

Title: Helminth survey of dogs in Bangkok, Thailand.

Principal Investigator: George S. Manning, CPT, MSC

Assistant Investigators: Louis E.H. Allen, SFC. M.T. (ASCP)  
Keturat Sukhavat, M.T.  
Vithoon Viyanant, M.T. B.Sc.

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Objectives Interest in the parasites of dogs has recently been stimulated by reports that many are potentially transmissible to man. Toxocara canis, for example, has been found in the liver and other tissues of children (Ehrenford, 1957; Beaver, 1962), and has been shown to be the cause of the disease known as visceral larva migrans. Woodruff et al., (1966) have reported that the larva of T. canis may also be involved in the transmission of polomyelitis and epilepsy. In addition the larva of hookworms Ancylostoma caninum and A. braziliense have long been recognized as causing creeping eruption (cutaneous larva migrans) in man. Trichuris vulpis is also believed to be capable of infecting man (Hall and Sonnenberg, 1956).

The objectives of this study are (1) to survey the dog population in Bangkok and determine the species and prevalence of helminths infecting them; (2) to carry on the study for an entire year so that seasonal variations in incidence, if present, will be elucidated; and (3) make recommendations on the control and eradication of those that are known to infect man.

Description The dogs that have been examined were strays supplied by the Rabies Control Center in Bangkok. A single stool specimen was collected and the sex and approximate age of each dog recorded (either younger or older than one year). Stools were taken to the laboratory where they were concentrated by the formalin—ether technique (Ritchie, 1948) and examined. Collections have been made on a monthly basis and an attempt made to collect the stools at about the same time each month.

Occasional antopsies have been performed so that adult helminths could be collected for species identification and a more accurate assessment of tapeworm infections made. Tapeworm infections can be diagnosed only if proglottids are recovered from the feces, or eggs from disintegrated proglottids can be found on microscopic examination. Since proglottids are not shed continuously, Lillis (1967) found that from stool exams alone, "about 40 to 50% of the Taenia infections and about 95% of the Dipylidium infections will be missed".

Progress Collection of stool specimens began in September and as of March 1104 samples have been examined. The results are summarized in Table 9. Data gathered from the Department of Meteorology in Bangkok shows that during the months of December through February there was less than 3 inches of rainfall, as well as a significant reduction in average minimum temperature and average relative humidity. This may account, in part at least, for the decline in incidence especially of the soil transmitted helminths.

Data on sex and age differences in infection rates are summarized in Table 10. In most cases male dogs under 1 year of age had fewer parasites than did the females of corresponding ages. Adult dogs show no marked sexual differences in resistance or susceptibility to any of the parasites.

Table 9. Incidence of helminth infection in dogs based on microscopic examination of fecal samples.

MONTH	S E P (1967)		O C T		N O V		D E C		J A N (1968)		F E B	
TOTAL NO. EXAM	2 6 9		2 0 7		2 3 9		4 4		9 5		2 5 0	
P A R A S I T E	No. Pos.	% Pos.	No. Pos.	% Pos.	No. Pos.	% Pos.	No. Pos.	% Pos.	No. Pos.	% Pos.	No. Pos.	% Pos.
Ancylostoma spp.*	227	84	176	85	220	92	38	86	71	75	203	81
Trichuris vulpis*	52	19	38	18	33	14	4	9	3	3	38	15
Strongyloides sp.	51	19	34	16	30	13	2	5	5	5	27	11
Toxocara canis*	17	6	11	5	16	7	5	11	1	1	8	3
Gnathostoma spinigerum*	13	5	4	2	6	3	0	0	0	0	0	0
Spirocerca sp.*	31	12	26	13	43	18	8	18	16	17	46	18
Taenia spp.	1	1	1	1	1	1	0	0	0	0	0	0
Toxascaris sp.	15	6	11	5	10	4	5	11	6	6	18	7
Dipylidium caninum*	0	0	2	1	0	0	0	0	0	0	0	0
Opisthorchis viverrini*	7	3	3	1	3	1	2	2	1	1	3	1
Diphyllobothrium sp.*	12	4	8	4	21	9	13	7	7	7	18	7
Fasciola/Fasciolopsis*	0	0	1	1	0	0	1	2	0	0	0	0
Totals	253	94	195	94	227	95	41	93	79	83	222	89

\* Transmissible to man.

Table 10. Sex and age differences in helminth infections of dogs during a 5 month period.

Groups	Percent of total infected									
	Hook-worm	Whip-worm	Tox-ascaris	Stron-gylal-des	Spiro-ceria	Toxo-cara	D. ma-nsoni	Gnath-ostome	Opis-chis	Taen-sp.
Male dog under 1 yr.	88	12	5	7	17	6	3	4	0	0
Female dog under 1 yr.	92	21	6	12	16	10	8	3	2	1
Male dog over 1 yr.	91	48	7	12	20	2	7	1	2	0
Female dog over 1 yr.	86	39	8	12	22	5	8	3	1	0

Species identification has not yet been completed on all of the adult worms recovered from autopsied animals, and some of the species, because of their low incidence, have not as yet been recovered.

Summary Approximately 90% of 1,104 dogs examined in the Bangkok area have been found to be infected with one or more species of helminths. However there was a marked seasonal variation in incidence in several of the species.

To date there have been at least 9 species of helminths identified that can be considered as zoonoses. As Vaughn and Jordan (1960) state, "It is apparent that even in well-ordered neighborhoods there is ready transmission of intestinal parasite infections among dogs, and...the possibility of indirect transmission of these infections to children would appear to be considerable."