TRANS., Ill. State Acad. Sci.
Vol. 67, no. 2, June, 1974

ECTOPARASITES FROM MICROTUS OCHROGASTER, PEROMYSCUS LEUCOPUS, AND CRYPTOTIS PARVA IN COLES COUNTY, ILLINOIS[1]

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Abstract: Ectoparasites were taken from 50 white-footed deer mice, Peroymscus leucopus noveboracensis (Fischer), 50 prairie voles, Microtus ochrogaster ochrogaster (Wagner), and 11 least shrews, Cryptotis parva parva (Say), all collected within a five-mile radius from Charleston, Illinois, from 23 January 1973 through 25 June 1973. A total of 4,242 ectoparasites were recovered; 2,395 from M. o. ochrogaster, 542 from P. l. noveboracensis, and 1,305 from C. p. parva. The major groups of ectoparasites and their percent recovery were: Acari (excl. of Metastigmata) 81.5%, Metastigmata 2.5%, Anoplura 15.5% and Siphonaptera 0.5%. Eighteen families and 31 species of mites, 1 family and 1 species of tick, 1 family and 2 species of lice, and 2 families and 3 species of fleas were represented.

In recent years there has been an increase in the study of arthropod groups associated with non-domestic animals because of their importance as vectors and reservoirs of disease, as well as their natural importance as living organisms. Ectoparasites have been reported previously from small mammals in North America, however, little concerning the ectoparasites of small mammals in Illinois has been published. Records of ectoparasites of small mammals in Illinois include a general survey of the parasites of the cottontail rabbit by Ecke and Yeatter (1956),

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[1] based on a thesis by the senior author submitted in partial fulfillment of requirements for the degree of master of science at Eastern Illinois University

ecological notes on a few species of lice on the small mammals of Illinois by Verts (1960), and records of fleas from mammals by Layne (1958) and Verts (1961).

The present survey has intended primarily to identify and tabulate the ectoparasites of Peromyscus leucopus noveboracensis (Fischer), Microtus ochrogaster ochrogaster (Wagner), and Cryptotis parva parva (Say).

MATERIALS AND METHODS

The host mammals were trapped from 23 January 1973 through 25 June 1973 in Coles County, Illinois. The 111 host mammals were trapped in 50 standard museum special traps and 20 Sherman live traps, at five trapping areas within a five mile radius of Charleston. Microtus ochrogaster and P. leucopus specimens were trapped both dead and alive, while C. parva specimens were all trapped dead. All traps were baited with peanut butter and set flush to the ground, in or near runways. On cold days the Sherman traps were supplied with rags which acted as nesting material to prevent the freezing of the trapped animal. In each field the traps were set in lines 10 yds. apart. The traps were checked and baited daily, shortly after dawn, and on cold days in the evening as well.

Upon capture, the host specimens were placed in individual, labeled plastic bags to prevent loss of ectoparasites from drop-off, and to prevent host transfer by the ectoparasites (Cook, 1955). Specimens trapped alive were individually transferred to a one gallon jar, killed with chloroform, and then placed in plastic bags. Host specimens were placed in a freezer the day of their capture and left frozen until examined for ectoparasites.

Prior to the examination for ectoparasites each host was thawed in its plastic bag for approximately two hours. The host was then removed from the bag and placed in a 12 oz. jar for washing (Lipovsky, 1951). The bag was examined for ectoparasites with the aid of a dissecting microscope before the host was washed. Immediately after washing, the host was placed in a petri dish and examined for ectoparasites under a dissecting microscope using a dissecting probe to look through the animal's fur.

Ectoparasites were transferred from the bag, the host, and the wash water directly to individual microscope slides for identification, or to vials for storage. Ectoparasites to be stored were placed in 70% ethyl alcohol in specimen vials,

stoppered with cotton and placed in air-tight, labeled, storage jars. Three mounting media were used: Hoyer's, C.M.C. with acid fuchsin, and clear C.M.C. The slides were labeled with both host and ectoparasite data. The ectoparasites were identified with the aid of a compound microscope and a variety of specific taxonomic keys and papers.

RESULTS

A list of the ectoparasites which were recovered and their abundance is presented in Tables I, II and III.

DISCUSSION

The word "ectoparasite", as used in this and similar surveys, is misleading. A number of the recovered organisms listed in this paper do not express a true ectoparasitic relationship with the mammals. Because of the association of small mammals with vegetation in the form of stored food, nesting materials and runways, they are found accidentally to harbor phytophagous mites (Cryptostigmata, etc.). Other organisms listed here as ectoparasites are instead displaying a form of phoresis. Immature forms (deutonymphs or hypopi) of the Acaridia exhibit a phoretic relationship with other animals including small mammals, as shown in this survey by Dermacarus hypudaei (Table I) and Orycteroxenus soricis (Table III).

Few animal groups duplicate the enormous diversity in morphology, habitat and behavior seen in the Acari. Every terrestrial vertebrate group has its complex of external acarine parasites. Therefore, it is not surprising that 84 percent of the ectoparasites recovered in the present study were mites. The most common mite recovered was the phoretic species Orycteroxenus soricis (Table III). Hypopi of the genus Orycteroxenus have seldom been reported from North America because they are so small, and they cling tenaciously to individual hairs (Krantz, 1970). These characteristics of Orycteroxenus hypopi account for the inaccurate density reported for this group in many surveys as well as in the present (Table III). More accurate counts would be obtained only if the technique of digesting the host were used to recover the hypopi (Hilton, 1970).

Among the most abundant ectoparasite groups recovered in this survey was the genus Myocoptes (Table I, II). Besides the recovery of Myocoptes musculinus and Myocoptes japonensis (Fain and Hyland, 1970) a number of adults which possessed taxonomic

TABLE I - ECTOPARASITES RECOVERED FROM 50 MICROTUS OCHROGASTER IN COLES COUNTY, ILLINOIS

Taxonomic group	No. of hosts infested	% of hosts infested	Total no. of organisms	Density*
Acari				
Astigmata				
Glycyphagidae				
Dermacarus hypudaei	12	24.0	121	2.420
Listrophoridae				
Listrophorus leuckarti	7	14.0	97	1.940
Myocoptidae				
Myocoptes japonensis	21	42.0	52	1.040
Myocoptes musculinus	6	12.0	8	0.160
Myocoptes sp.	34	68.0	541	10.800
Cryptostigmata				
Brachychthoniidae				
Brachychthonius sp.	1	2.0	2	0.040
Oppiidae				
Oribella sp.	1	2.0	1	0.020
Mesostigmata				
Laelapidae				
Androlaelaps fahrenholzi	31	62.0	187	3.740
Laelaps kochi	44	88.0	461	9.200
Metastigmata				
Ixodidae				
Dermacentor variabilis	5	10.0	14	0.280
Prostigmata				
Ereynetidae				
Paraspeleognathopis sp.	2	4.0	2	0.040
Myobiidae				
Radfordia lemnina	25	50.0	140	2.800

TABLE I - ECTOPARASITES FROM MICROTUS (CONTINUED)

Taxonomic group	No. of hosts infested	% of hosts infested	Total no. of organisms	Density*
Pyemotidae				
Pseudopygmephorus sellnicki	3	6.0	3	0.060
Siteroptes absidatus	2	4.0	3	0.060
Tarsonemidae				
Tarsonemoides truncatus	4	8.0	45	0.900
Trombiculidae				
Euschongastia peromysci	3	6.0	7	0.140
Trombicula whartoni	7	14.0	38	0.760
Insecta				
Siphonaptera				
Hystrichopsyllidae				
Ctenophthalmus pseudagyrtes	10	20.0	16	0.320
Epitedia wenmanni wenmanni	1	2.0	1	0.020
Anoplura				
Hoplopleuridae				
Hoplopleura acanthopus	37	74.0	595	11.900
Total	50	100.00	2,395	47.900

*Density is determined by dividing total number of organisms by the total number of hosts examined.

TABLE II - ECTOPARASITES RECOVERED FROM 50 *PEROMYSCUS LEUCOPUS* IN COLES COUNTY, ILLINOIS

Taxonomic group	No. of hosts infested	% of hosts infested	Total no. of organisms	Density*
Acari				
Astigmata				
Glycyphagidae				
Dermacarus hypudaei	2	4.0	3	0.060
Acaridae				
Troupeavia sp.	3	6.0	5	0.100
Tyrophagus sp.	2	4.0	2	0.040
acarid nymphs	1	2.0	3	0.060
Anoetidae				
Prowichmannia spiniferum	1	2.0	2	0.040
Myocoptidae				
Myocoptes japonensis	3	6.0	6	0.120
Myocoptes musculinus	21	42.0	38	0.760
Myocoptes sp.	13	26.0	40	0.800
Saproglyphidae				
Calvolia sp.	1	2.0	1	0.020
Cryptostigmata				
Oribatellidae				
Zygoribatula sp.	1	2.0	1	0.020
Mesostigmata				
Ascidae				
nymph	1	2.0	1	0.020
Laelapidae				
Androlaelaps fahrenholzi	16	32.0	42	0.840
Haemogamasus sp.	1	2.0	1	0.020
Hirstionyssus arcuatus	7	14.0	21	0.420
Laelaps kochi	4	8.0	5	0.100
Phytoseiidae				
Typhlodromus sp.	1	2.0	1	0.020

TABLE II - ECTOPARASITES FROM PEROMYSCUS (CONTINUED)

Taxonomic group	No. of hosts infested	% of hosts infested	Total no. of organisms	Density*
Metastigmata				
Ixodidae				
Dermacentor variabilis	10	20.0	109	2.360
Prostigmata				
Myobiidae				
Radfordia subuliger	20	40.0	69	1.480
Pyemotidae				
Pseudopygmephorus sellnicki	1	2.0	1	0.020
Siteroptes absidatus	3	6.0	21	0.420
pyemotid male	1	2.0	1	0.020
Scutacaridae				
Scutacarus sp.	3	6.0	4	0.080
Tarsonemidae				
Tarsonemoides truncatus	3	6.0	5	0.100
Trombiculidae				
Euschongastia peromysci	11	22.0	83	1.660
Insecta				
Siphonaptera				
Hystrichopsyllidae				
Ctenophthalmus pseudagyrtes	1	2.0	1	0.020
Epitedia wenmanni wenmanni	6	12.0	8	0.160
Ceratophyllidae				
Orchopeas leucopus	3	6.0	5	0.100
Anoplura				
Hoplopleuridae				
Hoplopleura hesperomydis	15	30.0	63	1.260
Total	47	94.0	542	10.804

*Density is determined by dividing total number of organisms by the total number of hosts examined

TABLE III - ECTOPARASITES RECOVERED FROM 11 CRYPTOTIS PARVA IN COLES COUNTY, ILLINOIS

Taxonomic group	No. of hosts infested	% of hosts infested	Total no. of	Density*
Acari				
Astigmata				
Glycyphagidae				
Dermacarus hypudaei	1	9.1	1	0.090
Orycteroxenus soricis	11	100.0	1,255	114.000
Acaridae				
Tyrophagus sp.	1	9.1	1	0.090
acarid nymphs	2	18.2	2	0.180
Mesostigmata				
Laelapidae				
Androlaelaps fahrenholzi	1	9.1	1	0.090
Prostigmata				
Erythraeidae				
Erythraeoidea sp.	1	9.1	1	0.090
Myobiidae				
Blarinobia simplex	4	36.4	26	2.360
Protomyobia claparedei	5	45.5	13	1.180
Pyemotidae				
Pseudopygmephorus sellnicki	3	27.3	5	0.455
Total	11	100.0	1,305	119.000

*Density is determined by dividing total number of organisms by the total number of hosts examined.

characters not fitting the description of the known species were found and recorded as "Myocoptes sp." (Table I, II). Although it has been shown by Dubinina (1969) that two or more species of a single genus may coexist on the same host, the collection of two species and essentially intermediate forms from the same host in this investigation suggests the need for additional taxonomic work on the genus Myocoptes.

An acarine family known to contain a number of external parasites is Laelapidae. Of the laelapids collected, the cosmopolitan mite Androlaelaps fahrenholzi has been found to parasitize a variety of hosts (Baker et al., 1956), and was found on all three species of hosts examined in this survey. Another mite of this group, Laelaps kochi, was found clearly to illustrate a preference for M. ochrogaster (Table I). Hirstionyssus arcuatus was recovered only from P. leucopus and was recorded from Peromyscus by Whitaker and Wilson (1968) as Hirstionyssus talpae.

The members of the family Myobiidae are ectoparasites of rodents, marsupials, bats and insectivores (Krantz, 1970), and show a high degree of host specificity (Table I, II). Blarinobia simplex exhibited a high percent of infestation in this survey the only ticks recovered were nymphs of Dermacentor variabilis (Table I, II).

The major ectoparasitic group with the second greatest number of representatives recovered in this study was Anoplura. Due to the fact that anoplurans show a high degree of host specificity, two host groups were found infested with their own specific anopluran (Table I, II). Jameson (1947) also found that M. ochrogaster supported only Hoplopleura acanthopus.

The Siphonaptera make up the remaining 0.5 percent of ectoparasites recovered in the present study. Ctenophthalmus pseudagyrtes is the most common flea of small mammals and at the same time the least host specific (Benton and Cerwonka, 1960). The flea Orchopeas leucopus has shown a strong preference for P. leucopus (Table II), and this example of host specificity is supported by Layne (1958) and Verts (1961). Because most flea activity usually occurs within the den or nest of the host animal, and since fleas seldom oviposit on their host, selecting instead the confines of the host's nest, it was not surprising that few fleas were recovered.

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Received for publication January, 1974.