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ECTOPARASITES AND OTHER ARTHROPOD ASSOCIATES OF SOME VOLES AND SHREWS FROM THE CATSKILL MOUNTAINS OF NEW YORK

John O. Whitaker, Jr.¹ and Thomas W. French²

ABSTRACT

Reported here from the Catskill Mountains of New York are 30 ectoparasites and other associates from 39 smoky shrews, *Sorex fumeus*, 17 from 11 masked shrews, *Sorex cinereus*, 11 from eight long-tailed shrews, *Sorex dispar*, and 31 from 44 rock voles, *Microtus chrotorrhinus*.

There is relatively little information on ectoparasites of the long-tailed shrew, *Sorex dispar*, and the rock vole, *Microtus chrotorrhinus* (Whitaker and Wilson 1974). Recently we were able to collect samples of both of these species along with smoky shrews, *Sorex fumeus*, and masked shrews, *S. cinereus*, in the Catskill Mountains of New York.

O'Connor (1985) examined ectoparasites of eight long-tailed shrews from Tennessee and found chiggers (*Farrelloides jamesoni* (Brennan), *Neotrombicula cavicola* Ewing), laelapid mites (*Laelaps alaskensis* Grant), myobiid mites (*Amorphacarus* cf. *hengerorum* Jameson), glycyphagid mites (*Glycyphagus* sp. nr *hypudaei* (Koch), and *Orycterovenus* sp.), a pygmephorid mite (*Bakerdania plurisetosa* Mahunka), and a tick (*Ixodes angustus* Neumann).

Other than for data presented by Whitaker and French (1982) on 17 rock voles from New Brunswick, there is relatively little published information on ectoparasites of this species except for laelapid mites and fleas. These latter authors reported five species of fleas, one tick, 23 mites (most identified to species), and four chiggers. Fleas reported from rock voles other than from New Brunswick are *Atyphloceras bishopi* Jordan, *Catallagia borealis* Ewing, *Ctenophthalmus pseudagyrtes* Baker, *Epitedia w. wenmanni* (Rothschild), *Megabothris asio asio* (Baker), *M. quirini* (Rothschild), *Orchopeas leucopus* (Baker), and *Peromyscopsylla catatina* (Jordan) (see Martin 1972; Timm 1974, 1975; Timm et al. 1977). The tick, *Ixodes angustus*, was reported by Timm (1974, 1975). Mites reported were three laelapids, *Laelaps alaskensis*, *L. microti* Ewing, and *Haemogamasus ambulans* (Thorell) (Martin 1972; Timm 1974, 1975; Timm et al. 1977) and two trombiculids (chiggers) (Timm et al. 1977).

The purpose of this paper is to describe and compare the ectoparasite communities of *Sorex dispar*, *S. fumeus*, *S. cinereus*, and *Microtus chrotorrhinus* from the Catskill Mountains of New York.

MATERIALS AND METHODS

Mammals were collected in the Catskill Mountains in Green, Schoharie, Sullivan, and Ulster counties, New York, during September and October 1981 (French and Crowell, in

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press). Specimens were captured in standard snap-back mouse traps and in #10 cans set as pitfalls and filled to approximately 10 cm with water. Trap lines were set along relatively high elevation streambanks, on major talus slopes with open canopies, and on rocky hillsides in deep woods. Specimens were taken at elevations between 488-1250 m. Traps were checked each morning and specimens were placed in individual plastic bags until they were examined for parasites later in the day. Ectoparasites were collected by examining the fur with a dissecting microscope while manipulating it with dissecting needles. Parasites were counted or their numbers estimated if too large to count, and samples were preserved in alcohol. They were then cleared and stained for about five days in Nesbitt's Solution, mounted in Hoyer's Solution, and the cover slips ringed with Euparal.

Voucher specimens will be deposited in the U.S. National Museum and in the acarological collection of the Biosystematics Research Institute, Agriculture Canada, Ottawa, Ontario.

RESULTS

Eight long-tailed shrews, 11 masked shrews, 39 smoky shrews, and 44 rock voles were examined for ectoparasites and other arthropod associates. Taxa collected are reported in Tables 1 and 2.

In addition, one southern bog lemming, *Synaptomys cooperi*, from Slide Mountain, Ulster County, was included from which the following ectoparasites were collected. SIPHONAPTERA: *Peromyscopsylla catatina* (1). ACARINA, Laelapidae: *Laelaps alaskensis* (58); Trombiculidae: *Neotrombicula microti* (Ewing) (15, from ears); and Listrophoridae: *Listrophorus mexicanus squamosus* Fain and Hyland (2).

From two meadow voles, *Microtus pennsylvanicus*, from high elevation forests the following species were taken. SIPHONAPTERA: *Atyphloceras bishopi* Jordan (1), *Catallagia borealis* (1), *Peromyscopsylla catatina* (1). ANOPLURA: *Hoplopleura acanthopus* (Burmeister) (1). ACARINA, Glycyphagidae: *Glycyphagus hypudaei* Koch (20); Laelapidae: *Androlaelaps fahrenheitzi* (Berlese) (4), *Laelaps microti* (5); Trombiculidae: *Euschoengastia ohioensis* Farrell (7), *E. peromysci* (Ewing) (106), *E. setosa* (Ewing) (75), *Neotrombicula microti* (Ewing) (2); and Ascidae: *Proctolaelaps* sp. (3).

One woodland vole from Balsam Mountain, Ulster County, yielded the following. SIPHONAPTERA: *Ctenophthalmus pseudagyrtis* (2), *Peromyscopsylla catatina* (3). ACARINA, Laelapidae: *Laelaps alaskensis* (8), *L. microti* (6); Listrophoridae: *Listrophorus pitymys* Fain and Hyland (15); Myocoptidae: *Myocoptes japonensis* Radford (1); Pygmephoridae: *Bakerdania* sp. (1); Trombiculidae: *Euschoengastia ohioensis* (3), *E. peromysci* (21), *E. setosa* (6), *Neotrombicula harperi* (Ewing) (3), and *N. microti* (17).

Masked Shrew, *Sorex cinereus*

Only 11 masked shrews were taken (Table 1). The most abundant forms found were the mites *Orycteroxenus soricis* (Oudemans), *Bakerdania plurisetosa* (Pygmephoridae), *Cyrtolaelaps* sp., an histiostomatid sp., *Amorphacarus hengererorum* and the flea *Nearctopsylla genalis* (Baker).

Results from *Sorex dispar* from New York and Tennessee, and from *S. gaspensis* from New Brunswick were quite dissimilar. *Orycteroxenus soricis* and *A. hengererorum* occurred in all samples. The chigger, *Farrelloides jamesoni*, occurred in both *S. dispar* samples, but *Miyatrombicula esoensis* was the chigger on *S. gaspensis* from New Brunswick (it was the common chigger on all hosts at that locality). *Ixodes angustus* and *Bakerdania plurisetosa* occurred on *S. dispar* from Tennessee, whereas the tick, *I. angustus*, and *Pygmephorus horridus* Mahunka occurred on *Sorex dispar* from New York and on *S. gaspensis*. Six of the more abundant taxa were found on only one of the three populations.

Table 1. Ectoparasites and other arthropod associates of three species of shrews, *Sorex fumeus*, *S. cinereus*, and *S. dispar*, from the Catskill Mountains of New York.

	Smoky shrew n = 39		Masked shrew n = 11		Long-tailed shrew n = 8	
	No. parasites	No. hosts	No. parasites	No. hosts	No. parasites	No. hosts
SIPHONAPTERA						
<i>Nearctopsylla genalis</i>	11	10	—	—	—	—
<i>Ctenophthalmus pseudagyrtis</i> Baker	3	3	1	1	—	—
<i>Doratomyssa blarinae</i> C. Fox	2	2	—	—	—	—
<i>Peromyscopsylla hesperomys</i> (Baker)	1	1	—	—	—	—
ANOPLURA						
<i>Hoplopleura hesperomydis</i>	—	—	—	—	1*	1*
COLEOPTERA						
<i>Leptinus americana</i> (LeConte)	1	1	1	1	—	—
MITES						
HISTIOSTOMATIDAE						
Histiostomatid sp.	15	5	4	2	—	—
ASCIDAE						
<i>Proctolaelaps</i> sp.	5	5	1	1	1*	1*
OLOGAMASIDAE						
<i>Cyrtolaelaps</i> sp.	29	13	6	3	1*	1*
<i>Euryparasitus</i> sp.	2	2	—	—	—	—
GLYCYPHAGIDAE						
<i>Glycyphagus hypudaei</i>	2	1	1	1	—	—
* <i>Orycteroxenus soricis</i>	188	15	2526	6	361*	7*
* <i>Xenoryctes latiporus</i> Fain and Whitaker	—	—	1	1	—	—
* <i>Xenoryctes nudus</i> Fain and Whitaker	1	1	—	—	—	—
LAELAPIDAE						
<i>Androlaelaps fahrenheitzi</i> (Berlese)	3	3	—	—	—	—
<i>Haemogamasus ambulans</i> (Thorell)	4	4	—	—	—	—
<i>Haemogamasus liponyssoides</i> Ewing	1	1	2	2	—	—
<i>Myonyssus jamesoni</i> Ewing and Baker	1	1	—	—	—	—
MYOBIIDAE						
<i>Amorphacarus hengererorum</i>	13	4	4	2	14*	2*
<i>Protomyobia brevisetosa</i> Jameson	8	5	—	—	—	—
PARASITIDAE						
<i>Pergamasus</i> sp.	2	2	—	—	—	—
PYGMEPHORIDAE						
<i>Bakerdania plurisetosa</i>	138	16	19	5	4	2
<i>Bakerdania</i> sp.	8	6	1	1	2	2
<i>Pygmephorus brevicaudae</i> Smiley and Whitaker	1**	1	—	—	—	—
<i>Pygmephorus hastatus</i> Mahunka	1**	1	—	—	—	—
<i>Pygmephorus horridus</i>	—	—	—	—	2**	2
* <i>Pygmephorus moreohorridus</i> Mahunka	—	—	2	1	—	—
* <i>Pygmephorus nidicolus</i> Mahunka	—	—	1**	1	—	—
<i>Pygmephorus whitakeri</i>	37	16	1	1	1**	1

Table 1. (continued)

	Smoky shrew n = 39		Masked shrew n = 11		Long-tailed shrew n = 8	
	No. Parasites	No. hosts	No. parasites	No. hosts	No. parasites	No. hosts
TROMBICULIDAE						
<i>Euschoengastia blarinae</i> (Ewing)	2	2	—	—	—	—
<i>Euschoengastia peromysci</i> (Ewing)	1	1	1	1	—	—
<i>Farreloides jamesoni</i>	12	3	—	—	3	1
<i>Neotrombicula harperi</i>	1	1	—	—	—	—
<i>Neotrombicula microti</i>	1	1	—	—	—	—
IXODIDAE						
<i>Ixodes angustus</i>	1	1	1	1	3	3

Long-tailed Shrew, *Sorex dispar*

Only eight individuals of this shrew were examined for ectoparasites. Although we took 11 species from *Sorex dispar* from the Catskills, only two, *Orycteroxenus soricis* (\bar{x} = 45.1) and *Amorphacarus hengererorum* (\bar{x} = 1.75) were very abundant. On *Sorex gaspensis* from New Brunswick, Whitaker and French (1982) took members of 15 taxa, of which the most abundant were *Orycteroxenus soricis*, *Miyatrombicula esoensis* Sasa and Ogata, *Ixodes angustus*, *Pygmephorus horridus*, and *Cyrtolaelaps* sp. However, small numbers of *A. hengererorum* were also taken.

Smoky Shrew, *Sorex fumeus*

Thirty taxa of ectoparasites and other associates were taken from 39 smoky shrews from the Catskills. The most abundant associates of *Sorex fumeus* from the Catskills were *Orycteroxenus soricis*, *Bakerdania plurisetosa*, *Pygmephorus whitakeri* Mahunka, *Cyrtolaelaps* sp., and histiostomatids.

Rock Vole, *Microtus chrotorrhinus*

Thirty-one taxa were taken from 44 specimens of this species from the Catskill Mountains (Table 2), including six species of fleas, one louse, one tick, and five species of chiggers, along with other mites from several families.

DISCUSSION

Records of mites not previously taken from New York are indicated in Tables 1 and 2 by an asterisk before the species name. New host records are indicated by two asterisks in the number of parasites column.

A new mite parasite record for *M. chrotorrhinus* is *Myocoptes musculus* (Koch), but only one individual was taken and it could have been a contaminant from *Peromyscus*. All of the fleas, the tick, and, among the chiggers, *Neotrombicula harperi* (Ewing) and *N. microti* have been previously reported. We are not aware of previous records of *Euschoengastia setosa*, *E. ohioensis* or *E. peromysci* from this host. One individual of *Hoplopleura acanthopus* was found. It is the first record of a louse on this host, but it is a *Peromyscus* louse and is undoubtedly accidental, as is *Hoplopleura hesperomydis*

Table 2. Ectoparasites and other arthropod associates of 44 Rock Voles from the Catskill Mountains of New York.

	No. parasites	No. hosts
SIPHONAPTERA		
<i>Peromyscopsylla catatina</i>	32	13
<i>Catallagia borealis</i>	24	11
<i>Ctenophthalmus pseudagyrtes</i>	17	10
<i>Megabothris quirini</i>	17	10
<i>Atyphloceras bishopi</i>	11	6
<i>Epitedia wemmani</i>	2	2
ANOPLURA		
<i>Hoplopleura acanthopus</i>	1	1
ACARINA		
ASCIDAE		
<i>Proctolaelaps</i> sp.	1	1
OLOGAMASIDAE		
<i>Cyrtolaelaps</i> sp.	11	10
<i>Euryparasitus</i> sp.	4	2
GLYCYPHAGIDAE		
<i>Glycyphagus hypudaei</i> (complex)	1878	33
<i>Xenoryctes latiporus</i>	1	1
PARASITIDAE		
<i>Pergamasus</i> sp.	2	2
LAELAPIDAE		
<i>Androlaelaps fahrenheitzi</i>	82	22
<i>Echinonyssus isabellinus</i> (Oudemans)	4	2
<i>Eulaelaps stabularis</i> (Koch)	1	7
<i>Haemogamasus ambulans</i>	26	19
<i>Haemogamasus liponyssoides</i>	3	3
<i>Laelaps alaskensis</i>	385	23
<i>Laelaps kochi</i> Oudemans	596	40
LISTROPHORIDAE		
<i>Listrophorus mexicanus squamiferus</i>	12817	33
Fain and Hyland		
MYOBIIDAE		
<i>Radfordia hylandi</i> Fain and Lukoschus	1	1
MYOCOPTIDAE		
<i>Myocoptes japonensis</i>	97	11
* <i>Myocoptes musculus</i>	1**	1
PYGMEPHORIDAE		
<i>Bakerdania plurisetosus</i>	4	3
TROMBICULIDAE		
* <i>Euschoengastia ohioensis</i>	329	13
* <i>Euschoengastia peromysci</i>	249	19
* <i>Euschoengastia setosa</i>	525	27
<i>Neotrombicula harperi</i>	38	3
<i>Neotrombicula microti</i>	1512	40
IXODIDAE		
<i>Ixodes angustus</i>	4	4

(Osborn) on *Sorex dispar* from the Catskills. This parasite is host specific to mice of the genus *Peromyscus*, and may have come from a deer mouse that was scavenged by a shrew in the same trap line about 50 ft (15 m) from where the shrew was trapped.

The fleas taken during this work were particularly interesting. Benton (1980) indicated *Microtus pennsylvanicus* is probably a true host for *Atyphloceras bishopi*, and that other voles may be also. *Microtus chrotorrhinus* would appear to be a true host for this species and for *Catallagia borealis*, as indicated by the present study. Benton listed *M. chrotorrhinus* as a true host for *Peromyscopsylla catatina* and *Megabothris quirini*. Benton listed *Nearctopsylla genalis*, *Atyphloceras bishopi*, and *Catallagia borealis* as winter fleas, but our collection was made in summer and fall (through October).

In Tennessee, OConnor (1985) reported one individual each of two species of *Microtus* parasites, *Laelaps alaskensis* and *Listrophorus mexicanus*, also indicating the possibility of scavenging by these shrews. The most abundant forms among eight species taken from this host in Tennessee (OConnor 1985) were *Farrelitoides jamesoni* (9), *Glycyphagus* sp. nr. *hypudaei* (7), *Amorphacarus hengererorum* (7), and *Orycteroxenus* sp. nr. *soricis* (4 taken, $\bar{x} = 0.5$).

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