

A. FAIN, & J. O. WITHAKER, Jr.

PHORETIC HYPOPI,
OF NORTH AMERICAN MAMMALS
(ACARINA : SARCOPTIFORMES,
GLYCYPHAGIDAE)

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PHORETIC HYPOPI OF NORTH AMERICAN MAMMALS
(ACARINA : SARCOPTIFORMES, GLYCYPHAGIDAE)

BY

A. FAIN¹ and J. O. WHITAKER², JR.

ABSTRACT.

Two new species and one new genus of pilicolous hypopi (Glycyphagidae) are described in this paper : *Xenoryctes latiporus* sp. n. from *Scalopus aquaticus* (typical host) and *Spermophilus tridecemlineatus* and *Scalopacarus obesus* g. n., sp. n. from *Scalopus aquaticus*. The number of phoretic hypopi known from North American mammals is now 18. Among these, three species are hypopi living in the hair follicles ; the fifteen others are pilicolous hypopi. Besides the two new species two forms of pilicolous hypopi are reported for the first time in North America, *Marsupialichus brasiliensis* on *Didelphis marsupialis*, and *Labidophorus talpae* on *Parascalops breweri*. Other pilicolous species known from North America are *D. hypudaei*, *D. hylandi*, *D. newyorkensis*, *D. sciurinus*, *D. sylvilagi*, *D. mexicanus*, *D. tamiasciuri*, *D. ondatrae*, *Marsupialichus johnstoni*, *Orycteroxenus soricis* and *O. canadensis*. The three forms living in hair follicles are *Microlabidopus americanus*, *Aplodontopus latus* and *A. sciuricola*.

INTRODUCTION.

The presence of hypopi living in the hair follicles of North American mammals was first reported by FAIN (1967 *b* and 1967 *c*).

RUPES and WHITAKER (1968) summarized information on pilicolous hypopi phoretic on mammals in North America and described a new species from the muskrat. They reported a total of four species in this group from North America.

FAIN (1969 *a*) published a monograph on the hypopi living in phoretic association with mammals. In that paper several new American species were described and taxonomic changes were made.

In the present paper we describe two new species and a new genus of pilicolous hypopi and bring together information on all the phoretic hypopi presently known from North America. Also included is a key to the species.

The types of the two new species are deposited in the U. S. National Museum, Washington, D. C.

Genus *Labidophorus* KRAMER, 1877.

1. *Labidophorus talpae* Kramer, 1877.

This species was previously known only from moles and shrews from Eurasia. We have taken it from the hairy-tailed mole, *Parascalops breweri*, for the first record in North America.

1. *Institut de Medecine tropicale Prince Leopold, Antwerpen.*

2. *Department of Life Sciences, Indiana State University Terre Haute, Indiana.*

The species is characterized by having the coxal area of legs IV completely enclosed by epimera and epimerites IV (Fig. 1). FAIN (1969 c) figures the adult of this species and outlines its life history.

Records of *Labidophorus talpae* in North America

Parascalops breweri

New York

new record (15 individuals)

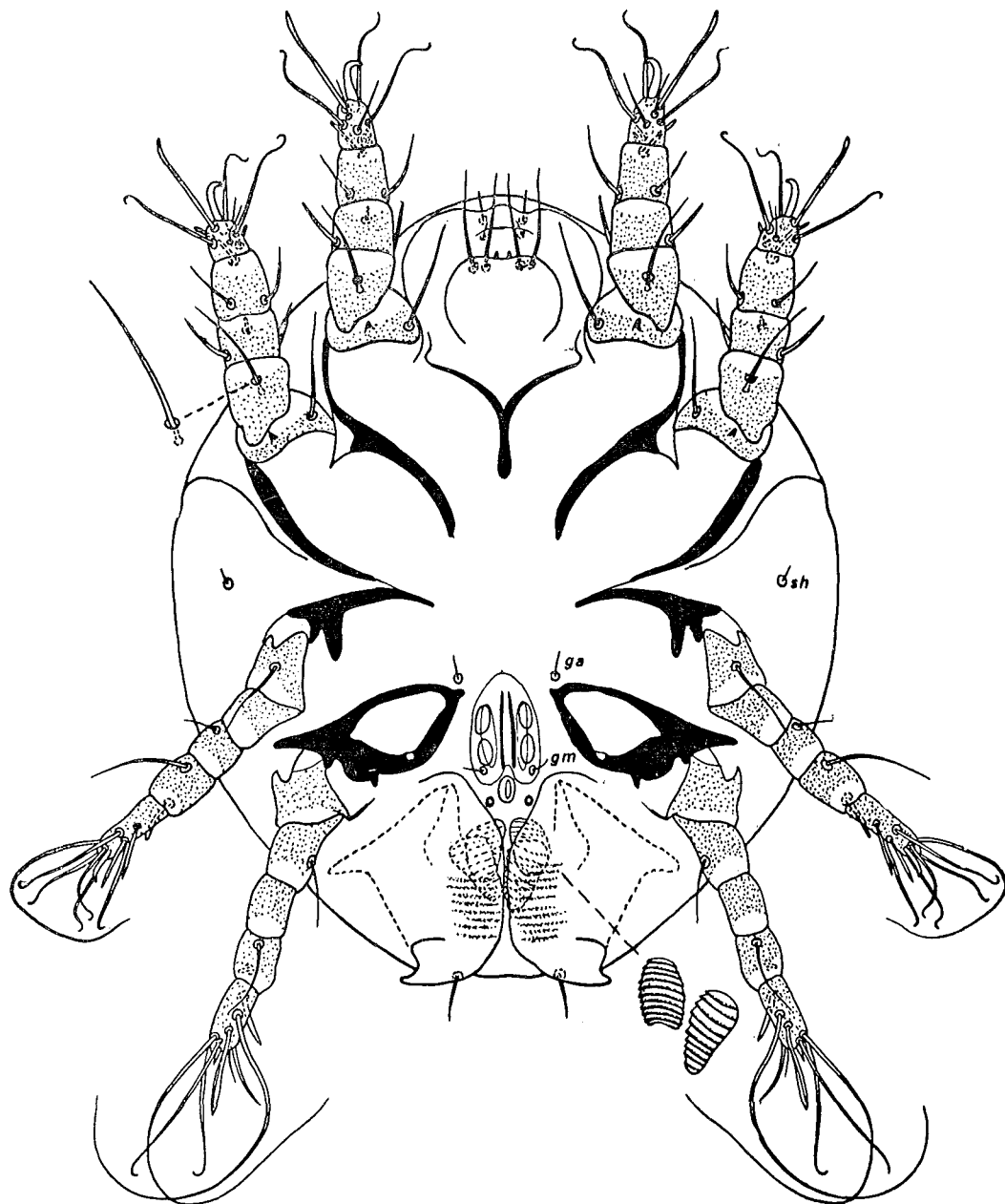


FIG. 1 : Ventral view of hypopus of *Labidophorus talpae* Kramer.
Length from 230 to 255 μ (Figure from Fain, 1969a).

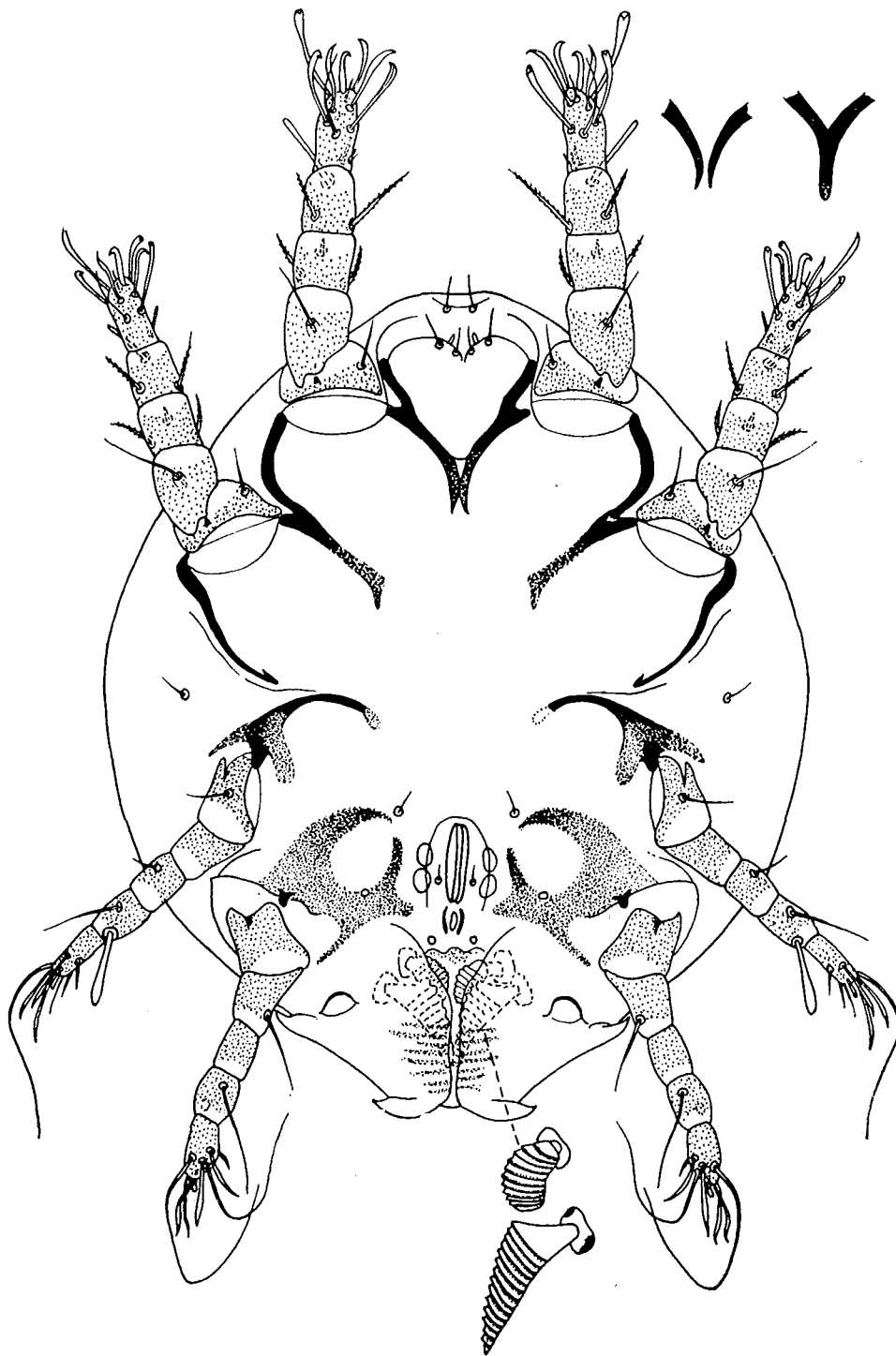


FIG. 2 : Ventral view of hypopus of *Orycteroxenus soricis* (Oudemans). Length of 3 individuals ranged from 192 to 214 μ . (Figure from Fain, 1969a).

Genus *Orycteroxenus* ZACHVATKIN, 1941.

1. *Orycteroxenus soricis* (Oudemans, 1915).

RUPES and WHITAKER (1968) reported this species from North America as *Labidophorus soricis*. FAIN (1969 *a*) redescribed the species (Fig. 2) and reported two new hosts from U.S.A. This is a species primarily of shrews.

North American records of *Orycteroxenus soricis*.

<i>Blarina brevicauda</i>	Indiana	Rupes and Whitaker, 1968 Whitaker and Mumford, 1972 <i>a</i> Whitaker and Wilson, 1968
	Ontario	Fain, <i>et al.</i> , 1971
	Rhode Island	Fain, 1969 <i>a</i>
<i>Cryptotis parva</i>	Indiana	Rupes and Whitaker, 1968 Whitaker and Mumford, 1972 <i>a</i> Whitaker and Wilson, 1968
	Rhode Island	Fain, 1969 <i>a</i>
	Indiana	new record (1 individual)
<i>Microtus pennsylvanicus</i>	Minnesota	Whitaker and Pascal, 1971
<i>Microtus pinetorum</i>	Indiana	Whitaker and Mumford, 1972
<i>Sorex arcticus</i>	Minnesota	Whitaker and Schmeltz, 1973
<i>Sorex longirostris</i>	Indiana	
<i>Sorex palustris</i>	Minnesota	

FAIN (1969 *a*) described from *Sorex cinereus* a new subspecies *O. soricis ohioensis* which differs from the typical form by the shape of epimera I which are fused into a Y with a well-formed sternum, by the absence of projections on trochanters III and IV and by the presence of a triangular cuticular process on the lateral parts of coxa IV.

Records of *O. soricis ohioensis* from North America.

<i>Sorex cinereus</i>	Indiana	Whitaker and Mumford, 1972
	Minnesota	Whitaker and Pascal, 1971
	Ohio	Fain, 1969 <i>a</i>
	Ontario	Fain, <i>et al.</i> , 1971

2. *Orycteroxenus canadensis* Fain, Kok, Lukoschus, and Clulow, 1971.

This species is known only from the star-nosed mole, and is easily recognized from *O. soricis* by the widely separated epimera of legs I (Fig. 3).

Records of *Orycteroxenus canadensis* from North America

<i>Condylura cristata</i>	New York	new record (153 individuals)
	Ontario	Fain, <i>et al.</i> , 1971



FIG. 3 : Ventral view of hypopus of *Orycteroxenus canadensis* Fain, et. al ;
Length of 10 paratypes averaged 205 μ . (Figure from Fain, 1969a).

Genus **Scalopacarus** gen. nov.

This genus is close to both *Orycteroxenus* and *Labidophorus* but is closer to the first genus. The *ve* setae are present. The palposoma bears two pairs of hairs and one pair of solenidia. The claws of tarsi III and IV are much smaller and less curved than claws I and II. Epimera and epimerites IV converge and nearly meet. The clasping apparatus has the posterior extremities produced into triangular hooks directed laterally. We have not seen lateral hooks just ahead of the clasping organ on each side, which are present in *Orycteroxenus*.

This genus is distinguished from *Orycteroxenus* mainly by the chaetotaxy of the legs. Legs I and II bear two long and narrowly membranous hairs, three very small spines, and two short hairs. Tarsi IV bear one very long and strong hair and six much shorter hairs. The tibia IV bears a very long and moderately thick hair.

In none of the known species of *Orycteroxenus* and *Labidophorus*, do the tarsi and tibiae IV bear a very long hair. *Type species* : *Scalopacarus obesus* spec. nov.

Scalopacarus obesus spec. nov.

This species is known only from the hypopus (Figs. 4-6). **HYPOPUS** : The holotype is 250 μ long and 210 μ wide. *Dorsal surface* : Sejugal furrow well developed dorsally. There seems to be a transverse furrow in the posterior region of the dorsum. In the posterior third of the hysterosoma there are two small paramedian punctate shields, triangular in shape. *Ventral surface* : epimera I fused into a Y. Epimera II and III as described above. Clasping apparatus well developed, with the posterior corners produced into a blunt hook antero-laterally directed ; internal claspers with 11-13 transverse ribs, the external claspers with 9-11 ribs. Anterior legs rather thick, the posterior ones thinner. Trochanters III and IV without processes. Tarsal claws I-II thick, each with curved apex ; claws III-IV thinner, shorter and only very slightly curved.



FIG 4 : Ventral view of hypopus of *Scalopacarus obesus* n. sp.

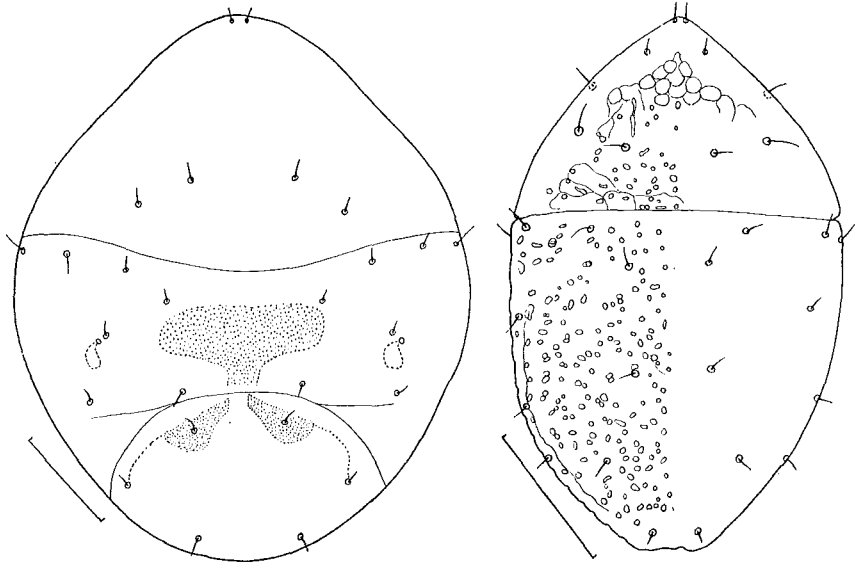


FIG. 5 : Dorsal view of *Scalopacarus obesus* n. sp. (left) and *Xenoryctes latiporus* n. sp. (right). Lines represent 50 μ .

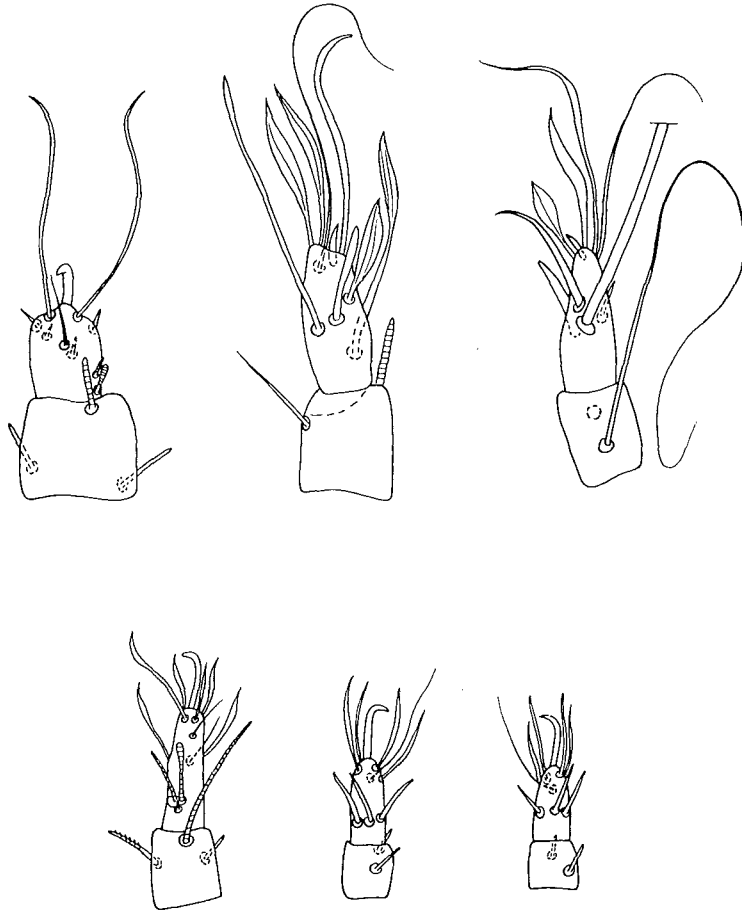


FIG. 6 : Tarsi I, III and IV of *Scalopacarus obesus* n. sp. (above) and *Xenoryctes latiporus* n. sp. (below).

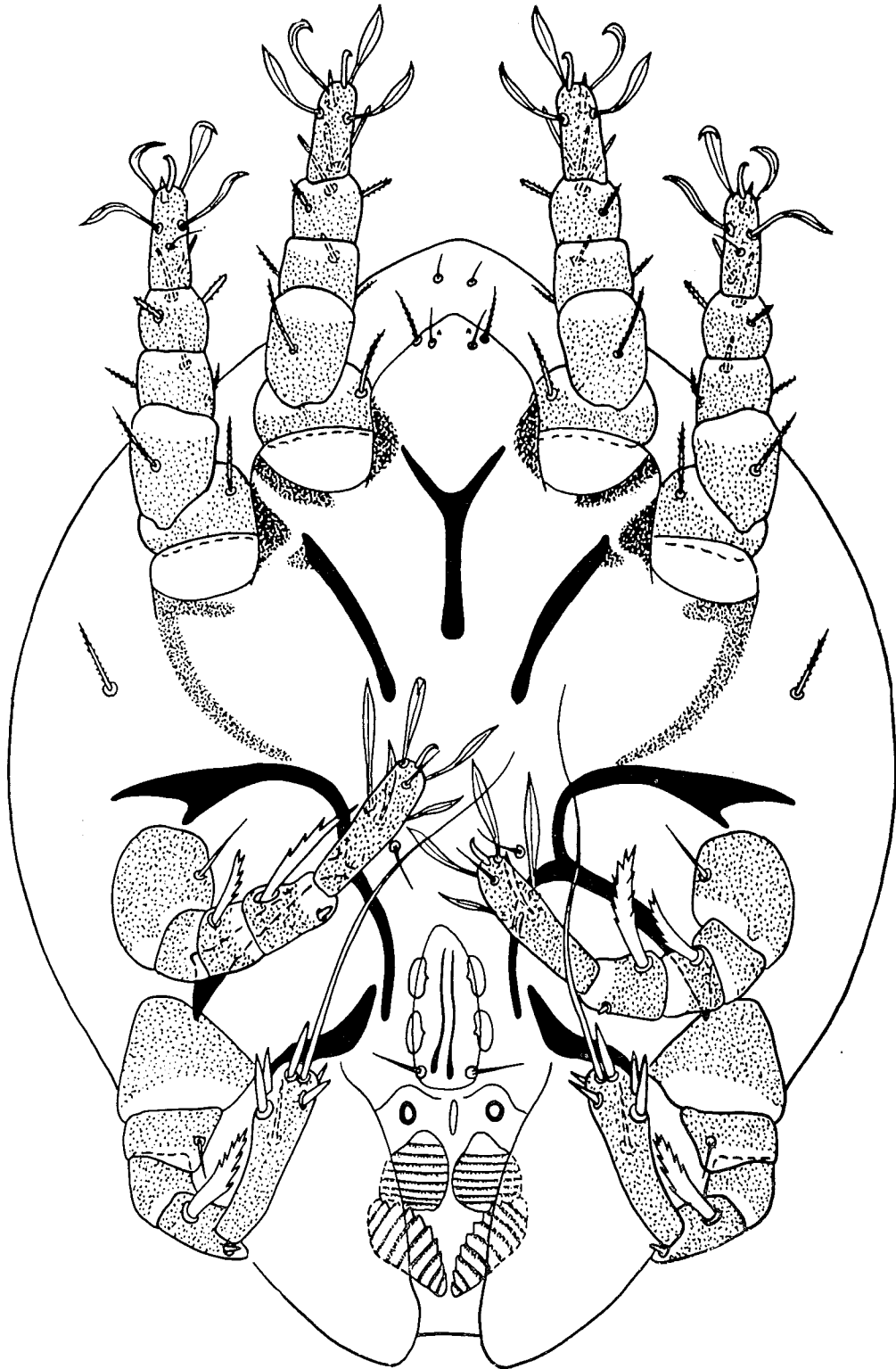


FIG. 7 : Ventral view of hypopus of *Marsupialichus brasiliensis* Fain. (Figure from Fain, 1969a).

Chaetotaxy and *solenidiotaxy* : palposoma with two pairs of long simple setae and one pair of short solenidia. Setae *vi* and *ve* very short. Dorsal setae short and thin except 15 which is stout and has an expanded flat extremity. We have not observed setae on coxa I nor the *gm* setae. Tarsi I-II with 7 setae. Dorsally there are two long, narrowly foliate subapical setae and one short simple median seta ; ventrally there are three very short and small spines and one very short thin seta. Tarsi III with eight setae (seven foliate and one simple). Tarsi IV with eight setae : four foliate, one spinose, three simple among which one is short, one moderately long, and one very strong and approximately 170 μ long. Tibia IV also bears a very long seta (120 μ), thinner than that of the tarsus. Tarsus I with two short solenidia situated basally (*w* 3 and *w* 1). Tibia I with *phi* a little longer than the tarsal *w* 1. *Sigma I* very short. *Host and locality* :

Scalopus aquaticus, Ind. Park Co, Rockville, U.S.A. 12.X.1971 (JOW n^o 7311) (Coll. J. Whitaker, Jr.) (Holotype and five paratypes, all hypopi) ; Ind. Vigo Co, Terre Haute, 18.X.1971 (JOW n^o 7588) (1 paratype) and 17.IX.1972. (20 paratypes).

Genus *Marsupialichus* FAIN, 1967.

1. *Marsupialichus brasiliensis* Fain, 1967.

This species was described from *Didelphis azarae* from Brazil, only at the type locality. The species is here reported from North America for the first time. It is easily recognized from other hypopi so far taken in North America by having the claws on legs III much smaller than those on legs I and II, and having the epimera of legs III meeting to form a coxal ring and those of legs IV nearly meeting (Fig. 7).

Records of *Marsupialichus brasiliensis* from North America.

Didelphis marsupialis Indiana new record (8 individuals)

2. *Marsupialichus johnstoni* Fain, 1969.

This species (Fig. 8) was described from an armadillo from Texas. It differs from *M. brasiliensis* in having epimerites IV much less developed, and coxae IV not nearly enclosed. Also the clasping apparatus is much smaller and the spines on the posterior tibiae and genera are not barbed.

Records of *M. johnstoni* in North America.

Dasybus novemcinctus Texas Fain, 1969 *a, b*

Genus *Xenoryctes* ZACHVATKIN, 1941.

1. *Xenoryctes latiporus* spec. nov.

Dermacarus sp. Whitaker, 1972.

Dermacarus heptneri, Rupes and Whitaker, 1968, Whitaker, 1970, nec Zachvatkin, 1941 ; Hilton and Mahrt, 1971.

This species presents all the characters of the genus *Xenoryctes* (see ZACHVATKIN, 1941) :

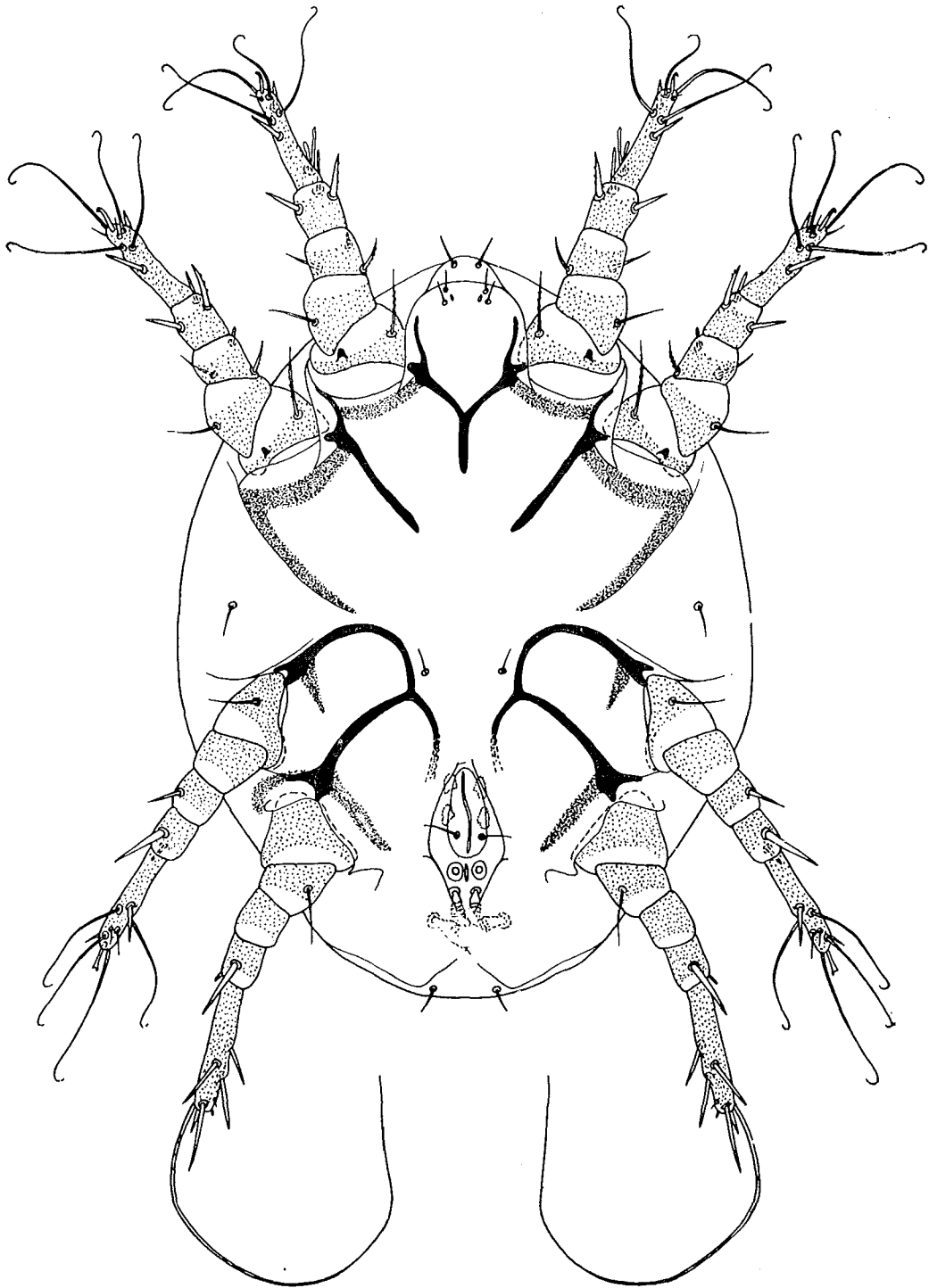


FIG. 8 : Ventral view of hypopus of *Marsupialichus johnstoni* Fain.
Length of 3 paratypes ranged from 261 to 290 μ . (Figure from Fain, 1969a).

seta *ve* are present ; there are two pairs of setae and one pair of solenidia on the palposoma ; epimera I are fused in a Y ; epimera III and IV are convergent but not fused ; tarsal claws III and IV are equal and not greatly smaller than claws I.

The genus *Xenoryctes* contains two species : *X. krameri* Michael and *X. punctatus* Fain, both known only from Europe.

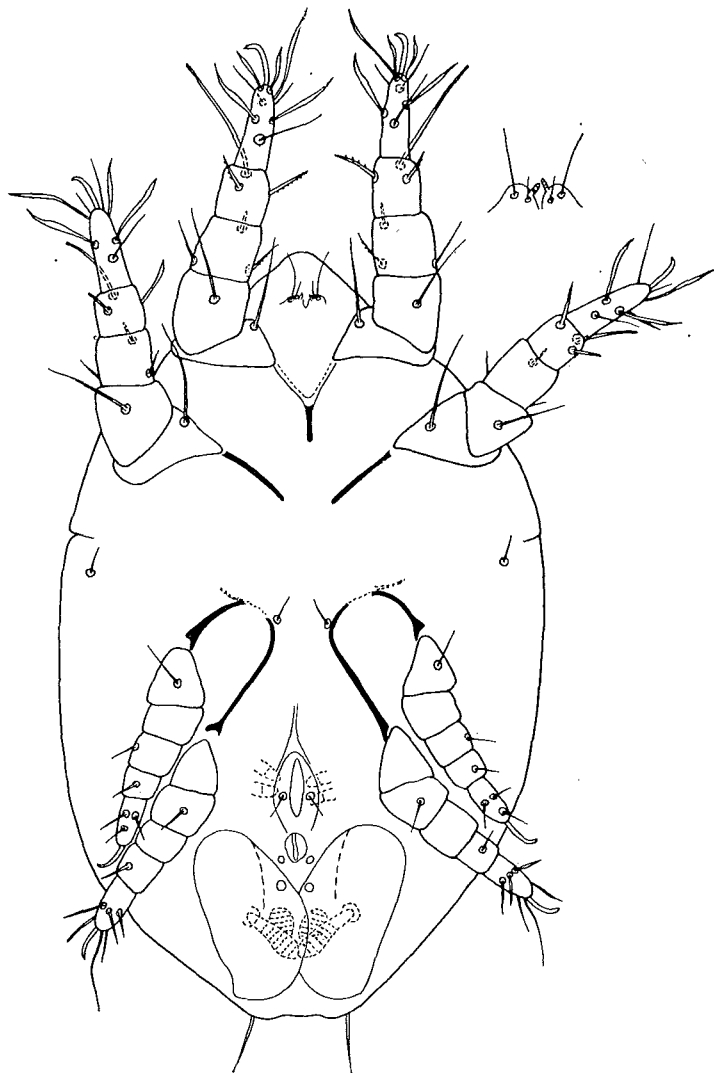


FIG. 9 : Ventral view of hypopus of *Xenoryctes latiporus* n. sp.

X. latiporus has the dorsal cuticle densely pitted as in *X. punctatus*. However, it is distinguished from that species mainly by the greater size and more irregular shape of the dorsal pits, the smaller size of the body, the smaller number of ribs on the claspers, and the relatively smaller length of solenidia *phi* of tibiae I.

Hypopus (holotype) (Figs. 5, 6, 9) : Length 174 μ , width 111 μ . The entire body is very poorly sclerotized. Anterior extremity narrowly conical ; posterior extremity straight. *Dorsum* : sejugal furrow well developed. The surface of the dorsum is densely covered with small irregular pits. In the anterior part of the propodosoma the pits are replaced

by a scaly structure. *Venter* : as in *X. punctatus*. Epimera III and IV are convergent but not fused. Claspers with 6-8 transverse ridges. Legs closely resembling those of *X. punctatus* but shorter : tarsi I-IV respectively 19 μ -18 μ -12 μ -13 μ long.

Chaetotaxy and *solenidiotaxy* : outer palposomal setae longer (12 μ) than the inner setae (3, 5-4 μ) ; palposomal solenidia very short (2-3 μ). All dorsal setae are very short. Legs : setae as in *X. punctatus* but the solenidia of tibia I are distinctly shorter.

Host and locality :

- 1) *Scalopus aquaticus*, Ind., Newton Co., Willow Slough, U.S.A. ; 31 July 1971 (JOW n^o 7152) (holotype and one paratype, hypopi) (Coll. J. Whitaker, Jr.).
- 2) *Spermophilus tridecemlineatus*, Ind. Vigo Co., Terre Haute, U.S.A. ; 30 September 1969 (3 hypopi, and paratypes) (Coll. J. Whitaker, Jr.).

Other records of *Xenoryctes latiporus* in North America.

<i>Mus musculus</i>	Indiana	Rupes and Whitaker, 1968 Whitaker, 1970 Whitaker and Wilson, 1968
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Genus *Dermacarus* HALLER, 1880.

Dermacarus Haller, 1880 ; 261 ; Fain, 1969 *b* : 47.

Myacarus Zachvatkin, 1941 : 495, nom n. pro *Homopus* Koch 1841, praeocc.

Zibethacarus Rupes, Yunker, and Wilson, 1971 : 17.

RUPES, YUNKER, and WILSON (1971) were successful in rearing hypopi of *Dermacarus ondatrae* Rupes and Whitaker to the adult stage. From the study of the adults they concluded that this species should be placed in a new genus *Zibethacarus*.

It is to be noted that *Dermacarus hypudaei* (Koch) known only from the hypopus, is the type of the genus *Myacarus* Zachvatkin, 1941. As this species is very close to *D. ondatrae* and certainly not separable from the latter at generic level, at least in the hypopi, it seems probable that *Zibethacarus* is a synonym of *Myacarus*.

The genus *Myacarus* has been synonymized with *Dermacarus* by Fain (1969 *a* and *b*) owing to the fact that the life cycle of *D. hypudaei* was not known and that the characters separating the hypopi of both *D. hypudaei* and *D. sciurinus* were of minor importance.

Judging from the drawings and descriptions of the adults of *Dermacarus ondatrae*, the type species of *Zibethacarus*, it does not appear that they differ by important characters from those of *Dermacarus sciurinus*. As *D. ondatrae* is probably much closer to *D. hypudaei* than to *D. sciurinus* one may surmise that these two species belong to the same genus which by the law of priority should be *Myacarus*.

We think that the most reasonable procedure is to maintain provisionally *Zibethacarus* as a synonym of *Myacarus* and to reconsider the situation after the life cycle of *Dermacarus hypudaei* has been elucidated.

The following species of *Dermacarus* have been found in North America. :

1. *Dermacarus hypudaei* (Koch, 1841).

RUPES and WHITAKER (1968) recorded this species (Fig. 10) from a series of host in N. America, including *Zapus hudsonius* and *Napaeozapus insignis*. FAIN (1969 *b*) described a new species,

D. newyorkensis from *Microtus pennsylvanicus* (typical host) and *Zapus hudsonius*. The hypopi recorded as *D. hypudaei* from *Zapus* and *Napaeozapus* are really *D. newyorkensis*. We give here a corrected list of the hosts of *D. hypudaei* on mammals of North America.

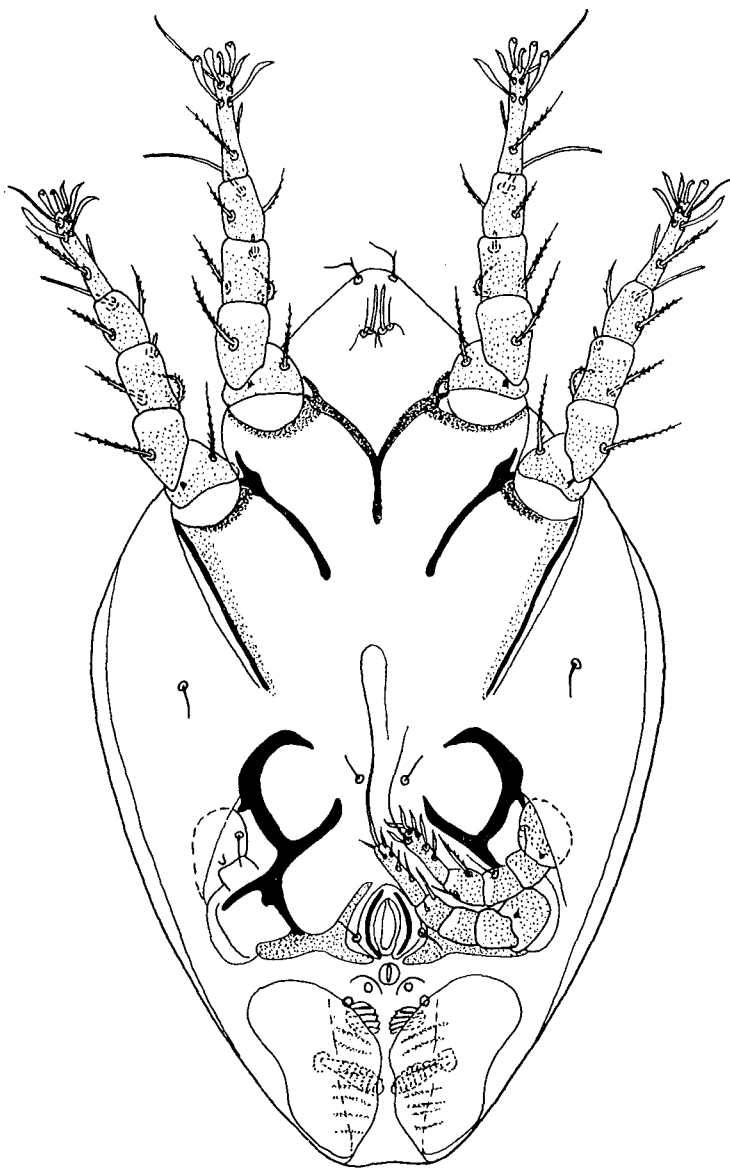


FIG. 10 : Ventral view of hypopus of *Dermacarus hypudaei* (Koch).
Specimens from 8 different hosts ranged from 280 to 360 μ . (Figure from Fain, 1969a).

Records of *Dermacarus hypudaei* in North America :

Insectivora.

Blarina brevicauda

Indiana

Rupes and Whitaker, 1968

Whitaker and Mumford, 1972 a

	Minnesota	Whitaker and Wilson, 1968 new record (1 individual)
<i>Condylura cristata</i>	New York	new record (4 individuals)
<i>Cryptotis parva</i>	Indiana	Whitaker and Mumford, 1972
<i>Sorex cinereus</i>	Indiana	new record (4 individuals)
<i>Carnivora</i>		
<i>Urocyon cinereoargenteus</i>	Indiana	new record (4 individuals)
<i>Rodentia</i>		
<i>Baiomys taylori</i>	Texas	new record (29 individuals)
<i>Clethrionomys gapperi</i>	Minnesota	new record (6 individuals)
	New York	new record (77 individuals)
	Rhode Island	Fain, 1969 <i>a</i>
<i>Microtus ochrogaster</i>	Indiana	Rupes and Whitaker, 1968
	Kentucky	Whitaker and Wilson, 1968 new record (156 individuals)
<i>Microtus pennsylvanicus</i>	Indiana	Rupes and Whitaker 1968
	Rhode Island	Whitaker and Wilson, 1968
	Fain, 1969 <i>a</i>	
<i>Microtus pinetorum</i>	Indiana	new record (62 individuals)
	Kentucky	new record (12 individuals)
	Rhode Island	Fain, 1969 <i>a</i>
<i>Mus musculus</i>	Indiana	Whitaker, 1970
<i>Ochrotomys nuttalli</i>	Kentucky	new record (209 individuals)
<i>Peromyscus leucopus</i>	Indiana	Rupes and Whitaker, 1968
	Whitaker and Wilson, 1968	
	Rhode Island	Fain, 1969 <i>a</i>
<i>Peromyscus maniculatus</i>	Indiana	Rupes and Whitaker, 1968
	Whitaker and Wilson, 1968	
<i>Reithrodontomys megalotis</i>	Indiana	Whitaker and Mumford, 1972 <i>b</i>
<i>Spermophilus columbianus</i>	Alberta	Hilton and Mahrt, 1971
<i>Spermophilus richardsoni</i>	Alberta	Hilton and Mahrt, 1971

In addition, Fain described a new subspecies, *D. hypudaei neotropicalis*, with one record as follows :

<i>Rattus norvegicus</i>	Rhode Island	Fain, 1969 <i>a</i>
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2. *Dermacarus hylandi* Fain, 1969.

This species (Fig. 11) was described from *Clethrionomys gapperi* from Rhode Island (Fain, 1969 *a*). It is similar to *D. hypudaei* (Fig. 10), but the anterior claspers are elongate (about 13 μ long and 7 μ wide with four or five transverse striations) and rounded posteriorly. In *D. hypudaei*, the anterior claspers are more nearly equal in length and width, and are concave posteriorly.

Records of *Dermacarus hylandi* in North America.

<i>Clethrionomys gapperi</i>	Rhode Island	Fain, 1969 a
<i>Tamias striatus</i>	Indiana	new record (2 individuals)
	Ontario	Fain, <i>et al.</i> , 1971

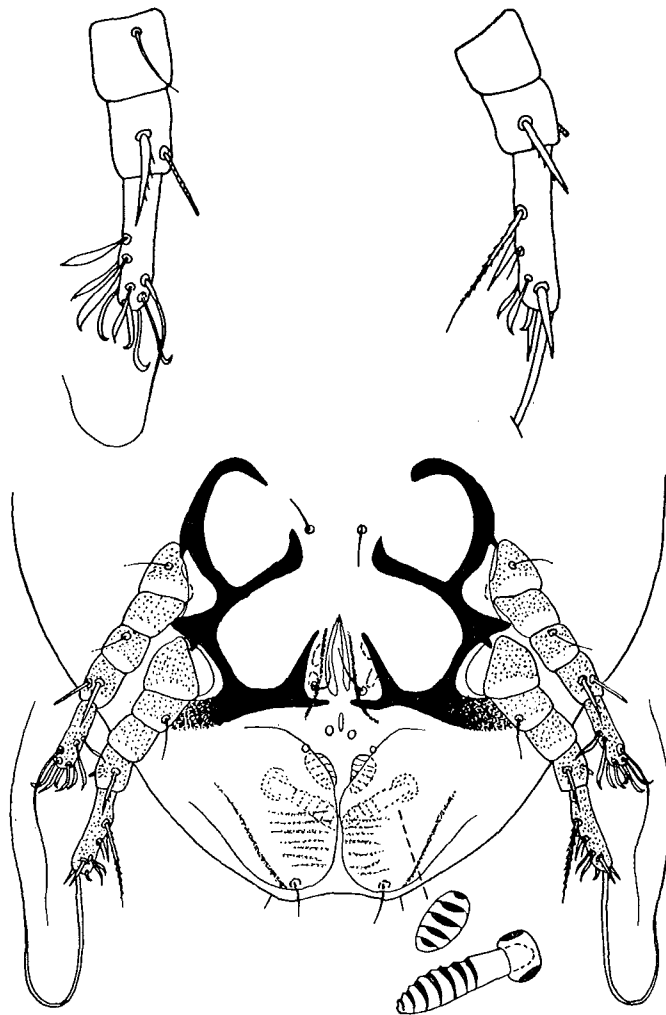


FIG. 11 : Leg III (left) and IV (right), and ventral view of hypopus of *Dermacarus hylandi* Fain. Length from 285 to 330 μ . (Figure from Fain, 1969a).

3. *Dermacarus ondatrae* Rupes and Whitaker, 1968.

(Equals *Zibethacarus ondatrae*, Rupes, Yunker, and Wilson, 1971). This species was described from the muskrat, *Ondatra zibethica* from Vermillion County, Indiana. We have discussed above the generic status of this species.

Records of *Dermacarus ondatrae* in North America.

<i>Ondatra zibethica</i>	Indiana	Rupes and Whitaker, 1968
		Whitaker and Wilson, 1968

Montana	Rupes, Yunker, and Wilson, 1971
Ohio	new record (9 individuals)
Ontario	Fain, <i>et al.</i> , 1971
Rhode Island	Fain, 1969 <i>a</i>
Indiana	new record (1 individual)

Mustela vison

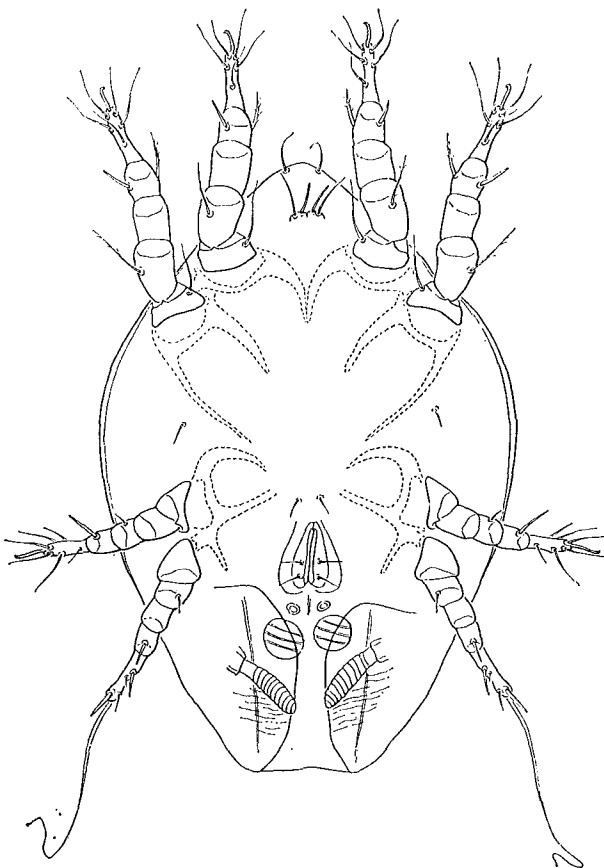


FIG. 12 : Ventral view of hypopus of *Dermacarus ondatrae* Rupes & Whitaker.
Length from 415 to 570 μ . (Figure from Rupes, Yunker and Wilson, 1971).

The record from the mink, *Mustela vison*, likely is from predation on the muskrat.

It is to be noted that the slide containing the types of *Listrophorus validus* Banks 1910 contains two hypopi of *Dermacarus ondatrae*. Moreover, it seems that the description and figures given by Banks for *L. validus* have been partly made from these hypopi (FAIN, 1970).

4. *Dermacarus newyorkensis* Fain, 1969 *b*.

This species is distinguished from *D. hypudaei* mainly by the following characters : the preapical dorsal hair of tarsus I is a short spine (it is a fine hair in *D. hypudaei*) ; solenidia *w* 1 and *w* 3 of tarsus I are situated in the apical half of the segment (in the basal half in *D. hypudaei*). Also, the bases of epimeres and epimerites II are not joined. *D. newyorkensis* is primarily a form of jumping mice, *Zapodidae*, although it was originally described from *Microtus pennsylvanicus*.

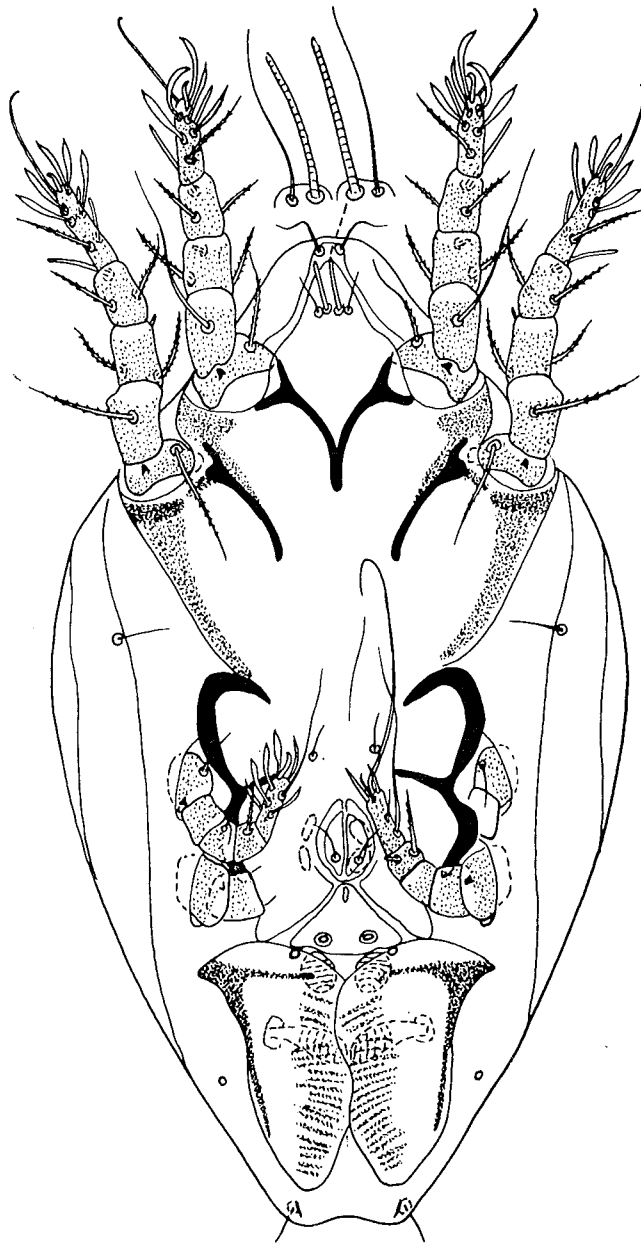


FIG. 13 : Ventral view of hypopus of *Dermacarus newyorkensis* Fain.
Length of type 358 μ . (Figure from Fain, 1969a).

Records of *Dermacarus newyorkensis* in North America.

<i>Microtus pennsylvanicus</i>	New York	Fain, 1969 <i>b</i>
<i>Napaeozapus insignis</i>	New York	Whitaker, 1963 <i>b</i>
	North Carolina	new record (60 individuals)
<i>Peromyscus maniculatus</i>	Ontario	Fain, <i>et al.</i> , 1971
<i>Sorex palustris</i>	Minnesota	Whitaker and Schmeltz, 1973

Zapus hudsonius

Indiana

Rupes and Whitaker, 1968
Whitaker and Mumford, 1971
Whitaker and Wilson, 1968
new record (3 individuals)
Fain, 1969 *a, b*
Whitaker, 1963 *a*

Minnesota

New York

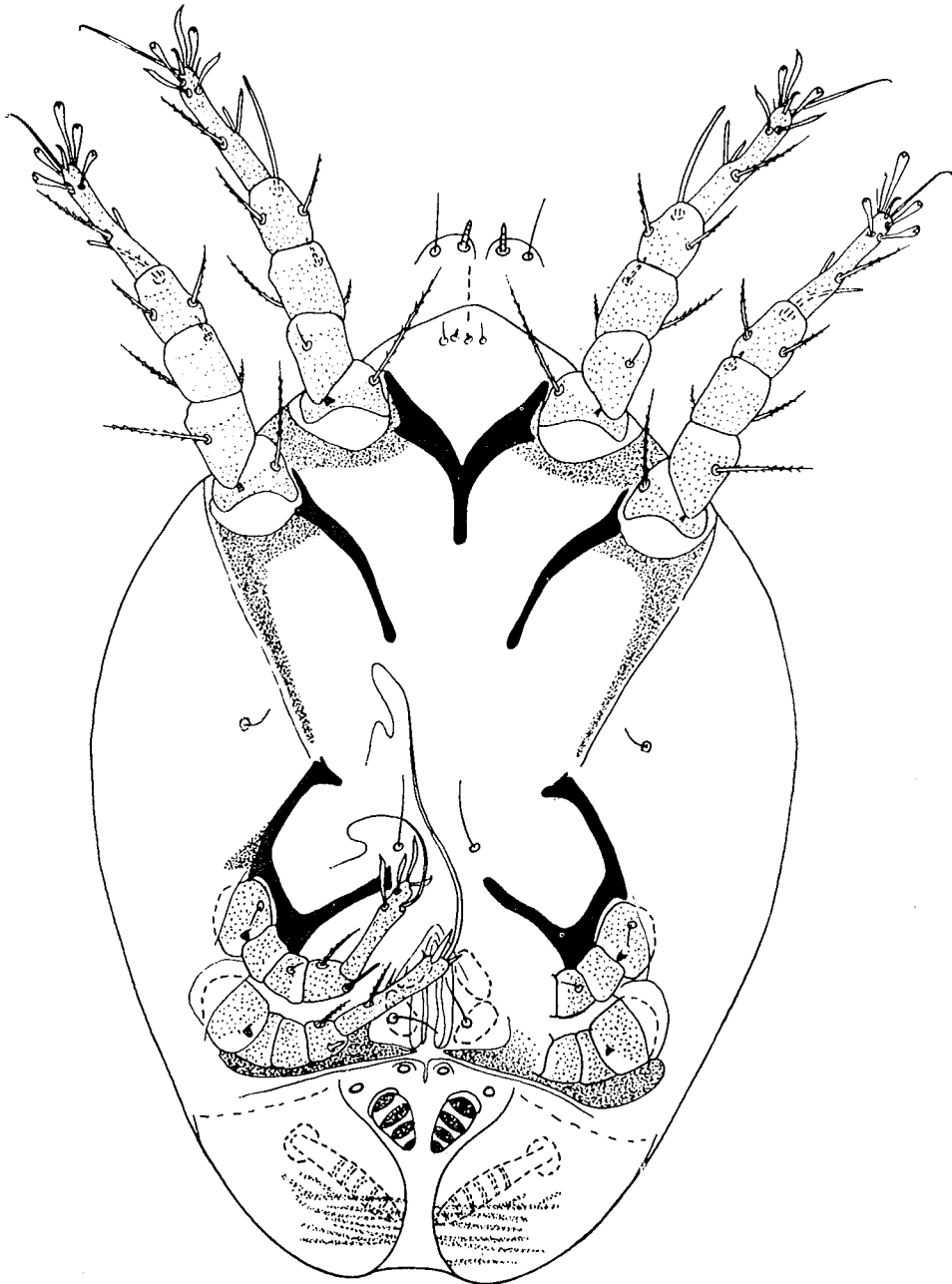


FIG. 14 : Ventral view of hypopus of *Dermacarus sylvilagi* Fain.
Length of type 298 μ . (Figure from Fain, 1969*a*).

Ontario
Rhode Island
Washington

Fain, *et al.*, 1971
Fain, 1969 *a*
new record (2 individuals)

Zapus trinotatus

5. *Dermacarus sylvilagi* Fain, 1969.

This species (Fig. 14) was described from the cottontail rabbit from Mexico.

Record of *Dermacarus sylvilagi* in North America.

Sylvilagus floridanus

Yucatan

Fain, 1969 *a*

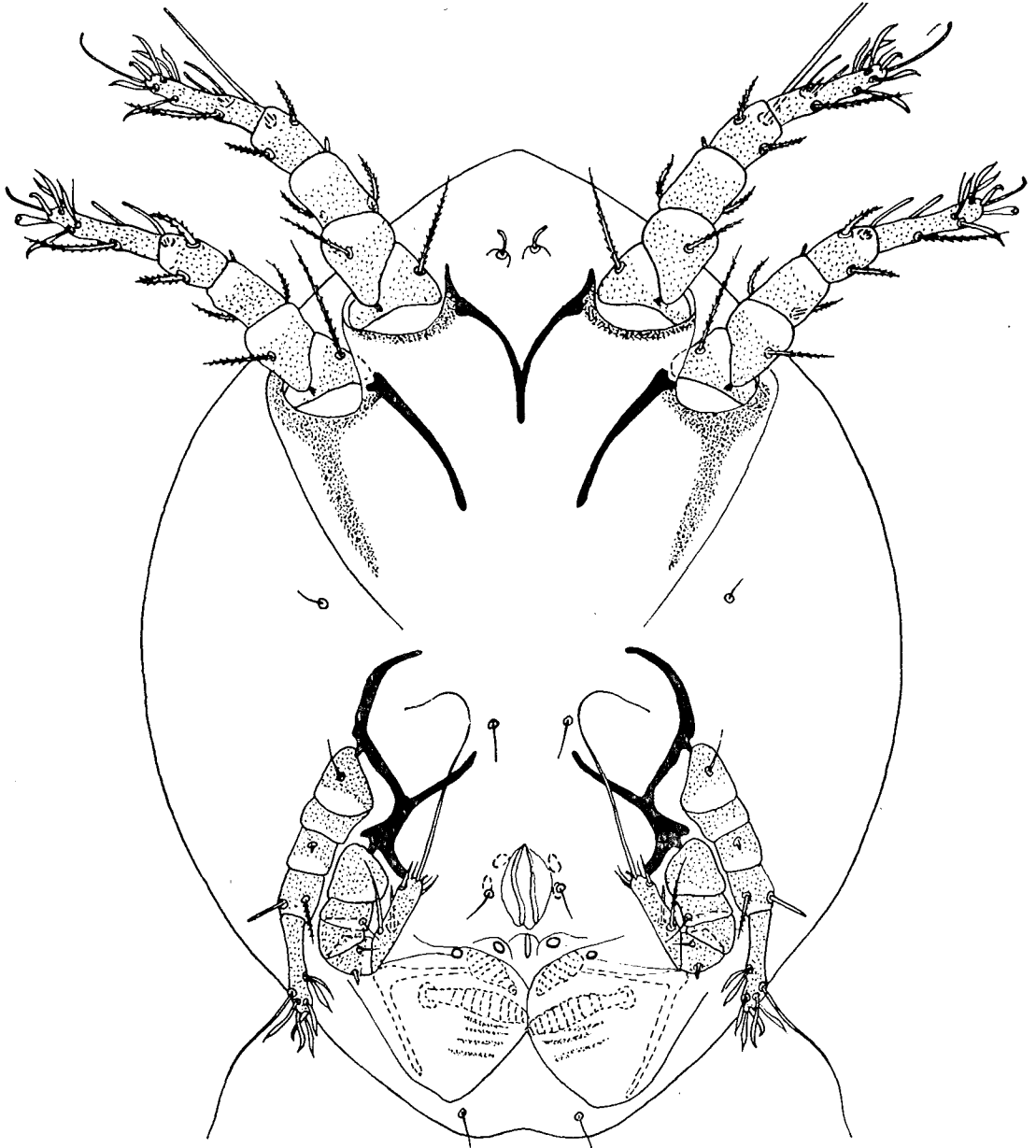


FIG. 15 : Ventral view of hypopus of *Dermacarus mexicanus* Fain.
Length of type 270 μ . (Figure from Fain, 1969*a*).

6. *Dermacarus mexicanus* Fain, 1969.

This form (Fig. 15) is known only from Mexico.

Record of *Dermacarus mexicanus* in North America.

Baiomys musculus

Oaxaca

Fain, 1969 a

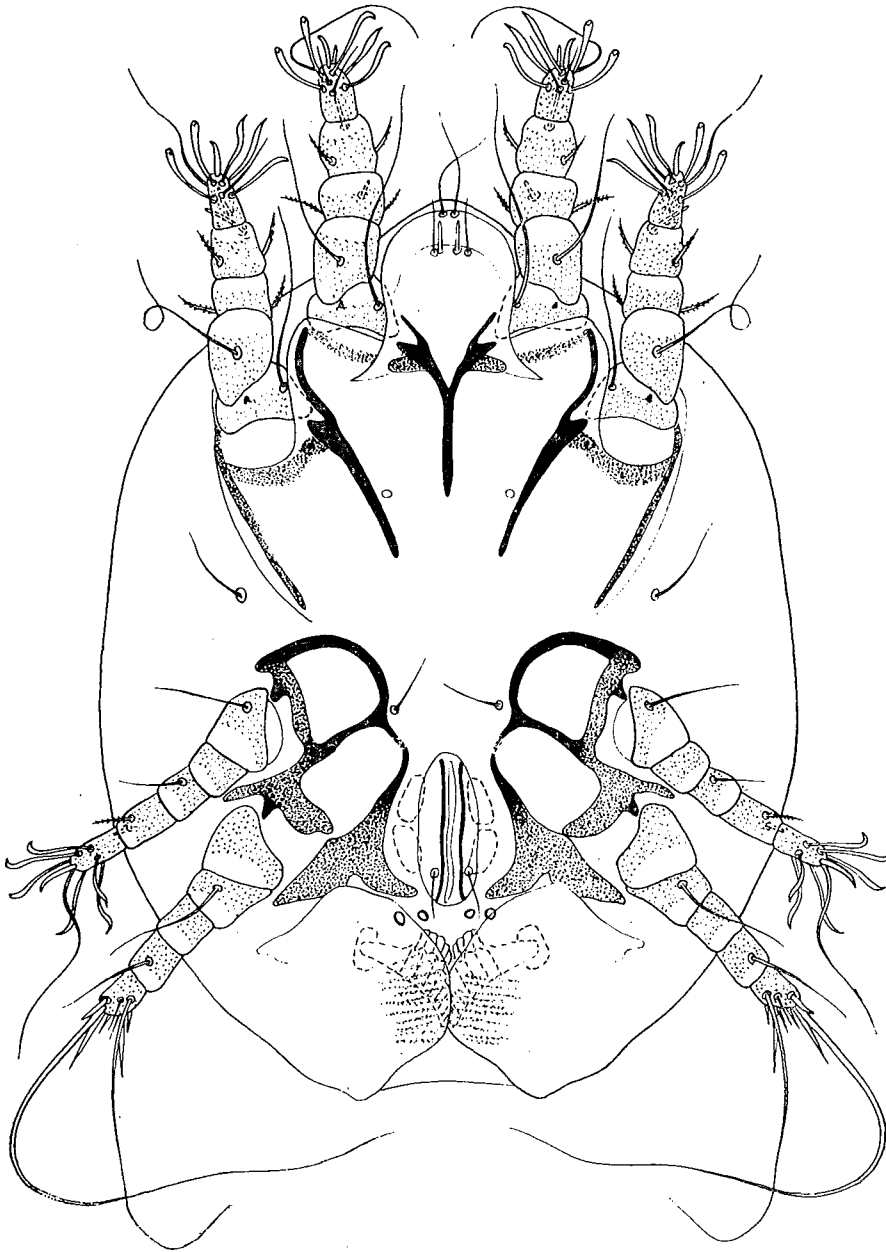


FIG. 16 : Ventral view of hypopus of *Dermacarus sciurinus* (Koch).
Length in 6 individuals ranged from 270-315 μ . (Figure from Fain, 1969a).

7. *Dermacarus sciurinus* Koch, 1841.

We have not seen specimens of this species (Fig. 16) from North America and we know of only one report of it, that of Drummond (1957) from a small mammal nest.

Record of *Dermacarus sciurinus* in North America.

Peromyscus leucopus (nest) Maryland Drummond, 1957

8. *Dermacarus tamiasciuri* Rupes, Yunker, and Wilson, 1971.

We have not seen this species, but we present here the illustration (Fig. 17) from Rupes, Yunker, and Wilson (1971). We wonder if it is not the true *D. sciurinus*, whose typical host

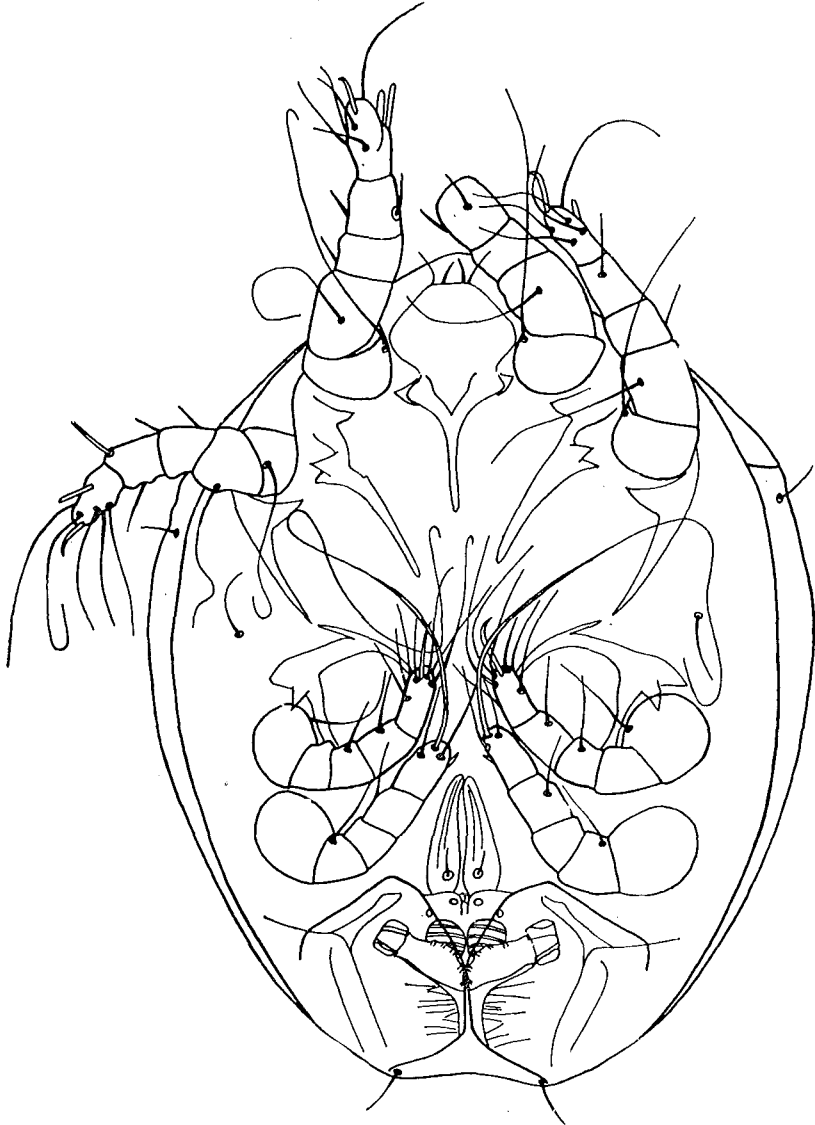


FIG. 17. : Ventral view of hypopus of *Dermacarus tamiasciuri* Rupes, Yunker and Wilson. Length of holotype 270 μ long. (Figure from Rupes, Yunker and Wilson, 1971)

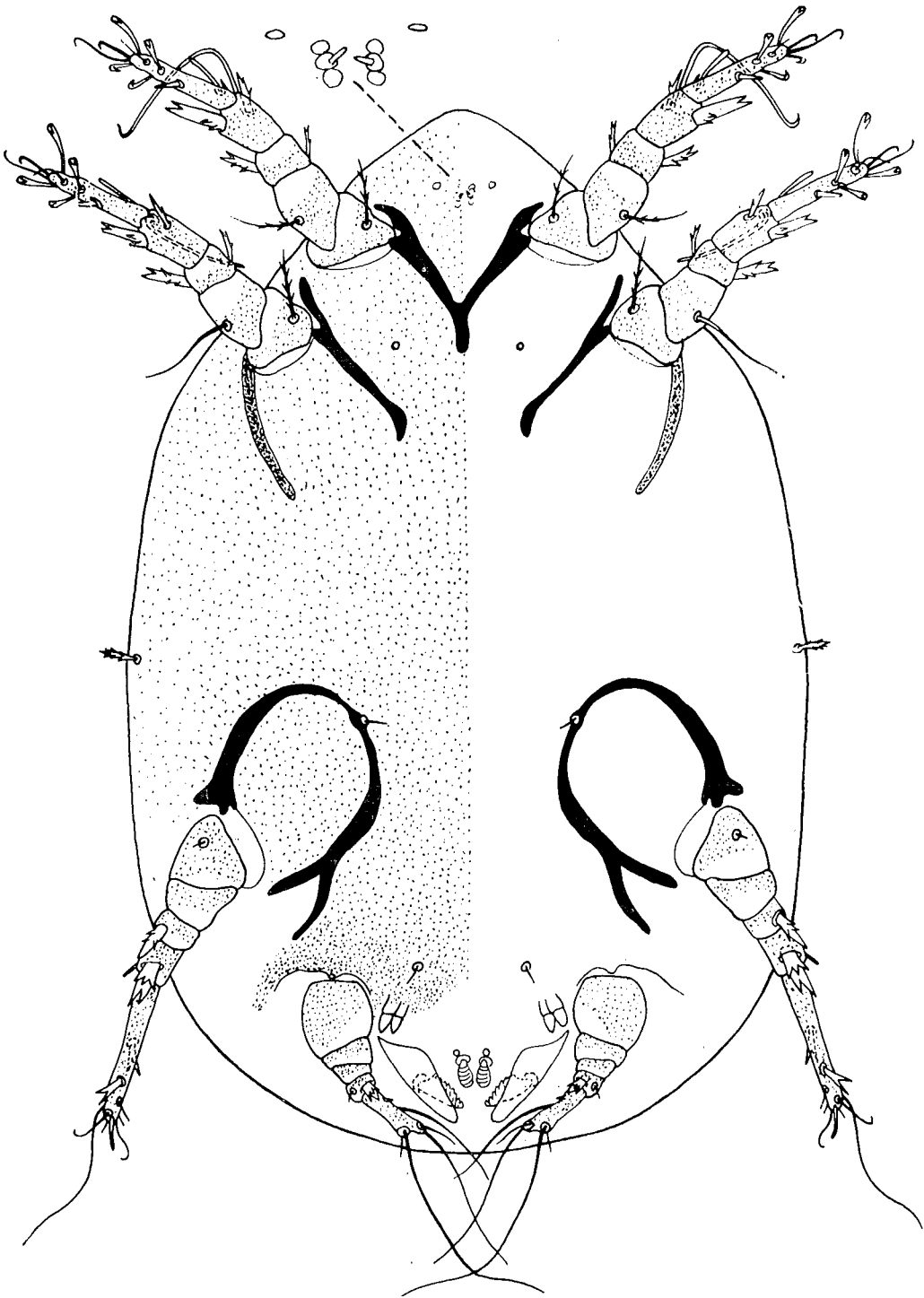


FIG. 18 : Ventral view of hypopus of *Microlabidopus americanus* Fain.
Length of type 351 μ . (Figure from Fain, 1969a).

is a European sciurid. The size of the body is identical and the epimera and epimerites III are fused as in that species. The claspers have less ribs than in *D. sciurinus* but this character should be rechecked on the types.

Record of *Dermacarus tamiasciuri* in North America.

Tamiasciurus hudsonicus Michigan Rupes, Yunker, and Wilson, 1971

Genus *Microlabidopus* FAIN, 1967.

1. *Microlabidopus americanus* Fain, 1967.

This species (Fig. 18) has been found in the hair follicles of the venter of the Mountain Beaver, *Aplodontia rufa*.

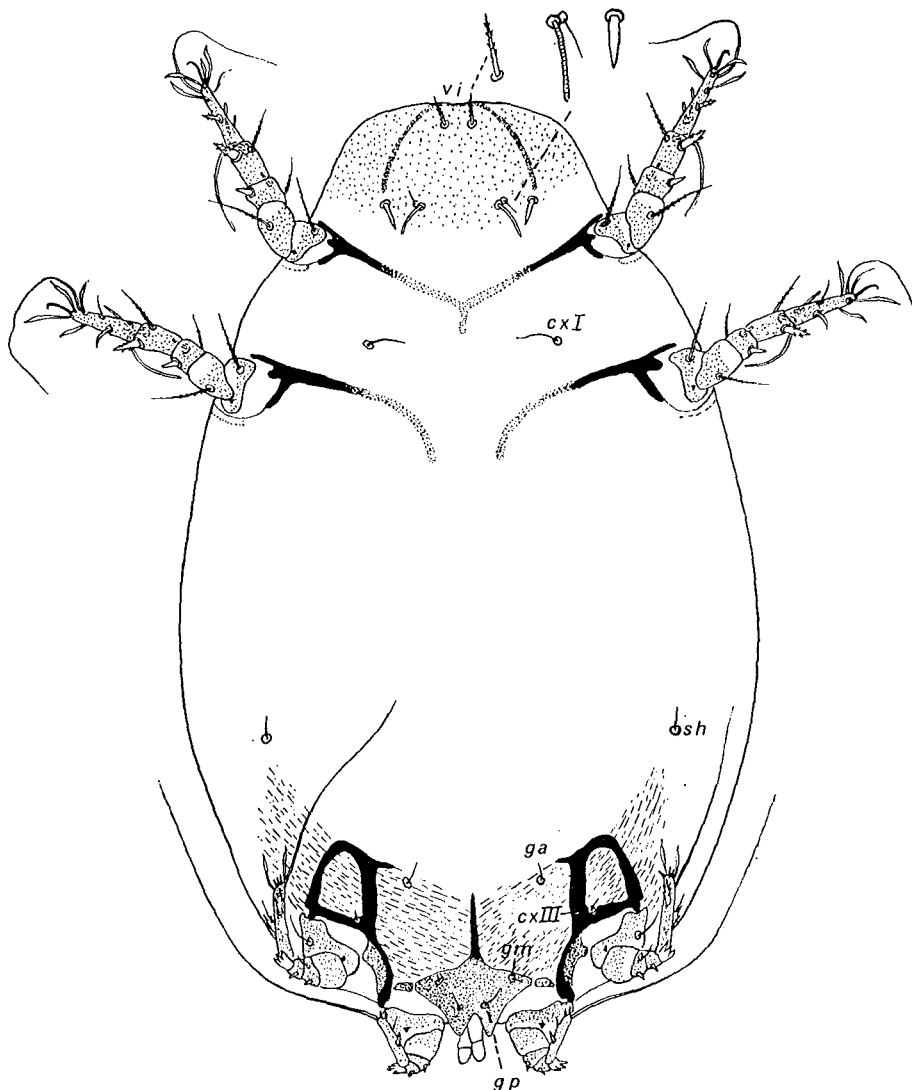


FIG. 19 : Ventral view of hypopus of *Aplodontopus latus* Fain.
Length of type and 2 paratypes from 375 to 405 μ . (Figure from Fain, 1969a).

Records of *Microlabidopus americanus* in North America.

<i>Aplodontia rufa</i>	Canada	Fain, <i>et al.</i> , 1971
	Oregon	Fain, 1967 <i>b</i> , 1969 <i>a</i>

Genus *Aplodontopus* FAIN, 1967.

1. *Aplodontopus latus* Fain, 1967.

This species (Fig. 19) is known only from the typical host *Aplodontia rufa* in Canada and in U.S.A. The specimens were associated with hypopi of *Microlabidopus americanus*. All the hypopi were located in the hair follicles of the venter.

Records of *Aplodontopus latus* in North America.

<i>Aplodontia rufa</i>	British Columbia	Fain, 1967 <i>c</i>
	Oregon	Fain, 1969 <i>a</i>

2. *Aplodontopus sciuricola* Hyland and Fain, 1968.

The typical host of this species is *Tamias striatus*, where the hypopus occurs in the hair follicles. This species (Fig. 20) has also been found on the same host in Canada (Fain *et al.* 1971).

Records of *Aplodontopus sciuricola* in North America.

<i>Tamias striatus</i>	Ontario	Fain, <i>et al.</i> , 1971
	Rhode Island	Hyland and Fain, 1968

KEY TO THE PHORETIC HYPOPI FROM
NORTH AMERICAN MAMMALS

(Partly adapted after FAIN, 1969 *a*, pp. 21-25 and 48-51).

(N.B. : The species *Dermacarus tamiasciuri* RUPES *et al.* is inadequately described, and is not included in this key.)

1. Claspings apparatus on ventral face of opisthosoma very small or completely absent. Hypopi living in the hair follicles..... 2
- Claspings apparatus well developed and consisting of a pair of large superficial membranous and movable folds and two pairs of deeper ribbed claspers. Hypopi living attached to the hairs... 4
2. Pilicolous apparatus normally developed but very small. Genital suckers situated laterally, close to the trochanters IV.....
- Genus *Microlabidopus* FAIN, 1967 (One species) *M. americanus* FAIN, 1967
- Pilicolous apparatus completely absent. Genital suckers terminal median.....
- Genus *Aplodontopus* FAIN, 1967 (3)
3. Setae *v i* 13-15 μ long ; external palposomal setae 11-15 μ long. Pregenital sclerite not bifurcate. Palposoma never more than twice as wide as long..... *A. latus* FAIN, 1967
- Setae *v i* 17-21 μ long ; external palposomal setae 17-20 μ long. Pregenital sclerite slightly bifurcate. Palposoma at least three times as wide as long.....
- A. sciuricola* HYLAND and FAIN, 1968
4. Claws I and III equal or subequal..... 5
- Claws III much shorter than claws I..... 14
5. Claws III and IV equal or subequal. Dorsum intensively pitted *Xenoryctes latiporus* sp. n.
- Claws IV much shorter than claws III. Dorsum not pitted..... 6

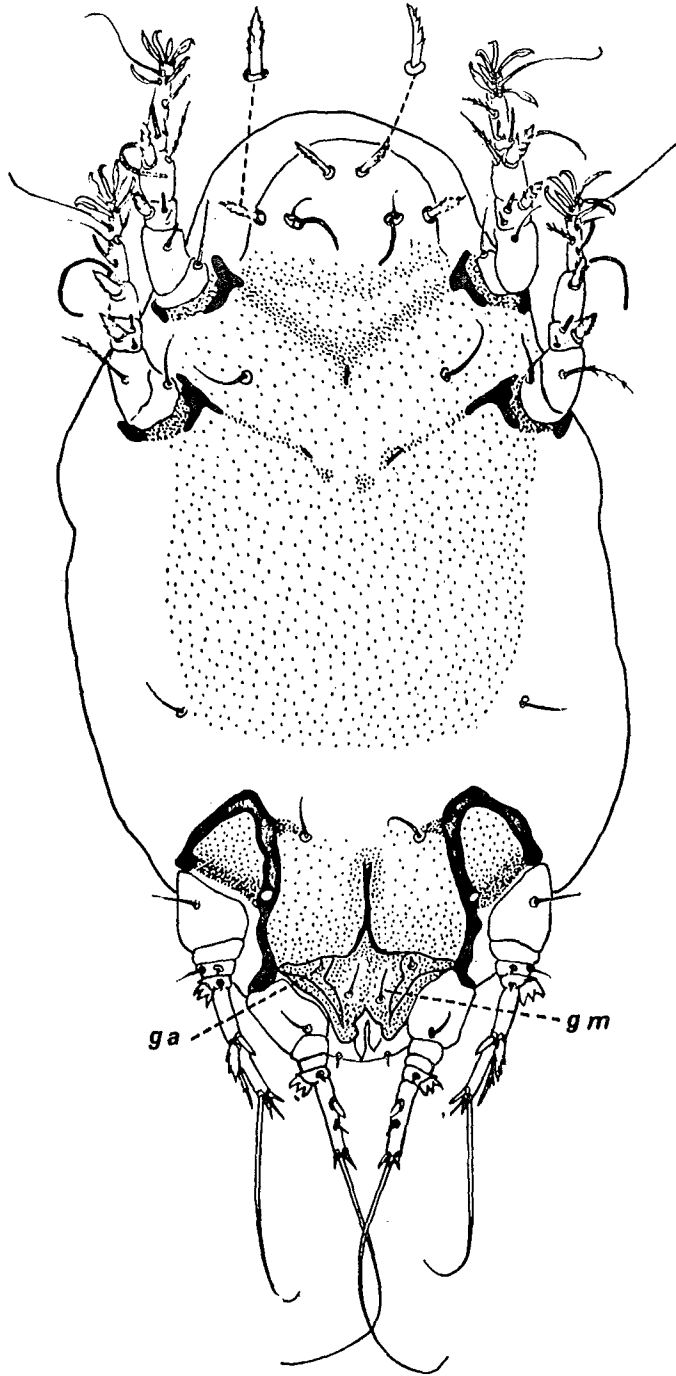


FIG. 20 : Ventral view of hypopus of *Aplodontopus sciuricola* Hyland & Fain. Length in 7 individuals ranged from 338 to 394 μ . (Figure from Hyland and Fain, 1968).

6. Coxal region III completely enclosed by the fusion of epimera and epimerites III..... 7
 Coxal region III not closed, the epimera and epimerites III not meeting..... 9
7. Epimera and epimerites IV nearly meeting ; coxa IV is nearly enclosed..... 8
 Epimera and epimerites IV widely separate..... *Marsupialichus johnstoni* FAIN, 1969
8. Palposoma (equals gnathosoma) with one external pair of setae and one internal pair of well-developed solenidia. Tibia IV with a normal hair. Tarsi IV slightly longer than wide.....
Dermacarus sciurinus (Koch, 1841)
 Palposoma with two pairs of setae and one pair of vestigial solenidia. Tibia III and IV with a strong barbed spine. Tarsi IV more than three times longer than wide.....
Marsupialichus brasiliensis FAIN, 1967
9. Seta of femur I simple and 80 to 90 μ long ; seta of femur II barbed and 35 to 42 μ long.....
Dermacarus newyorkensis FAIN, 1969
 Seta of femur I much shorter..... 10
10. Palposoma with one pair of solenidia but without hairs... *Dermacarus mexicanus* FAIN, 1969
 Palposoma with one pair of simple hairs and on pair of solenidia..... 11
11. Epimera III abruptly expanded near its apex. Femoral hair I very thin, not barbed and short (11 μ) ; femoral hair II barbed and longer (36 μ)..... *Dermacarus sylvilagi* FAIN, 1969
 Epimera III not abruptly expanded near its apex. Femoral hairs I and II barbed, subequal and moderately long..... 12
12. Larger size (415 to 500 μ long). Epimera I fused into a V. External claspers with 11 ribs.....
Dermacarus ondatrae RUPES and WHITAKER, Jr., 1968
 Smaller size (285 to 360 μ long). Epimera I fused into Y. External claspers with 6-9 ribs.. 13
13. Internal claspers wider than long, with 5 transverse ribs. External claspers with 9 transverse ribs.
Dermacarus hypudaei (Koch, 1841)
 Internal claspers longer (13 μ) than wide (7 μ), with 4-5 transverse ribs. External claspers with 6-7 transverse ribs..... *Dermacarus hylandi* FAIN, 1969
14. Epimera and epimerites IV fused and forming a ringlike coxal area.....
Labidophorus talpae KRAMER, 1877
 Epimera and epimerites IV convergent but not fused..... 15
15. Tarsi I and II with only 2 narrowly foliate hairs. Tarsus IV with a very strong and very long hair.
 Epimera I fused in a Y..... *Scalopacarus obesus* spec. nov.
 Tarsi I and II with 6 foliate hairs. Tarsus IV without a very strong and very long hair.... 16
16. Epimera I widely separate. Palposomal hairs long (22 and 33 μ). Setae *v e* much longer than *v i*. Solenidion tibial III narrow..... *Orycteroxenus canadensis* FAIN, et al. 1971
 Epimera I either fused, contiguous or slightly separate. Palposomal hairs much shorter. Solenidion tibial III longer and expanded apically..... 17
17. Epimera I separate or contiguous but not fused. Trochanters III and IV with projections. Absence of triangular cuticular projections laterally to coxa IV. Palposomal hairs unequal (externals 7-8 μ , internals 5-6 μ)..... *Orycteroxenus soricis soricis* (OUDEMANS, 1915)
 Epimera I fused into a Y. Trochanters III-IV without projections. A distinct triangular cuticular projection laterally to coxa IV and directed anteriorly. Palposomal hairs subequal (5 μ).
Orycteroxenus soricis ohioensis FAIN, 1969

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ADDENDUM.

Since this paper was submitted we have had the opportunity to examine the holotype of *Dermacarus tamiasciuri*. As we had expected, this species is very close to *D. sciurinus*. It has the same completely closed coxal fields III and IV as in the latter. It differs from this species : 1) by the presence on epimera III of a narrow and short anterior prolongation directed anterolaterally, and 2) by the equal length (21 μ) and width of tarsi III and IV. We thank Dr. Nixon Wilson for loan of this specimen.

