

This cestode, which in this survey was found in dogs in the Cape Province, Natal and Transvaal, was present in 209 (19,7%) of the animals examined. The fact that it was not found in the 12 purgation specimens from the Orange Free State is fortuitous, as it was recovered from a dog in Bloemfontein before the survey commenced (Verster, 1957, unpublished data).

Echinococcus granulosus

Ten animals (0,9%) were infested with *E. granulosus*. Two of these animals came from farms but the remaining 8 were from urban areas. Ortlepp (1934) reported an incidence of 20% in dogs from the vicinity of Pretoria, but in this survey it was much less prevalent, only 1,4% being affected. Despite the low incidence of *E. granulosus*, its presence in dogs from urban areas is disturbing, as meat sold legally in these areas is subject to inspection at the local abattoir and

infested viscera etc., may not be sold to the public. It is possible that some of these animals acquired infestation from sources outside the urban areas, as was undoubtedly the case with 2 dogs from Johannesburg. Their owner was an elderly gentleman who had undergone a lobotomy for a pulmonary hydatid cyst and 2 years later developed another hydatid cyst in the other lung. When his dogs were examined for *E. granulosus*, 2 of the 4 animals were infested. It then transpired that the owner regularly bought meat for home consumption in rural areas where carcasses and viscera were not subject to inspection.

Mesocostoides lineatus

A single animal from Bredasdorp (Cape Province) was infested with this species.

Taenia hydatigena

This, the most prevalent *Taenia* sp., occurred in all parts of the country and was identified in 69 of the dogs.

Taenia multiceps

Nineteen (3,8%) of the purgation specimens from the Karoo and Eastern Cape contained this cestode. In this survey it was not found in animals from the Western Cape despite the fact that a severe outbreak of cerebral coenuriasis in sheep occurred in the Bredasdorp district in 1964. However, some of the dogs were known to have been treated with niclosamide when the outbreak occurred and before the purgation specimens were collected.

Until recently *Taenia multiceps* had not been recovered from the Transvaal or Natal. In 1976, however, its larval stage was recovered from the brain of a sheep in the Delmas district. The sheep concerned came from a flock descended from animals that originated from the Orange Free State (Verster, unpublished data).

Taenia serialis and *Taenia pisiformis*

Four dogs belonging to a jackal-hunting pack in Pietermaritzburg (Natal) were infested with *T. serialis* and 2 animals from Johannesburg harboured *T. pisiformis*.

Ancylostoma spp.

The worms or eggs of *Ancylostoma* spp. were present in 175 (16,5%) of the specimens. In the Pretoria area *A. caninum* (11,9%) was more prevalent than *A. braziliense* (6,0%), but the relative incidence of these 2 species in the other areas is not known.

Toxascaris leonina

This nematode was diagnosed in 58 (5,5%) of the dogs examined.

Toxocara canis

This helminth was identified in 133 (12,5%) of all the specimens examined. However, its prevalence at autopsy in 32,0% of the 253 dogs from the Pretoria municipal area, is undoubtedly a more accurate estimate of its prevalence. The low prevalence (1,4%) of this helminth in the purgation specimens is partly due to the fact that arecoline hydrobromide has a low efficacy against nematodes. Moreover, *T. canis* parasitizes mainly young animals and lactating bitches, neither of which may be treated with arecoline hydrobromide.

Other nematodes

Physaloptera canis was recovered at autopsy from one animal in Pretoria. *S. lupi* was found in only 2 dogs from Pretoria and 1 from Louis Trichardt but it is probably commoner than these findings suggest. Its eggs are heavy and consequently do not rise to the surface when glycerine is used for centrifugal flotation.

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