

The Ectoparasites and Other Associates of the Cottontail Rabbit, *Sylvilagus floridanus*, in Indiana

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Introduction

The cottontail rabbit, *Sylvilagus floridanus*, is one of the most frequently hunted and handled mammals in Indiana. Rabbits are carriers of tularemia, a disease which affects rabbits and man and is transmitted by certain ectoparasites (4). A study of the ectoparasites of the cottontail, therefore, is important not only for rabbit welfare, but also to man.

Ectoparasites previously reported from *Sylvilagus floridanus* in Indiana include the ticks *Dermacentor variabilis*, *Haemaphysalis leporispalustris* and *Ixodes dentatus*, and the fleas *Cediopsylla simplex*, *Epidemia wenmanni* and *Odontopsyllus multispinosus* (5). In addition, the mite *Cheyletiella parasitivorax* has been found on the rabbit flea, *Cediopsylla simplex*, from Indiana cottontails (5). Loomis (3) reports several species of chiggers on the cottontail from Kansas, including the four species found in this study—*Eutrombicula alfreddugesi*, *Neotrombicula whartoni*, *N. lipovskyi* and *Euschoengastia setosa*.

The purpose of this paper is to present information on the ectoparasites from 131 cottontail rabbits from Indiana.

Methods

A total of 131 rabbits was examined, 107 from Vigo County, and 24 from Clay, Gibson, Jefferson, Knox, Lake, Marshall, Parke, Pike, St. Joseph, Sullivan, Tippecanoe, and Warren Counties. Most were road-kills, although 16 were shot, 5 were examined alive and 2 were killed by a dog. Twenty-eight of the rabbits were examined by manipulating the fur with a dissecting needle while examining it with a dissecting microscope. The ectoparasites on 18 rabbits were removed using a potassium hydroxide dissolving technique (2). Those on the remaining rabbits were removed using a washing technique (1), after examining them under a dissecting microscope for attached parasites. Ectoparasites were placed in 75% ethanol with 5% glycerin for a few days, cleared and stained in Nesbitt's solution, and mounted in Hoyer's solution.

Results

Of the 131 cottontail rabbits examined, 100 (76.3%) harbored ectoparasites. Four species of flea, 5 species of mites and 4 others identified only to family or genus, 4 chigger mites, 3 ticks, and one parasitic fly larva were found (Table 1).

TABLE 1. *External parasites of 131 cottontail rabbits, Sylvilagus floridanus, from Indiana. (31 rabbits had no ectoparasites.)*

Parasites	Number of Parasites Rabbits Infested			
	Total	Average	No.	%
Siphonaptera (fleas)				
<i>Cediopsylla simplex</i> (Baker, 1895)	249	1.92	53	40.4
<i>Odontopsyllus multispinosus</i> (Baker, 1898)	15	0.11	9	6.9
<i>Ctenocephalides felis</i> Bouche, 1835	3	0.02	2	1.5
<i>Orchopeas leucopus</i> Baker, 1904	1	0.008	1	0.8
Acarina				
Mites				
<i>Cheyletiella parasitivorax</i> (Megnin, 1878)	1313±	10.0	19	14.5
<i>Marsupialichus brasiliensis</i> Fain, 1969	150±	1.15	1	0.8
<i>Psorobia</i> sp.	100±	0.76	1	0.8
Oribatidae	35	0.27	14	10.7
<i>Androlaelaps fahrenheiti</i> (Berlese, 1911)	12	0.09	9	6.9
<i>Dermanyssus</i> sp.	2	0.015	2	1.5
Glycyphagidae	2	0.015	2	1.5
<i>Ornithonyssus bacoti</i> Hirst, 1913	1	0.008	1	0.8
<i>Pygmephorus designatus</i> Mahunka, 1973	1	0.008	1	0.8
Chigger Mites (Trombiculidae)				
<i>Eutrombicula alfreddugesi</i> Oudemans, 1910	531±	4.05	6	4.6
<i>Neotrombicula whartoni</i> (Ewing, 1929)	200	1.53	17	12.9
<i>Euschoengastia setosa</i> (Ewing, 1939)	6	0.05	2	1.5
<i>Neotrombicula lipovskyi</i> (Brennan and Wharton, 1950)	3	0.02	2	1.5
Ticks				
<i>Ixodes dentatus</i> Marx, 1899	353	2.69	38	29.0
<i>Haemaphysalis leporis-palustris</i> (Packard, 1869)	277	2.11	45	34.3
<i>Dermacentor variabilis</i> (Say, 1821)	49	0.37	10	7.6
Diptera (flies)				
<i>Cuterebra</i> sp.	5	0.04	4	3.1

The common flea was *Cediopsylla simplex*, with 249 individuals taken. Cottontail rabbits are the major hosts of this flea in Indiana, but it is also found on carnivores which prey on rabbits. The next most common flea, *Odontopsyllus multispinosus*, is found primarily on rabbits. *Ctenocephalides felis* is usually found on carnivores, while *Orchopeas leucopus* is a rodent flea.

The most abundant parasite found was *Cheyletiella parasitivorax*, a small mite commonly found on rabbits. It is also the mite occurring on the highest percentage of rabbits (14.5). Mites of the family Oribatidae, not parasitic, but found in small numbers on many mammals, occurred on 10.7% of the rabbits.

Chiggers were infrequent on rabbits, although *Neotrombicula whartoni* occurred on 12.9% of them. *Eutrombicula alfreddugesi* was the most abundant chigger, with 531± found. Both of these chiggers also occur on microtines.

The most abundant tick occurring on the rabbits was *Ixodes dentatus*. *Haemaphysalis leporis-palustris*, the most frequently occurring tick, is also found on ground-inhabiting birds. The tick *Derma-*

centor variabilis, occurring least frequently and in smallest numbers, also parasitizes small rodents.

The parasitic bot fly larva, *Cuterebra* sp., was found on only 4 rabbits. Botfly larvae (more than one species involved) occur on white-footed mice, squirrels and deer in Indiana.

There is some indication of seasonal changes in parasite load (Table 2). The fleas *C. simplex* and *O. multispinosus* were most abundant in winter, while the ticks *I. dentatus*, *H. leporis-palustris*, and *D. variabilis* were most abundant in spring. The seasonal variations for *C. simplex* and *I. dentatus* were significant at the 99% level ($\chi^2=134$ for *I. dentatus*, $\chi^2=139$ for *C. simplex*, 3 and 2 df, respectively), for *H. leporis-palustris* at the 95% level ($\chi^2\approx 89$, 2 df).

The infestation of rabbits 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 five of the common ectoparasites (*C. simplex*, *O. multispinosus*, *I. dentatus*, *H. leporis-palustris*, and *D. variabilis*). The ticks (*I. dentatus*, *H. leporis-palustris*, and *D. variabilis*) and the flea *C. simplex* were significantly more common on males than females ($\chi^2=5.6$ or more).

Many of the ectoparasites of *S. floridanus* in Indiana in this study have previously been reported. To our knowledge, however, the fleas *Ctenocephalides felis* and *Orchopeas leucopus*, the 4 species of chiggers, and all the mites (except *Cheyletiella parasitivorax*) are reported for the first time on *S. floridanus* here.

TABLE 2. Seasonal abundance of the common ectoparasites of 129 cottontail rabbits, *Sylvilagus floridanus*, from Indiana, given as mean number per host.

# Rabbits	Spring	Summer	Fall	Winter
	45	38	21	25
Parasites	March-	June-	Sept.-	Dec.-
	May	Aug.	Nov.	Feb.
<i>Cediopsylla simplex</i>	1.86	0.92	0.52	5.00
<i>Odontopsyllus multispinosus</i>	0.06	0.05	0.05	0.20
<i>Ixodes dentatus</i>	4.16	0.89	0.48	—
<i>Haemaphysalis leporis-palustris</i>	4.38	1.21	1.57	—
<i>Dermacentor variabilis</i>	0.78	0.37	—	—

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