

MITES OF THE SUBFAMILY LABIDOPHORINAE
(ACARIDAE, ACARINA)
IN NORTH AMERICA

BY

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AND

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ABSTRACT

There are few reports of mites of the Subfamily Labidophorinae in North America, and only one in which the specimens were identified to species even though members of this group often are very common on small mammals. It would appear that the scarcity of reports is because of insufficient collecting rather than scarcity of mites. Four species have been found during the present work. They are *Labidophorus soricis* Oudemans, 1915, primarily of *Cryptotis parva*, *Dermacarus hypudaei* Koch, 1841, abundant on *Zapodids* but also found on other small mammals, *Dermacarus hepneri* Zachvatkin, 1941 found on *Mus musculus*, and *Dermacarus ondatrae* sp. n. found on *Ondatra zibethica*.

RÉSUMÉ.

Il y a peu de références sur les Acariens de la sous-famille des Labidophorinae en Amérique du Nord, et dans un seul cas les spécimens ont été identifiés par leur nom d'espèce, bien que les représentants de ce groupe soient souvent très communs sur les petits mammifères. Il semblerait que la rareté des références soit due à l'insuffisance des récoltes plutôt qu'à la rareté des Acariens. Quatre espèces ont été trouvées au cours du présent travail. Ce sont *Labidophorus soricis* Oudemans, 1915 sur *Cryptotis parva*, *Dermacarus hypudaei* Koch, 1841, abondant sur les Zapodides mais aussi présent sur d'autres petits mammifères, *Dermacarus hepneri* Zachvatkin, 1941, trouvé sur *Mus musculus*, et *Dermacarus ondatrae* n. sp., trouvé sur *Ondatra zibethica*.

INTRODUCTION.

Mites of the subfamily Labidophorinae have been recorded from North America only a few times. DRUMMOND (1957) reported two species of *Dermacarus*, *Labidophorus* sp. and *Labidophorus sciurinus* (Koch, 1841) from the nests of *Peromyscus*

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leucopus. SCHOLTEN and McLEAN (1962) reported "Labidophorids" in Ontario on *Sorex palustris* (1 specimen), *Sorex cinereus* (2), *Tamiasciurus hudsonicus* (20), *Peromyscus maniculatus* (10), *Microtus pennsylvanicus* (7) and *Clethrionomys gapperi* (6). PARSONS (1962) reported *Labidophorus hypopi* from *Blarina brevicauda*, *Clethrionomys gapperi*, *Mustela vison*, *Ondatra zibethica* and *Zapus hudsonius*, and *Dermacarus* sp. from *Sorex cinereus*, and *Microtus pinetorum* all from Massachusetts. WHITAKER (1963 a) found mites of this group on 334 of 579 meadow jumping mice, *Zapus hudsonis*, from New York. Many of the mice harbored hundreds of individuals, and mice with abundant hypopi were found throughout the months the mice were active, or from April through October. WHITAKER (1963 b) found hypopi commonly on the Woodland Jumping Mouse, *Napaeozapus insignis*, also in New York. Of 101 mice of this species examined, 44 harbored hypopi. The mites were very abundant (more than 50 individuals) on three mice, and occurred in smaller numbers on the rest. HANSEN (1964) found one mite, *Dermacarus*, on *Microtus montanus* from Oregon.

Mites of this group are better known from Europe where they have been recently studied by several authors (e. g. ZACHVATKIN, 1941 ; TURK and TURK, 1957 ; and RUPES, 1967).

MATERIALS AND METHODS.

Material for the present study was taken during work on the mammals of Vigo County, Indiana (WHITAKER, 1967). The mammals were taken from randomly selected plots, in ordinary snap-back mouse-traps, checked once per day. Mice were placed in individual plastic bags in the field and were later examined in the laboratory using the 10 to 60 power of a Bausch and Lomb zoom dissecting microscope with 10 and 20x eyepieces. Dissecting needles were brushed through the fur and external parasites were sought from the level of the skin to the tips of the hairs.

Hypopi of this group could not be accurately counted. They were too numerous in many cases, and could not easily be removed from the hairs for later counting. A hypopus of this group clings to individual hairs by its clasping organ, making it very difficult to remove. For purposes of this study, hypopi were counted if they numbered less than five, were listed as few if they appeared to number between 5 and 50 and numerous if they appeared to number more than 50. For summary purposes, "few" mites were tabulated as 15 and "numerous" mites were tabulated as 50. The numbers given in the table are probably conservative estimates of the actual numbers present.

During this work only the hypopial stage has been observed, although several attempts have been made to find adults in *Zapus* nests and also to maintain hypopi until transformation to adults has taken place.

RESULTS AND DISCUSSION.

During the present work, as during the work in New York on *Zapus* and *Napaeozapus*, many hypopi were found. In Indiana two major species were found, *Labidophorus soricis*, (Oud., 1915) primarily of *Cryptotis parva*, and *Dermacarus hypudaei* (Koch, 1841) of zapodids and other small mammals. In addition, *D. heptneri* (Zachv., 1941) was found on *Mus musculus* and *Dermacarus ondatrae* n. sp. was found on *Ondatra zibethica*. *Dermacarus hypudaei* is the form reported as *Dermacarus* sp. from *Zapus hudsonius* and *Napaeozapus insignis* (WHITAKER, 1963 a, b), while *L. soricis* has been seen only from Indiana.

TABLE I :
Hypopi of Mites of the Subfamily *Labidophorinae*
from small mammals of Vigo County, Indiana.

	No. <i>Examined</i>	No. <i>Infested</i>	% <i>Infested</i>	No. <i>Mites</i>	<i>Density</i>
<i>Dermacarus hypudaei</i>					
<i>Blarina brevicauda</i>	27	1	3.7	1	0.04
<i>Microtus ochrogaster</i>	63	3	4.7	11	0.17
<i>M. pennsylvanicus</i>	24	1	4.2	6	0.25
<i>Peromyscus leucopus</i>	276	1	0.3	1	0.003
<i>P. maniculatus bairdi</i>	454	7	1.5	42	0.09
<i>Zapus hudsonius</i>	29	22	75.9	452	15.59
<i>Dermacarus ondatrae</i>					
<i>Ondatra zibethica</i>	1	1	100.00	5	5.00
<i>D. heptneri</i>					
<i>Mus musculus</i>	428	3	0.7	58	0.14
<i>Labidophorus soricis</i>					
<i>Blarina brevicauda</i>	27	2	7.4	2	0.07
<i>Cryptotis parva</i>	31	18	58.1	651	21.00

Apparently hypopi of the *Labidophorinae* have seldom been reported from North America because they are so tiny, and because they cling tenaciously to individual hairs. When mammals are put into a freezer or are skinned, the mites remain attached. It is suspected that they also often remain attached to the hairs during immersion in various liquids which are sometimes used to collect mites. The best way to find mites of this genus on small mammals is simply to look for them in the fur. Another possibility that has not been well pursued in North America is that of examining the nests, a successful method in Eurasia (RUPES, 1967).

NORTH AMERICAN SPECIES TAKEN FROM MAMMALS.

Dermacarus hypudaei (Koch, 1841) (Fig. 1). *D. hypudaei* has been taken on six species of small mammals in Vigo County, Indiana, during the present study (Table I). It reached its greatest densities on *Zapus hudsonius* of the forms examined.

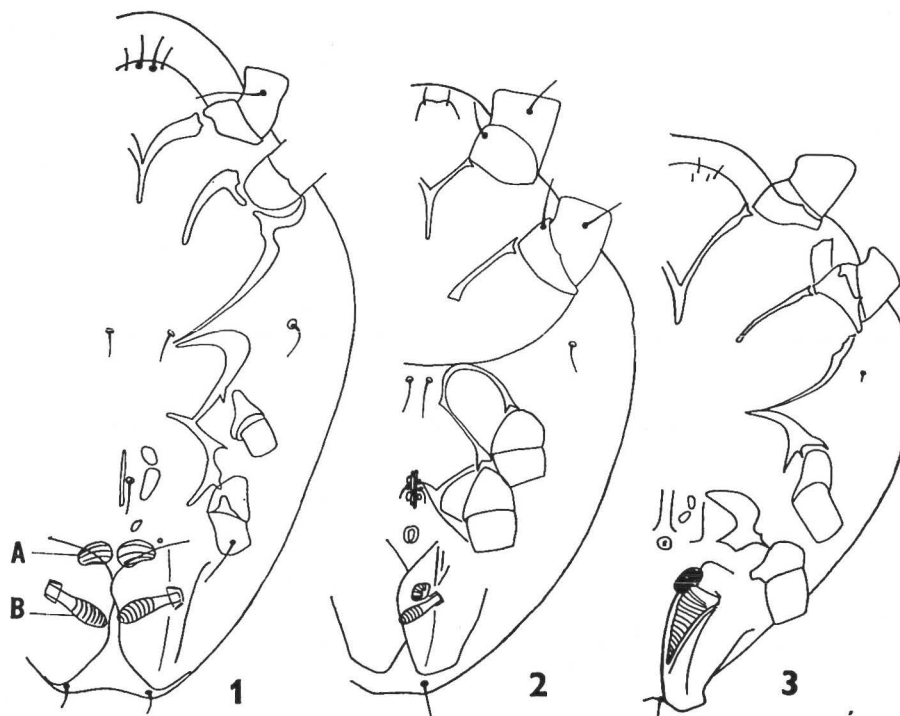


FIG. 1-3. — Hypopi, ventral view.

1. — *Dermacarus hypudaei* (C. L. Koch 1841) ; 2. — *Dermacarus heptneri* (Zachvatkui 1941) ;
3. — *Labidophorus soricis* Oudemans 1915.

A : The clinging appendages of pair I ; B : The clinging appendages of pair II.

Dermacarus heptneri (Zachvatkin, 1941) (Fig. 2). All specimens of this species were taken from the House Mouse, *Mus musculus*.

Labidophorus soricis Oudemans, 1915 (Fig. 3). This species was commonly taken on the Small Short-tailed Shrew, *Cryptotis parva*, but was also found on the Short-tailed Shrew, *Blarina brevicauda*.

***Dermacarus ondatrae* sp. n. (Figs. 4-8).**

Type Host : *Ondatra zibethica* L.

Type Locality : Indiana, Vermillion Co. 5 mi SW Clinton.

Hypopus :

Body broadly spindle-shaped : length $500\ \mu$: color : whitish.

Clinging apparatus : clinging appendages of pair I are near the frontal flap edges. They are circular with three transverse ribs. The clinging appendages of pair II are club-shaped and have II transverse ribs.

Tarsi I to III with apparent claws. Tarsi IV with short claws, not easily visible. The tarsus has a long terminal bristle.

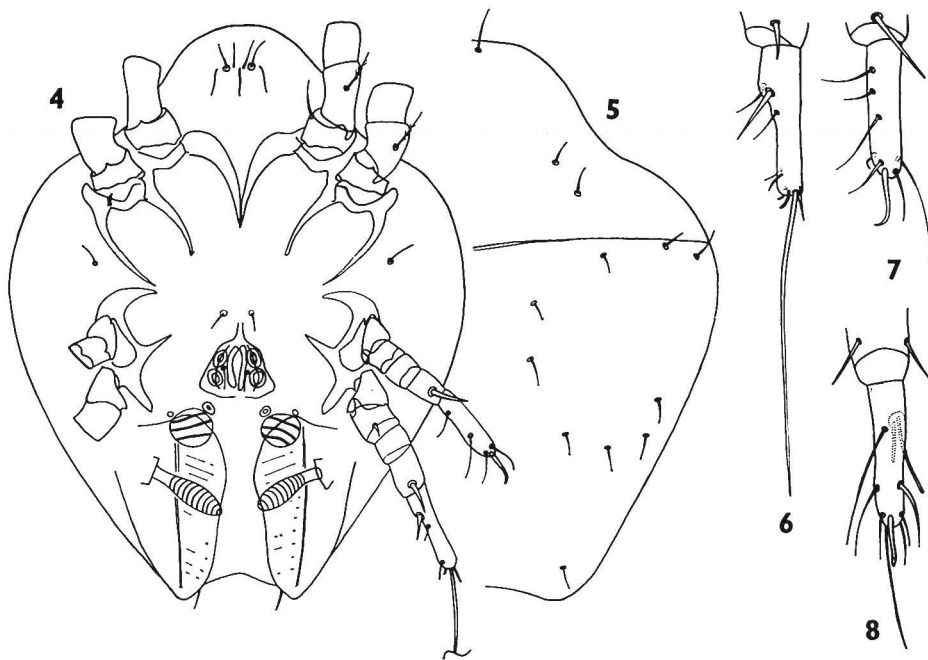


FIG. 4-8. — Hypopus of *Dermacarus ondatrae* sp. n.

4. — Ventral view ; 5. — Dorsal view ; 6. — Tarsus IV, lateral view ;
7. — Tarsus III, lateral view ; 8. — Tarsus I, ventral view.

Coxo-sternal skeleton : epimeres I touch in the middle of the body but do not join in a sternum ; epimeres II do not coalesce. Epimeres and epimerites II are joined by a ring surrounding coxa II. Epimeres III form a short, shallow arc. The coxo-sternal skeleton of pair IV forms a distinctive cross-like structure.

The hypopus resembles that of *Dermacarus hypudaei* (Koch, 1841) but differs as follows :

<i>D. hypudaei</i> (Koch)	<i>D. ondatrae</i> sp. n.
Body length 400 μ	Body length 500 μ
Pair II of clinging appendages with 8 ribs	Pair II of clinging appendages with 11 ribs
Sternum is formed	Sternum is not formed
Epimeres II and epimerites II are not joined	Epimerites II coalesce with epimeres III and both are joined with epimerites II and epimeres III on the opposite side of the the body.

IDENTIFICATION OF HYPOPI.

The following key should serve to separate the hypopi of the four species of mites of the subfamily Labidophorinae reported to date from the fur of mammals of North America.

- A. Appendages of pair II are triangular, have 15 to 25 ribs and at least partly overlap the appendages of pair I. The hysterosoma is not completely covered by the shield. The body is relatively broad..... genus *Labidophorus* Kramer, 1877
Labidophorus soricis Oud., 1915 : Body length approximately 200 μ , the appendages of a pair I have 15-17 ribs, appendages of pair II, 20-30 ribs.
- AA. Appendages of pair I are club shaped, have 6 to 12 ribs and are in front of appendages of pair II. The hysterosoma is completely covered by shield. The body is relatively narrow..... genus *Dermacarus*, Haller, 1879
- B. Coxal regions III are enclosed. Epimerites II are not developed, they are replaced by a fine, hardly discernible suture joining the left and right second coxae in an arc. The appendages of pair I are immediately in front of the appendages of pair II. Tarsus IV terminates in a fine short claw. Body Length is approximately 300 μ *D. heptneri* (Zachv. 1941)
- BB. Coxal regions III are not enclosed. Epimerites II point obliquely backwards. The appendages of pair I are under the front edge of the flap.
- C. Sternum developed. The bases of epimeres II and epimerites II are not joined. Epimeres III protrude forward in a deep arc. Appendages of pair II with 8 ribs. Body length is approximately 400 μ *D. hypudaei* (C. L. Koch 1841).
- CC. Sternum not developed. The bases of epimeres II and epimerites II are joined. Epimeres III form a short shallow arc. Appendages of pair II with 11 ribs. The body structure is more robust than in *D. hypudaei*. Body length is approximately 500 μ **D. ondatrae** sp. n.

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