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Capillaria hepatica IN SMALL MAMMALS COLLECTED FROM SHOA PROVINCE, ETHIOPIA

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Abstract: A total of 1,110 small mammals has been examined for *Capillaria hepatica* in Shoa Province, Ethiopia. Nineteen of 308 (6.2%) *Rattus rattus* and 1 of 212 (0.5%) *Praomys albipes* were infected. The data indicate that *C. hepatica* was essentially limited to commensal rats *(R. rattus).*

INTRODUCTION

Capillaria hepatica has been reported from numerous mammalian hosts throughout the world. Although rodents are the principal hosts,[2,3] the parasite has been found in primates, insectivores, lagomorphs, carnivores, and artiodactyls.[6,10] Although both genuine and spurious human infections with *C. hepatica* have been reported,[5] presently it is difficult to estimate the zoonotic implications. Reports of human infections with *C. hepatica* in different parts of the world in the last few years could indicate that infection with this parasite is more common in humans than presently supposed.[5,10] Even though documented human cases are relatively few, the majority of proven infections have ended fatally.[5] Furthermore, it has been suggested that infection with a few *C. hepatica* may cause the "Eosinophilia of Undetermined Origin" which frequently is reported throughout the world.[10]

Since commensal rodents are the principal hosts, association between human and rodent reservoirs can be considered a potential health hazard, especially to children. Infection in domestic rodents in the United States and in many other countries is well-documented.[2,4,6,10] However, data on the occurrence of *C. hepatica* in commensal or sylvatic rodents is still lacking for much of the world, especially for Africa. In January-March, 1976 and again in 1977, during the field studies on the ecology of murine typhus in Ethiopia, we examined the livers of small mammals for *C. hepatica.*

This paper reports the prevalence and distribution of *C. hepatica* in commensal and sylvan populations of small mammals in the Ethiopian highlands.

MATERIALS AND METHODS

A total of 1,110 small mammals was collected from five study areas within the Shoa Province, Ethiopia. The majority was collected by live trapping, the remainder by means of snap traps. Data recorded for each specimen usually included locality, date of collection, habitat, sex, age, body weight, external measurements and reproductive condition.

Screening for infection in the field was based primarily on gross examination of the liver for the *C. hepatica* lesions.[6] However, all specimens judged to be infected by gross examination were preserved in 70% ethyl alcohol. Confirmation of infection, performed in Baltimore, Maryland, was accomplished by microscopic examination for the presence of *C. hepatica* eggs or fragments of adult worms. Severity of infection was judged by the appearance and abundance of lesions as described by Luttermoser.[7]

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RESULTS

Twenty-eight species of mammals were examined, but only 19 of 308 (6.2%) *Rattus rattus* and one of 212 (0.5%) *Praomys albipes* were infected. The prevalence of infection among rats collected from the different study areas is shown in Table 1. These varied from 1.9% for Koka in the Rift Valley, to 17.4% for rats collected from houses in Makanissa Village, a suburb of Addis Ababa. Of 75 juvenile rats examined, only two were infected (2.6%), whereas 17 of 233 adults were infected (7.3%).

Species not infected, together with numbers examined (in parentheses) were: three species of *Crocidura* (16); *Procavia capensis* (2); *Tachyoryctes splendens* (14); *Graphiurus murinus* (4); *Tatera robusta* (12); *Acomys* sp. (2); *Arvicanthis abyssinicus* and *A. dembeensis* (161); *Dendromus lovati* (12); *Dendromus* sp. (4); *Desmomys harringtoni* (84); *Lophuromys flavopunctatus* (43); *Mastomys natalensis* (119); *Muriculus imberbis* (1); *Mus musculus* (18); *Mus* sp. (67); *Praomys fumatus* (16); *Praomys* sp. (2); *Stenocephalomys albocaudata* (6); *Otomys typus* (2); *Lepus capensis* (1); *Herpestes ichneumon* (3); *Genetta tigrina* (2); and *Ictonyx striatus* (2).

Lesions vary from punctate to string-like.[7] The diffuse type lesion, containing eggs and considerable necrotic tissue, was observed in only two cases. Eggs were recovered from the livers of all the infected *R. rattus* and *P. albipes*.

DISCUSSION

The data indicate that in the areas surveyed, *C. hepatica* infection was essentially limited to commensal *R. rattus;* only a single specimen of the other 27 species of mammals examined was positive. The infected *P. albipes* was collected in a house; moreover all the *R. rattus* were collected in buildings, and these were only in the vicinity of Addis Ababa and at Koka, in the Rift Valley. Sylvatic murines, in contrast, were abundant in the fields and other outdoor areas; however, in certain places they were common in domiciles and other buildings, as was the case in the area where the infected *Praomys* was taken. *C. hepatica* infection was present in all the sites where *R. rattus* occurred, but the prevalence of infection was relatively low, ranging only from about 1.9% in Koka, to 17% in a suburb of Addis Ababa. In contrast, infection rates of 25-30% have been reported for *R. rattus* from the island of Ponape in the South Pacific

TABLE 1. Prevalence of *Capillaria hepatica* infection among rodents collected from human settlements.

	Addis Ababa City and Suburbs					
		Makanissa				
	Town Houses	Village Houses	Barn	Intoto Kedani Mehrat	Intoto Kedani Mariam	Koka (Houses)
Rattus rattus:						
No. examined	84	23	47	48	0	106
No. positive	7	4	3	3		2
% infected	8.3	17.4	6.3	6.3		1.9
Praomys albipes:						
No. examined	0	0	0	38	80	0
No. positive				1	0	
% infected				2.6	0	

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(Jackson in Storer[11]), 90% or more for *R. norvegicus* in Baltimore, Maryland, USA,[2] and 48% for *Mastomys natalensis* in Johannesburg, South Africa. In South Africa, *C. hepatica* has been reported in other mammals such as mice, rabbits, hares, meerkats, and the gerbils; moreover, three cases of human infection have been reported in South Africa.[1,8]

Since *C. hepatica* infection in Shoa was virtually restricted to commensal rats living indoors, and a gamut of mammals can naturally acquire this nematode, the dearth of infection in native mammals in Ethiopa was due to either the absence of *Rattus* in the areas examined or else the other small mammals had little contact with rat-infested foci. *C. hepatica* infection apparently is perpetuated primarily by ingestion of infective ova released from the liver after 1) death and decomposition of the host, 2) cannibalism, or 3) predation.[3] Accordingly, the low population density of *Rattus* in the Ethiopian areas studied, and the low rate of infection in those hosts, may be factors contributing to the absence of *C. hepatica* in the indigenous mammals there. However, the present data are too limited to resolve that important point.

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