

The ectoparasites of the southern bog lemming, *Synaptomys cooperi*, in Indiana

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Introduction

The southern bog lemming, *Synaptomys cooperi*, is a small cricetid rodent found primarily in grassy fields. It is rarely trapped, since it is not readily attracted to bait, and since it tends to live in small colonies (1). Little is known about its external parasites. Connor (2) conducted an extensive life history study of *S. cooperi* in southern New Jersey and reported the ectoparasites as fleas, lice, ticks and mites, and Stegeman (7) reported mites, fleas and lice from *S. cooperi* from Michigan. Mites previously reported from *S. cooperi* include *Listrophorus synaptomys* (3), *Laelaps alaskensis* (8, 9) and *Laelaps stupkai* (6). Fleas reported by Wilson (10) are *Epitedia wenmanni* and *Rhadinopsylla orama*. Jackson (5) indicates that the louse, *Hoplopleura acanthopus*, has been found on the southern bog lemming.

The purpose of this paper is to present information on the ectoparasites from 65 bog lemmings from Indiana.

Methods

A total of 65 southern bog lemmings was examined, 50 from Vigo County, and 15 from Clay, Dearborn, Harrison, LaGrange, Martin, Newton, Parke and White Counties. Most were trapped with snapback mouse traps, although 17 were caught in pit traps and one was caught by a cat in Clay County. Twenty-five of the lemmings were examined by brushing the fur with dissecting needles while using a dissecting microscope. The ectoparasites on the remaining lemmings were removed using a washing technique (4), after examining the lemmings under a dissecting microscope for attached parasites. The washing technique involved placing the animal in a pint jar containing a few grams of detergent and 250-300 ml of water, then shaking the jar for 5 minutes to dislodge ectoparasites. The water was filtered through a vacuum filtration system. Ectoparasites were retained on the filter paper, which was examined under a dissecting microscope. Ectoparasites were placed in 75% ethanol with 5% glycerol for a few days, cleared and stained in Nesbitt's solution, and mounted in Hoyer's solution.

Results

Of the 65 bog lemmings examined, 62 (95.4%) were infested with ectoparasites. Two species of flea, one sucking louse, ten species of mites and 8 others identified only to family or genus, 4 chigger mites and 3 ticks were found (Table 1).

The common flea was *Ctenophthalmus pseudagyrtes*, with 16 individuals seen. This flea is mainly found on moles and shrews in Indiana, but is also found

TABLE 1. External parasites of 65 southern bog lemmings, *Synaptomys cooperi*, from Indiana.

Parasites	Number of Parasites		Bog Lemmings Infested	
	Total	Average	No.	%
Siphonaptera (fleas)				
<i>Ctenophthalmus pseudagyrtes</i>				
Baker, 1895	16	0.2	9	13.8
<i>Megabothris asio</i> Baker,				
1904	1	0.01	1	1.5
Anoplura (sucking lice)				
<i>Hoplopleura acanthopus</i>				
Burmeister, 1839	183±	2.8	11	16.9
Acarina				
Mites				
<i>Listrophorus synaptomys</i> Fain,				
Whitaker, McDaniel, &				
Lukoschus, 1974	1657±	25.5	20	30.7
<i>Dermacarus hypudaei</i> (Koch,				
1841	623±	9.6	24	36.9
<i>Laelaps alaskensis</i> Grant,				
1947	533	8.2	55	84.6
<i>Androlaelaps fahrenheitii</i>				
(Berlese, 1911)	13	0.2	9	13.8
<i>Laelaps kochi</i> Oudemans, 1936	13	0.2	2	3.1
<i>Ornithonyssus bacoti</i> Hirst,				
1913	12	0.18	2	3.1
<i>Bakerdania</i> sp.	10	0.15	6	9.2
<i>Euryparasitus</i> sp.	10	0.15	5	7.7
Oribatidae	7	0.1	7	10.8
Anoetidae	3	0.04	2	3.0
<i>Haemogamasus liponyssoides</i>				
Ewing, 1925	3	0.04	1	1.5
<i>Myocoptes japonensis</i> Radford,				
1955	3	0.04	1	1.5
<i>Radfordia lemnina</i> (Koch, 1841)	3	0.04	3	4.6
<i>Proctolaelaps</i> sp.	1	0.01	1	1.5
<i>Pygmephorus mustelae</i>				
Rack, 1975	1	0.01	1	1.5
<i>P. scalopi</i> Mahunka, 1973	1	0.01	1	1.5
<i>Pygmephorus</i> sp.	1	0.01	1	1.5
<i>Xenoryctes latiporus</i> Fain and				
Whitaker, 1973	1	0.01	1	1.5
Chigger mites (Trombiculidae)				
<i>Euschoengastia peromysci</i>				
(Ewing, 1929)	299	4.6	24	36.9
<i>E. ohioensis</i> Farrell, 1956	26	0.4	8	12.3
<i>Eutrombicula alfreddugesi</i>				
Oudemans, 1910	8	0.12	1	1.5
<i>Euschoengastia setosa</i> (Ewing,				
1939)	5	0.08	1	1.5
Ticks				
<i>Dermacentor variabilis</i>				
(Say, 1821)	381	5.9	28	43.1
<i>Ixodes muris</i> Bishopp &				
Smith, 1937	9	0.13	2	3.1
<i>I. dentatus</i> Marx, 1899	5	0.08	4	6.1

on rodents and carnivores. Only one individual of the other species of flea, *Megabothris asio*, was taken.

Sucking lice, *Hoplopleura acanthopus*, were found on 11 of the lemmings. This louse also infests the three species of *Microtus* in Indiana.

By far the most abundant parasite taken was *Listrophorus synaptomys*, a small mite which clings in large numbers to individual hairs. It occurred on 20 lemmings (30.7%), and was originally described on the basis of material collected during the present study (3). It is currently known only from Indiana and Sweden. In Sweden, the species was found on *Lemmus lemmus* and was described as a separate subspecies, *L. s. edleri* (3). *Listrophorus s. synaptomys* is known only from *Synaptomys cooperi* from Indiana, but likely occurs throughout the range of the host.

Other abundant parasites include the mites *Dermacarus hypudaei* and *Laelaps alaskensis*, the tick *Dermacentor variabilis*, and the chigger *Euschoengastia peromysci*. *Laelaps alaskensis* occurred most frequently, being found on 55 (84.6%) lemmings. *Laelaps alaskensis* reached its greatest abundance on *Synaptomys cooperi* on Indiana mammals, but occurs sparingly on all three species of *Microtus*, whereas *Laelaps kochi* occurs abundantly on *Microtus* (especially *M. pinetorum*), but sparingly on *Synaptomys*. *Androlaelaps fahrenheitsi*, which occurred on 9 bog lemmings, commonly infests many Indiana mammals. Both the chigger *E. ohioensis* and the mite *L. kochi* mentioned above are found on *Microtus pinetorum*, a species sometimes trapped with *S. cooperi* in this study. Other mites found include both parasitic and nonparasitic forms.

The data are few, especially in summer, but there was some indication of seasonal changes in parasite load (Table 2). *Listrophorus synaptomys* was most abundant in summer and fall. *Hoplopleura acanthopus* was most abundant in fall and winter, whereas *Laelaps alaskensis*, *Dermacarus hypudaei* and *Euschoengastia peromysci* were most abundant in spring and winter. When tested with Chi-square at the 95% level, the seasonal variations for all ectoparasites in Table 2 were significant ($\chi^2 = 87.0$ or more).

TABLE 2. Seasonal abundance of the common ectoparasites of 65 southern bog lemmings, *Synaptomys cooperi*, from Indiana, given as mean number per host.

	Spring 38 March- May	Summer 4 June- Aug.	Fall 11 Sept.- Nov.	Winter 12 Dec.- Feb.
# Lemmings Parasites				
<i>Laelaps alaskensis</i>	10.2	0.75	3.4	8.75
<i>Dermacarus hypudaei</i>	14.03	—	—	7.5
<i>Dermacentor variabilis</i>	9.4	—	0.45	0.08
<i>Euschoengastia peromysci</i>	8.1	—	—	3.25
<i>Listrophorus synaptomys</i>	8.7	103.7	82.3	0.42
<i>Hoplopleura acanthopus</i>	0.89	—	5.9	6.8

The infestation of bog lemmings by sex was investigated. Using Chi-square, the significance of the difference in infestation between males and females was

tested at the 95% level for seven of the common ectoparasites (*H. acanthopus*, *L. alaskensis*, *D. variabilis*, *D. hypudaei*, *L. synaptomys*, *E. peromysci* and *E. ohioensis*).

The chiggers (*E. peromysci* and *ohioensis*) were significantly more common on females than males ($\chi^2 = 10.98$ for *E. peromysci*, 11.55 for *E. ohioensis*). The infestation by the other ectoparasites was not significantly different between males and females.

To our knowledge, all of the ectoparasites of *S. cooperi* found in this study, with the exception of the louse *Hoplopleura acanthopus* and the mites *Laelaps alaskensis* and *Listrophorus synaptomys*, are reported for the first time on this host here. This includes 17 species and 8 various taxa of ectoparasites.

Literature Cited

1. BARBOUR, R. W. 1956. *Synaptomys cooperi* in Kentucky, with description of a new subspecies. J. Mammal. 37:413-416.
2. CONNOR, P. F. 1959. The bog lemming *Synaptomys cooperi* in southern New Jersey. Publ. Mus. Mich. St. Univ. 1(5):161-248.
3. FAIN, A., J. O. WHITAKER, JR., B. MCDANIEL and F. LUKOSCHUS. 1974. *Listrophorus synaptomys*, a new species from *Synaptomys* and *Lemmus* (Acarina: Listrophoridae). Acarologia 16:319-324.
4. HENRY, L. G., and S. MCKEEVER. 1971. A modification of the washing technique for quantitative evaluation of the ectoparasite load of small mammals. Jour. med. Entomol. 8:504-505.
5. JACKSON, H. H. T. 1961. Mammals of Wisconsin. The Univ. of Wis. Press, Madison. 504 p.
6. LINZEY, D. W., and D. A. CROSSLEY, JR. 1971. A new species of *Laelaps* from the lemming mouse, *Synaptomys cooperi* (Acarina: Laelapidae). Proc. Entomol. Soc. Wash. 73: 408-410.
7. STEGEMAN, L. C. 1930. Notes on *Synaptomys cooperi cooperi* in Washtenaw County, Michigan. J. Mammal, 11:461-466.
8. WHITAKER, J. O., JR., and N. WILSON. 1968. Mites of small mammals of Vigo County, Indiana. Amer. Midland Natur. 80:537-542.
9. WILSON, N. 1957. Some ectoparasites from Indiana mammals. J. Mammal. 38:281-282.
10. WILSON, N. 1961. The ectoparasites (Ixodides, Anoplura, and Siphonaptera) of Indiana mammals. Unpubl. Ph.d. Dissertation, Purdue Univ., West Lafayette, Indiana. 527 p.