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A SURVEY OF INTESTINAL HELMINTHS IN STRAY AND DOMESTIC DOGS OF RUTHERFORD COUNTY, TENNESSEE

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ABSTRACT

One hundred mongrel dogs collected by the Rutherford County Rabies Control Commission were autopsied. Ninety-six percent were found to contain intestinal helminths of one or more species. The following parasites were recovered: *Ancylostoma caninum, Trichuris vulpis, Toxocara canis, Taenia pisiformis,* and *Dipylidium caninum.*

Thirty fecal specimens were procured from the base veterinarian's office, Sewart Air Force Base, Rutherford County, Tennessee. From these hosts ova belonging to the family Ascaridae and the genera *Taenia, Trichuris, Ancylostoma,* and *Dipylidium* were isolated.

INTRODUCTION

As human populations become more densely settled in many areas of the world, there is an increasing awareness of domestic and feral animals as hosts for potentially harmful parasites. Despite the presence of frequent, varied and widespread parasitology surveys, there have been few investigations of canine intestinal helminths in Middle Tennessee. On the basis of three human cases Webster (1964) postulated the existence of endemic foci of *Echinococcus granulosus* in dogs in Middle Tennessee. While dissecting stray dogs from Bath County, Kentucky, Edney (1949) discovered three *E. granulosus* adults.

Canine intestinal helminth studies have occurred in widely scattered areas of the country. McGuire (1964) reported an incidence of 60% infestation for dogs examined in Carlsbad, New Mexico. He listed *Trichuris vulpis* as the fifth most frequently recovered intestinal helminth with an incidence of 0.8%. Braun and Thayer (1962), working in Iowa, raised this level for *T. vulpis* to 12%, while most other investigators in this country mentioned this nematode as one of the most frequently found. Lillis (1967) and Mann and Fratta (1952) reported values of 75.6% and 52.8% respectively, for New Jersey.

Worley (1964) found 52.8% of Michigan dogs infested with *T. vulpis* and he reported one of the highest overall rates of parasitism, 88.6% of 123 animals. The primary purpose of this study was to enumerate the intestinal helminths in stray and domestic dogs in Rutherford County, Tennessee.

MATERIALS AND METHODS

A total of 100 mongrel dogs of varying age, size, condition, and breed mixture was obtained from the Rabies Control Commission of Rutherford County, Tennessee. These animals were either unwanted pets or stray dogs being held for 48 hr. custody and eventual disposal by means of carbon monoxide asphyxiation. From five to ten were examined weekly. Where possible background data on each animal were procured either from Rabies Control personnel or the individual dog owners.

Autopsy specimens, consisting of the entire intestine ligated at the duodenum and the sigmoid and removed from the host animal within one hour after death, were incised longitudinally and the lumen contents and mucosa examined with a hand lens. These contents and adult helminths were preserved in 10% formalin-saline. Cestodes were stained in Semicohn's carmine. Nematodes were fixed and cleared in an alcohol-glycerol mixture and were mounted either *en face* or whole in glycerine jelly for specific identification.

The Sewart Air Force Base veterinarian's office supplied a second group of samples. One fecal specimen was collected from 30 dogs with symptoms suggesting helminth infestation. Since they would be expected to be heavily weighted toward infested animals, they are not presented as being representative of the dog population on Sewart Air Force Base. However, they furnish a valuable set of specimens since the background of each animal was investigated and in this sense it provided a control group for the stray animals in the larger series.

Richie's formalin-ether sedimentation technique modified by the addition of a wetting agent (triton) was used to concentrate ova. Where only fecal specimens were available several simultaneous concentration runs were made on each specimen so that a representative sample was more certain to be obtained from such materials. Sediments from each run were pooled with others from the original fecal specimen for microscopic examination. Capillary pipettes calibrated to deliver 0.05 ml. of sediment were used in dropping specimens to be coverslipped and examined. Quantities of ova are expressed in number per low power field (LPF). Low power was 100X.

RESULTS AND DISCUSSION

Table 1 shows the results of the survey in the Rutherford County Rabies Control Commission Group. These animals displayed a 96% total incidence of parasitism. Thirty-three percent were found with one species, 34% with two species, 16% with three species, 11% with four species, and 2% with five species.

No valid relationship was found among such parameters as sex, weight, breed, or overall condition, and the incidence or character of parasitism. However, a definite relationship between host age and character of parasitism was noted. Of the 100 animals autopsied, 37

TABLE 1: *Summary of Rabies Control Commission Group Infestations.**

Species	No. of Positive Hosts		No. of worms recovered per host	
	ova	adults	range	median
Ancylostoma caninum	52	52	1-30	9
Trichuris vulpis	45	53	1-186	24
Toxocara canis	34	37	1-56	11
Taenia pisiformis	17	21	1-19	4
Dipylidium caninum	8	30	1-196	27

*Total number of animals in group equals 100

were host to *Toxocara canis*. Of these 37, 21 were considered juveniles, i.e., were six months old or less. Five of the older animals in this juvenile group harboured *Ancylostoma caninum* and one was found with *Dipylidium caninum*.

Of all the helminths discovered, *A. caninum* was the most difficult to differentiate from the intestinal mucosal lining. Occasionally only 0-1 ovum per LPF was found after concentration while no adults were uncovered during the autopsy. It is possible hat several of these were overlooked in the intestinal mucosa where they had anchored themselves. The number of adult *A. canium* found per host ranged from 1-30 with a median of nine. Many pairs were found in copula and there was an approximate ratio of three females to two males. The heavier infestations yielded two to four ova per LPF upon concentration. All of the hookworms found were located in the small intestine with the greatest incidence in the jejunum and duodenum.

T. vulpis was the most common helminth found, being strictly localized in the cecum. Numbers per host animal ranged from 1-186 with a median of 24. Females outnumbered males by approximately two to one. Occasionally only females were present and as happened with the hookworms no ova were found. Any number above two impregnated females produced sufficient ova to give an occasional egg per LPF upon concentration. The upper ranges of infestation yielded four to six ova per LPF.

T. canis tended to be distributed evenly throughout the small intestine with numbers of 1-56 per host animal and a median of 11. Females comprised almost three out of every five individuals present. Larval forms amounted to 12% of the total. No definite correlation was seen between numbers of adults present at autopsy and ova found on concentration. However, the formalin-ether method had an extremely high over-all efficiency for eggs of this nematode. At times 20-30 ova per LPF were found and as few as three or four adults yielded two to four ova per LPF. The number of adult *Taenia pisiformis* and *D. caninum* was based on a scolex count. Ranges of *T. pisiformis* infestation were from 1-19 helminths per dog with a median of four. Scoleces and attached proglottids were found most frequently in the ileum and jejunum. *D. caninum* scolex counts ranged from 1-196 per host animal with a median of 27. Scoleces were anchored rather uniformly throughout the length of the small intestine.

Table 2 shows the results of the survey in the Sewart Air Force Base Group. Only 53% of these dogs displayed helminth ova in the fecal samples examined. Three had multiple infestations of two species but only one had a specimen with more than an occasional ovum per LPF. Ascarids were the most prevalent and this was probably due to the presence of 14 juveniles in the series of 30 dogs. These results were what would be expected from a group of dogs in which contacts with possible sources of infestation were kept to a minimum. Even

lower rates would probably have resulted from samples taken from dogs of a similar environment which did not display clinical symptoms of possible helminthiasis as did these animals.

TABLE 2: *Helminth Ova Found In Animals Of The Sewart Air Force Base Group**

Classification	Number of Animals with Ova
Ascaridae	10
Taenia sp.	1
Trichuris sp.	4
Ancylostoma sp.	4
Dipylidium sp.	1

* Total number of animals in group equals 30.

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