

THE INTESTINAL WORMS OF DOGS IN THE PHILIPPINE ISLANDS

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During the Spring of 1916 I was able, through the kindness of Professor Daniel de la Paz of the Department of Pharmacology of the College of Medicine and Surgery at Manila, to examine the intestinal tracts of 118 Philippine dogs. These dogs had been brought to the laboratory for teaching purposes and had been killed before recovery from the anesthetic. As there has never been any report made on the intestinal worms of dogs in the Philippine Islands, and as many of the findings were interesting and unusual, I feel that I am justified in reporting my findings.

The dogs which were examined were practically all collected by the city dog catchers and brought to the medical school from the city pound. At the pound, the dogs are kept in large cages with concrete floors which are daily washed and disinfected. There is a cage for each day of the week and when the dogs have been kept for seven days those which have not been claimed by their owners are either electrocuted or sent to the medical school for experimental and teaching purposes. As the work of the dog catchers extends all over the city of Manila, it will be seen that this series represents the average of the unclaimed dog population of the city. They are the canine nomads which forage about on the streets, and of which only a very small proportion ever fall into the hands of the dog catchers.

In making the examinations, the esophagus, stomach, and all of the intestines were removed from the body and opened in water. After thorough irrigation of these viscera, the worms which remained attached to the walls of the organs were removed and the washings were carefully examined for loose worms. The liver and bile ducts of about half the subjects were examined for trematodes, but none was found. The following table shows graphically the prevalence of infections.

	Number	Per Cent. Infected
Dogs examined	118	
Dogs infected	115	97.45
Hookworms (<i>Ancylostoma caninum</i>)	114	96.61
<i>Toxascaris limbata</i>	8	6.77
<i>Gnathostoma spinigerum</i>	8	6.77
<i>Spiroptera sanguinolenta</i>	7	5.92
<i>Dipylidium caninum</i>	55	46.56
<i>Dibothriocephalus</i> sp.	7	5.92
Total infections	199	168.55

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There were 52 dogs, or 44 per cent., in which two species of worms were found as follows:

Hookworm and Dipylidium, 43; hookworm and Dibothriocephalus, 3; hookworm and Spiroptera, 3; hookworm and Ascaris, 2; hookworm and Gnathostoma, 1.

There were triple infections in 12 dogs, or 10 per cent. These were the following:

Hookworm, Ascaris and Dipylidium, 3; hookworm, Ascaris and Dibothriocephalus, 1; hookworm, Dipylidium and Dibothriocephalus, 2; hookworm, Dipylidium and Gnathostoma, 3; hookworm, Spiroptera and Gnathostoma, 3.

One dog was infected with 4 species: hookworm, Ascaris, Dipylidium and Dibothriocephalus, and one with 5 species: hookworm, Ascaris, Dipylidium, Gnathostoma and Spiroptera.

Hookworms — 97.45 per cent.

All the hookworms which I examined belonged to the species *Ancylostoma caninum* (Ercolani, 1859). The number of worms present in an individual was found to vary from 2 up to 300 or 400. As well as being the most common this is probably also the most harmful worm parasite of dogs in the Philippine Islands. It is the cause of death of a large percentage of young dogs, particularly those of the better breeds and those which have been imported. The common street dogs seem to be more or less immune to the effects of this parasite, but even they are always emaciated and anemic when the worms are present in any considerable number. This hookworm is also very common in cats around Manila.

Toxascaris limbata (Railliet et Henry, 1911)—6.77 per cent.

The percentage of infections with this form was much lower than I had expected to find it, and the number of worms present in each case was very small. The fact that the majority of the dogs examined were full grown may account for the small percentage shown. A veterinary surgeon informs me that this parasite is very frequently found in puppies here in Manila, while they are only rarely encountered in older dogs.

Gnathostoma spinigerum (Owen, 1836) — 6.77 per cent.

Eight dogs were infected with this worm which has been reported from dogs in India by Mitter. The worms live in large cysts in the wall of the stomach which are connected with the lumen of that organ by a small pore. Cysts may contain anywhere from 1 to 11 or 12 worms, and there may be 3 or 4 cysts present in a stomach. In one case I found *Gnathostoma* and *Spiroptera* present in the same cyst. This form is also frequently found in cats.

Spiroptera sanguinolenta (Rudolphi, 1819)—5.92 per cent.

This worm is also found in cysts in the stomach and frequently in the lower part of the esophagus. In one dog there were three cysts in the esophagus and two in the stomach which yielded in all 18 worms. The cysts of *Spiroptera* and *Gnathostoma* present the same gross appearance and it is necessary to cut into them in order to determine which worms are present.

Dipylidium caninum (Linneus, 1767)—46.56 per cent.

This tapeworm was found in 55 out of the 118 dogs examined. In the majority of cases the number found ranged from 1 to 10 specimens, but in some instances they were very numerous. In such cases the majority of the worms were young and small. In one dog there were 2 specimens each about 20 cm. long, with ripe proglottids, and in addition I picked off from the surface of the intestine 196 individuals with heads the largest of which did not exceed 5 cm. in length.

Dibothriocephalus sp.

This is a small species of *Dibothriocephalus* which is more common in cats than in dogs in the Philippines. The entire worms measure from 40 to 62 cm. in length, and the largest segments at the posterior end are about 7 mm. wide by 2 to 3 mm. in length. The head closely resembles the head of *Dibothriocephalus latus*. I have never found more than three specimens in a single host. Specimens of this worm have been sent to Dr. H. B. Ward who has kindly consented to identify them.

The total absence of any tapeworms of the family Taeniidae from this series proved a surprise to me, and I might add that I have never found a *Taenia* in either a dog or a cat in the islands. Several cases of larval infections of man with *Echinococcus granulosus* have been reported, but I have not been able to find any authentic report of the finding of the adult in the islands. The absence of some of the other *Taenia* forms which are found in dogs may be accounted for by the fact that suitable intermediate hosts—rabbits and sheep—are not found in the islands.



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