

PARASITIC MITES OF SURINAM
XVII. DESCRIPTION AND LIFE-CYCLE OF *MARSUPIALICHUS*
MARSUPIALIS SP. N. FROM *DIDELPHIS MARSUPIALIS*
(GLYCYPHAGIDAE : SARCOPTIFORMES) ¹

BY

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INTRODUCTION.

Up to now four species have been described in the genus *Marsupialichus* FAIN, 1967. All were collected on South American Marsupials (FAIN, 1967, 1969a, b).

So far, all these species are known only after the hypopial nymph. These nymphs have been rattached provisionally to the subfamily Labidophorinae ZACHVATKIN, 1941, between the genera *Dermacarus* HALLER, 1880 and *Labidophorus* KRAMER, 1877.

During parasitological investigations in Surinam, one of us (F. L.) collected on *Didelphis marsupialis*, numerous hypopial nymphs that belong to a new species, morphologically close to *M. brasiliensis* FAIN, 1967. He succeeded to rear these hypopi and to obtain all the developing stages of this species.

The present paper is devoted to the description of the morphology and of the life-cycle of this new species.

EXPERIMENTAL LIFE-CYCLE OF *Marsupialichus marsupialis* sp. n.

The hypopi of this species were found on 10 of 17 investigated adult and subadult specimens of *Didelphis marsupialis marsupialis* LINNAEUS, 1758 from different localities in Surinam. They were attached to the base of hairs on lower and upper lips near mucous membranes, more than one-half being hidden within the follicle.

For rearing experiments two methods of collecting were applied :

1. Supported in parts by Grant W 83-1 from Netherlands Foundation for the Advancement of Tropical Research (WOTRO) given to F. S. LUKOSCHUS for investigations on parasitic mites of Surinam.

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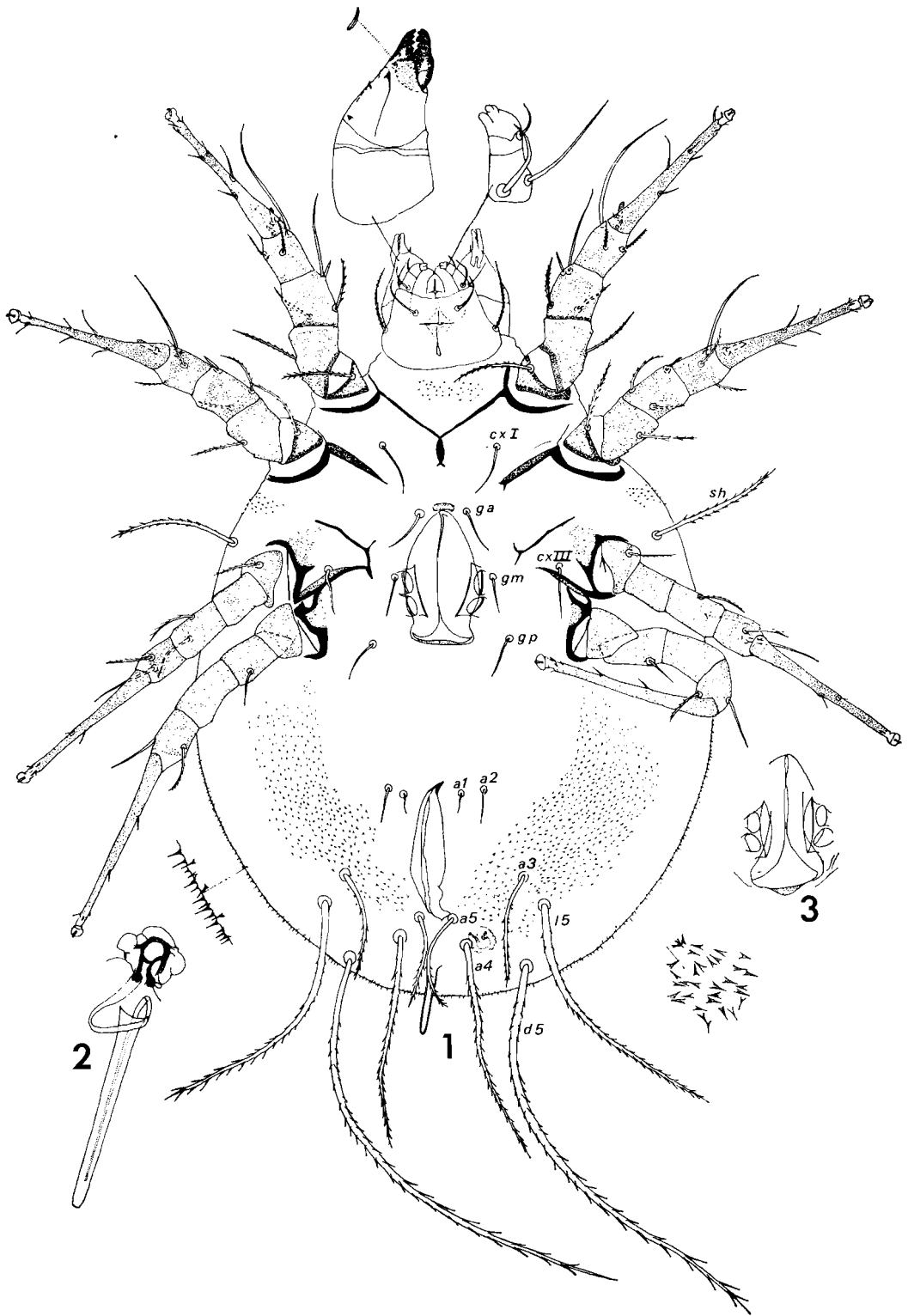


FIG. 1-3 : *Marsupialichus marsupialis* sp. n. :
Female venter (1) ; bursa copulatrix (2) ; genital opening (3).

- 1) Plucking out of hairs with attached hypopi.
- 2) Hardly scraping with scalpel over the lips, alternatively in direction against the hairs and with the hairs, then pressing out hairs, sebaceous fat, hypopi and scraping off epidermis scales and mucous secretions.

The hairs with attached hypopi were placed on evaporated milk or yeast into small glass tubes closed by cotton ball. The scrapings with hypopi were placed into glass tubes without food.

These rearing tubes were stored in darkness in a wooden box. Half of these tubes was placed beneath a dense tree in the garden at 28-34°C. The other half was placed in an air conditioned laboratory room at about 26°C. Cotton balls of tubes in the laboratory have been wettened twice a day. Most successful series were obtained from hypopi scraped off from a gravid female host trapped near Lelydorp on 10.1.1970 and stored either in the laboratory or in the garden.

We summarize hereunder the main data of this experimental life-cycle :

- 10.1.1970 at 8.30 p.m. : starting of rearing experiment with scraped off hypopi with hairs, sebaceous fat, skin scales, without other food, in laboratory conditions.
- 12.1.1970 : large numbers of tritonymphs present.
- 13.1.1970 : some tritonymphs in moulting stage.
- 14.1.1970 : first adults.
- 15.1.1970 : about 40 eggs, 10 coupling pairs isolated in glasstubes with evaporated milk or yeast to observe reproduction capacity.
- 16.1.1970 : first larvae.
- 19.1.1970 : first protonymphs, dead tritonymphs, adults and larvae.
- 21.1.1970 : no further development, many dead mites !

It is to be noted that in the rearing tubes kept in the garden no protonymphs developed. In tubes with yeast or evaporated milk some tritonymphs moulted but no adults. Yeast or evaporated milk, generally utilized for breeding stored-food mites, seemed to be unsuitable for reproduction, when couples are isolated on this food.

From these experiments it appears that the life-cycle of this species is fairly rapid. The first tritonymphs hatched from the hypopi after two days. Adults were obtained two days later. Eggs were seen the day later and they hatched into larvae after one day. The first protonymphs were observed three days after the emergence of larvae. The total life-cycle from hypopus to protonymph has taken 9 days.

Another point which is interesting to mention is that no development occurred from the hypopi taken off subadult hosts. The development of the hypopi are probably in relation with the reproduction of the host and that could be a general rule for the hypopi that live on mammals and birds (see FAIN, 1967).

SYSTEMATICAL SITUATION OF THE GENUS *Marsupialichus* FAIN, 1967.

The genus *Marsupialichus* has been rattached to the subfamily Labidophorinae on the basis of the characters of the hypopial nymph.

If one considers the characters of the adult mites then it becomes difficult to maintain this genus into the Labidophorinae. The most important characters which separate this genus from the genus *Labidophorus* are the following :



FIG. 4-5 : *Marsupialichus marsupialis* sp. n. :
Female dorsum (4) ; supracoxal setae (5). (N.B. The spinules of the dorsal surface of the idiosoma have been omitted here).

1. Anterolateral position of the *ve* (in *Labidophorus* these setae are situated behind the *vi* and in paramedian position).
2. Idiosoma without cuticular lobes in both sexes.
3. Epimera I fused in an Y. Epigynium remote from the sternum.
4. Legs much shorter in both sexes.
5. Vulva mostly longitudinal but with a small distinct posterior lip.
6. Presence of only 5 pairs of anals in the female.
7. Solenidion $\omega 2$ is more basal than $\omega 1$.

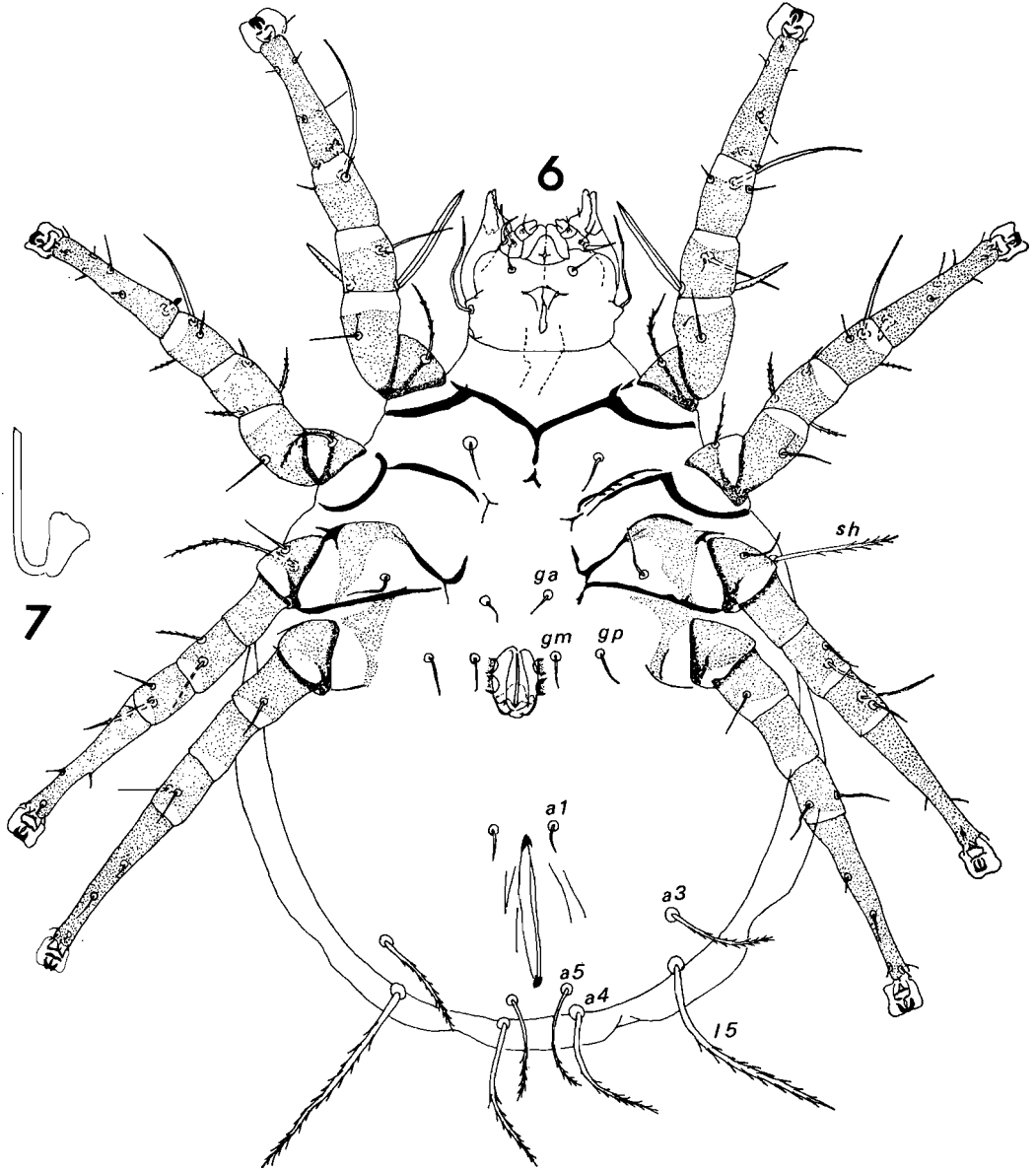


FIG. 6-7 : *Marsupialichus marsupialis* sp. n. :
Male venter (6) ; penis (7) in lateral view.

8. Famulus far form ωI and in lateral position.

9. Tarsal claws of male modified.

In the hypopi the solenidia *alpha* are vestigial, the epimera III and IV are fused, the claws I-II-III are subequal, and there are no retrorse processes on the idiosoma or on the posterior legs.

In the larva the Claparède organ is long (very short in *Labidophorus*).

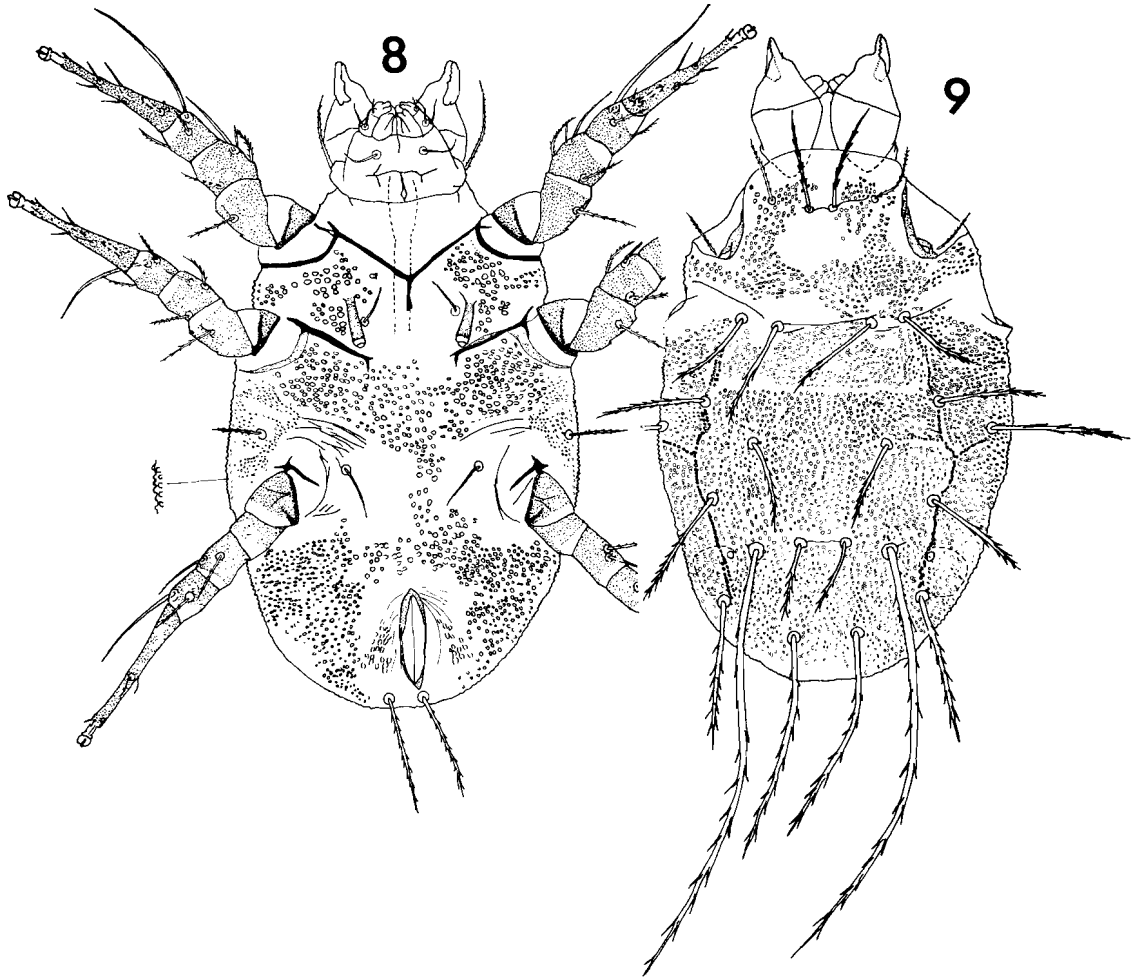


FIG. 8-9 : *Marsupialichus marsupialis* sp. n. :
Larva. Ventral surface (8) ; dorsal surface (9).

As a matter of fact, the genus *Marsupialichus* presents more relationships with the genus *Melesodectes* FAIN and LUKOSCHUS, 1968 (= *Melesodectinae* FAIN and LUKOSCHUS) than with the *Labidophorinae*. The life-cycle of *Melesodectes auricularis* FAIN and LUKOSCHUS, the type of the genus, has been described recently (LUKOSCHUS, de COCK and FAIN, in press). In the female of *Marsupialichus* the general aspect, the epimera, the vulva, the chaetotaxy and the solenidiotaxy are very similar to that of *Melesodectes*. The main differences are the situation of the *v e*, which are more external and anterior, the presence of a distinct posterior valve on the genital aperture, the presence of spinules on the cuticula, moreover the tarsi are

elongate and more glycyphagid-like. In the male of *Marsupialichus* the legs II are normal but on all the legs the claws are modified. The characters separating the hypopi are also important and they consist in the presence of a clasping apparatus for attaching to the hair of a mammal and in the different structure of the legs.

Owing to these relationships with the Melesodectinae, we propose to rattach the genus *Marsupialichus* to this subfamily. However, if one considers the important differences existing between the genera *Melesodectes* and *Marsupialichus* then it becomes necessary to separate the latter in a new tribe, Marsupialichini tr. nov., with the characters given here above.

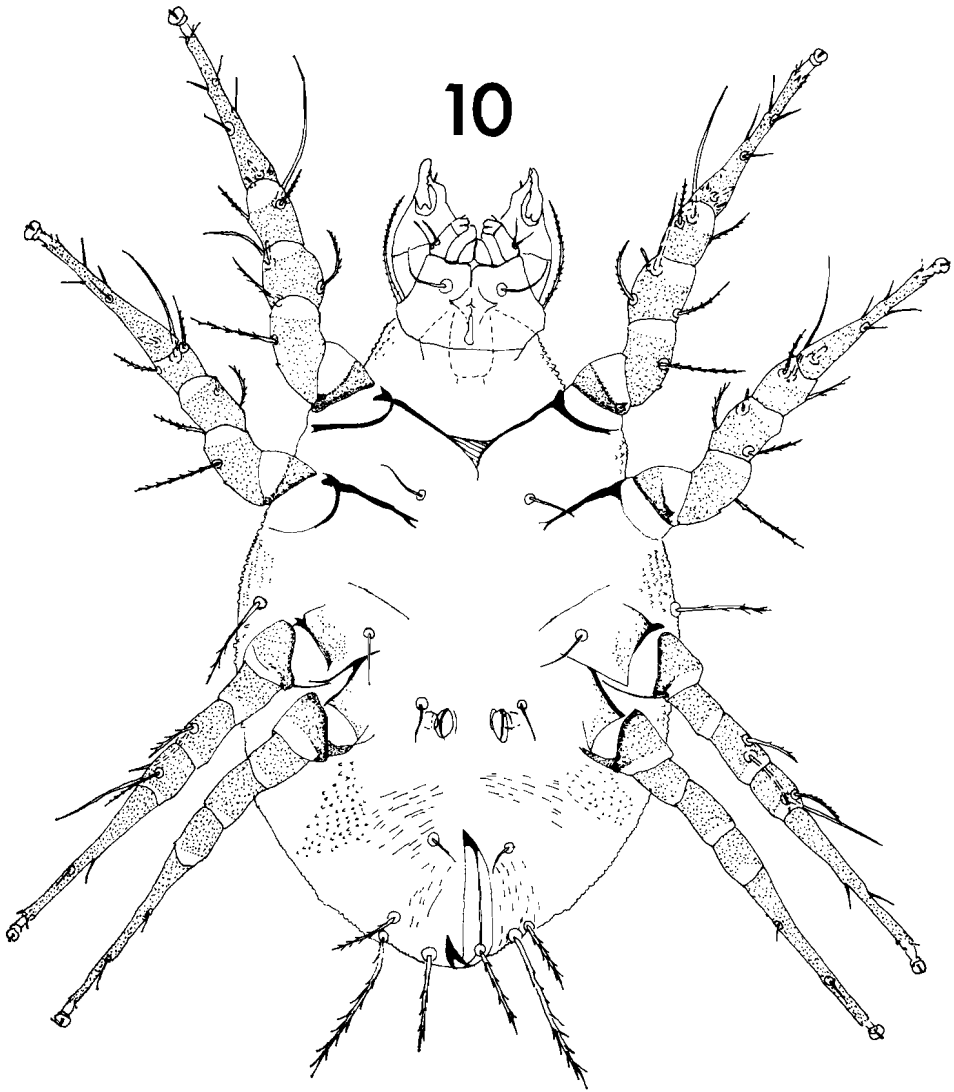


FIG. 10 : *Marsupialichus marsupialis* sp. n. Protozoon's venter.

FAMILY GLYCYPHAGIDAE BERLESE, 1887.
SUBFAMILY MELESODECTINAE FAIN and LUKOSCHUS, 1968.

TRIBE MARSUPIALICHINI tr. nov.

Genus *Marsupialichus* FAIN, 1967.

Définition : The definition of this genus was, so far, based only on the hypopial nymph. The discovery of the adult stages allows us to complete this definition.

The adults have a glycyphagid aspect. They have a whitish, non striate, and weakly sclerotized cuticle. In the female the cuticle bears numerous but very small spinules. These spinules are present on most of the dorsum and on some parts of the venter. In the larva and the nymphs these spinules are replaced by very small warts. Sejugal furrow indistinct. Propodosomal shield absent. Chelicerae rather small but well-dentated. Posterior border of the

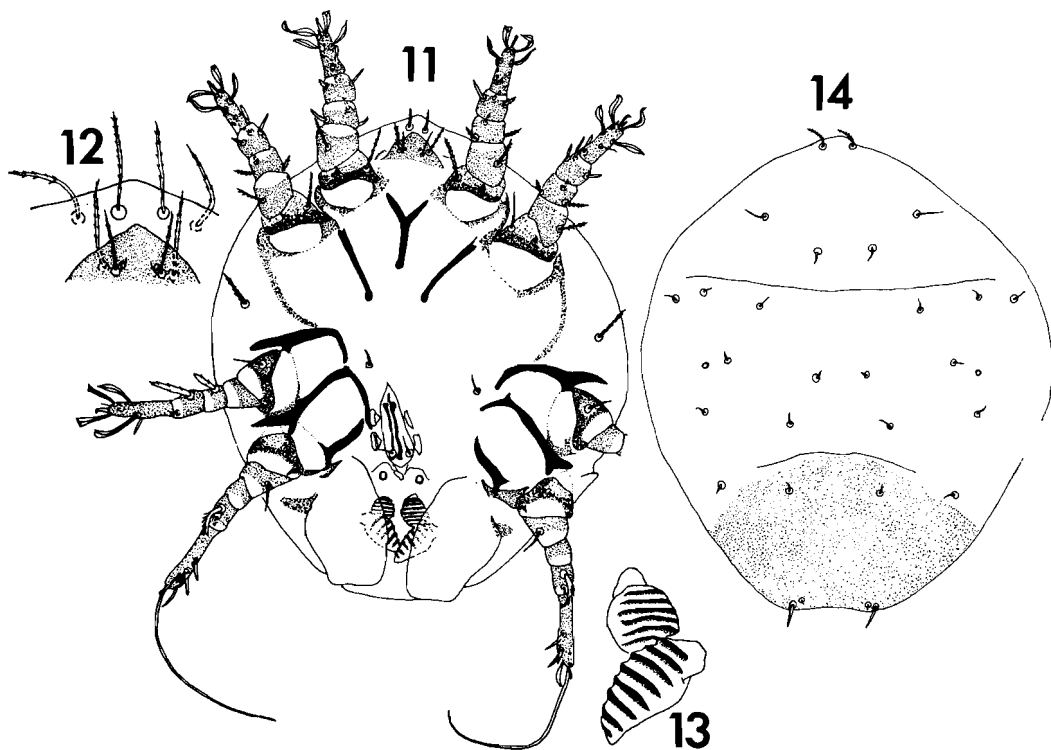


FIG. 11-14 : *Marsupialichus marsupialis* sp. n.
Hypopus venter (11) ; anterior part of idiosoma enlarged (12) ; claspers (13) ; hypopus, dorsum (14).

body rounded. Tarsi of legs long and narrow in the female, the nymphs and the larva. Pre-tarsus with a rather short stalk, a broad adhesive apparatus and a small claw. In the male the claw is highly modified. Epimera I are Y shaped. Epimerae III and IV free or loosely fused at their internal extremities. Anus subterminal ventral. *Female* : vulva situated at level of coxae III and IV, mostly longitudinal with two large lateral valves and a small posterior valve.

Epigynium small. Genital suckers short. Copulatory tube in the shape of a long and narrow cone. *Male* : penis cylindrical, very narrow and relatively short, situated at the level of coxae IV. Tarsi shorter and broader than in the female. Cuticle without spinules or warts. Genu I with a very strong anterior seta. Adanal and tarsal suckers absent. *Hypopus* : intermediate between *Labidophorus* and *Dermacarus*. It presents, as in *Dermacarus* the claws I, II and III equal or subequal and an absence of retrorse processes on the hysterosoma or on the posterior legs. It resembles *Labidophorus* by the presence of the *ve* setae and of two pairs of palposomal setae. It is distinct from these genera by the quite vestigial character of the palposomal solenidia (*alpha*)

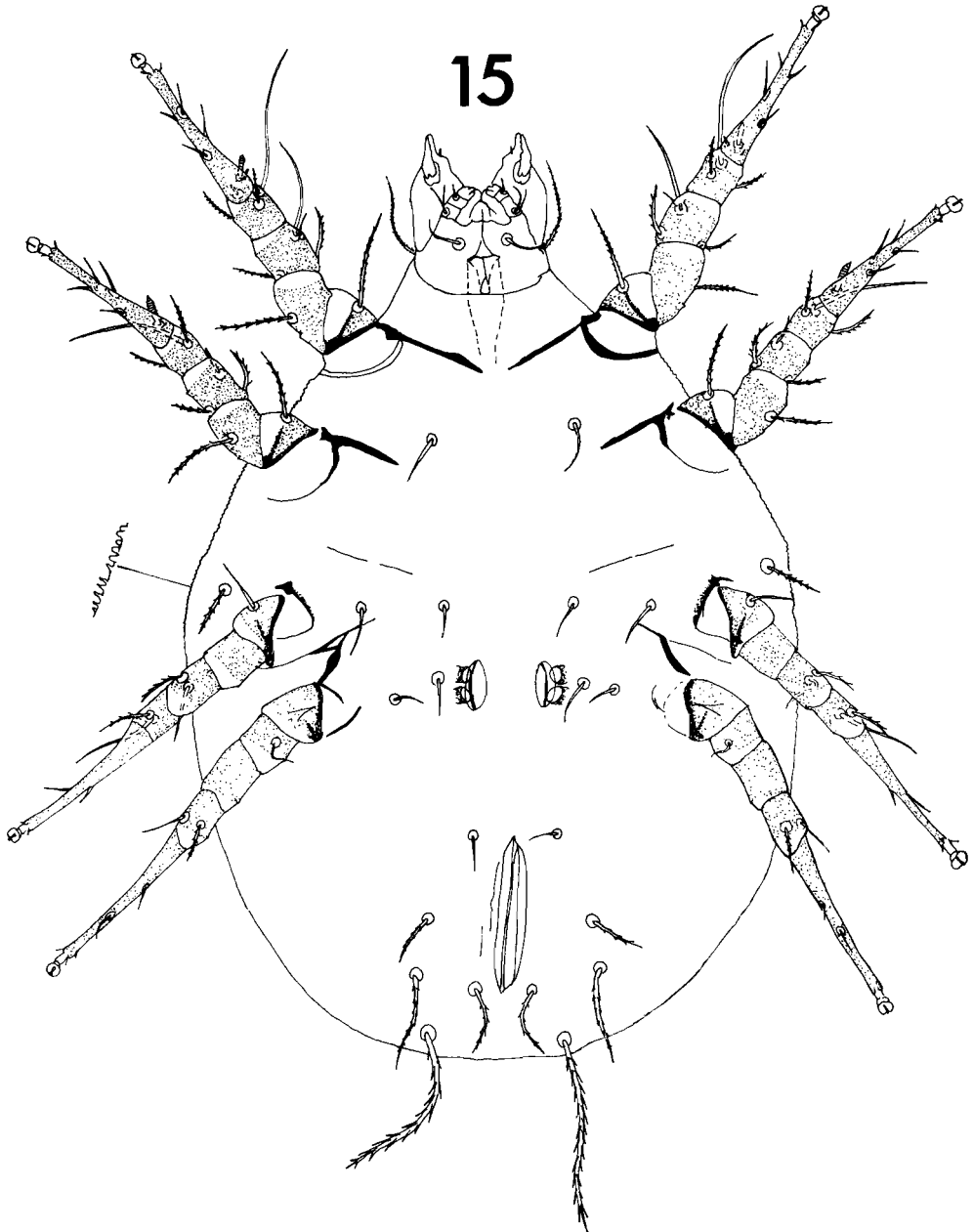


FIG. 15 : *Marsupialichus marsupialis* sp. n. Tritonymph venter.

and the fusion of epimera III and IV. *Larva* with well-developed CLAPAREDE organs. *Chaetotaxy* : in the adults the dorsal setae of idiosoma are long, strong and barbulated. Are present the following setae : *v i*, *v e*, *sc i*, *sc e*, *s cx*, *h*, *sh*, *d 1* to *d 5*, *l 1* to *l 5*, *g a*, *g m*, *g p*, *cx I*, *cx III*. There are 5 pairs of anals in the female and 4 pairs in the male. *Legs* of the female : Tarsi 12-12-10-10. Tibiae 2-2-1-1. Genua 2-2-1-0. Femora 1-1-0-1. Trochanters 1-1-1-0. Solenidia as in *Labidophorus* but there are two *sigma* on genu I and the $\omega 2$ is basal. A small *famulus* is present. Male tarsi with 8-8-6-6 setae. *Type species* : *Marsupialichus brasiliensis* FAIN, 1967.

***Marsupialichus marsupialis* spec. nov.**

The hypopus of this species is very close to that of *M. brasiliensis*. It differs from the latter only by the shape of the tibial spine of leg IV which is distinctly curved, and by the relative greater length of $\omega 3$ compared with $\omega 1$.

FEMALE (holotype) (fig. 1-5 ; 28-29) : Idiosoma 430 μ long and 340 μ wide. The measurements of paratypes are indicated in table I. Most of the characters have been described in the definition of the genus. Copulatory tube ventro-terminal, 45 μ long. Epimera I are Y shaped with a short sternum. Epimera III very poorly sclerotized in their basal half (the part in connexion with the trochanter), furcated apically and fused or not with epimera IV. Chelicerae with thick base, strongly attenuated apically.

Chaetotaxy : dorsal setae thick, long and barbulate. The *v e* are lateral and more anterior than *v i*. The *s cx* is not expanded ; it is barbed and slightly branched. The *d 2* setae are much more lateral than the *d 3*. Ventral setae shorter and slender except the postero-anals. Solenidion $\omega 3$ short and thin.

MALE (allotype) (fig. 6-7 ; 26-27) : Idiosoma 330 μ long and 250 μ wide. Cuticle without spinules. Penis arising from a thick base ; then it presents a curve at 180° and becomes straight and very thin. This straight part of the penis is about 25 μ long. Legs shorter and thicker, especially the tarsi, than in the female. The pretarsus is shorter than in the female and the claw is highly modified. Gnathosoma, epimera, and dorsal chaetotaxy as in the female. Chaetotaxy as in the definition of the genus. Unlike the female, genu I bears a thick and long spine, more or less flattened and slightly barbed.

TRITONYMPH (fig. 15 ; 24-25) : Measurements of 21 specimens have been given in table I. The tritonymph resembles the female but the cuticle bears very small wart-like surelevation instead of spinules.

HYPOPUS (fig. 11-14 ; 20-23) : Measurements are in table I. It is very close to the hypopus of *Marsupialichus brasiliensis* (see above).

PROTONYMPH (fig. 10 ; 18-19) : Measurements are in the table I. This nymph has the same cuticle pattern as the tritonymph.

LARVA (fig. 8-9 ; 16-17) : Measurements are in the table I. Cuticle as in the protonymph. The CLAPAREDE organ is well developed.

Host and locality :

The hypopi that we could rear until the adult stages, have been collected on *Didelphis marsupialis*, from two localities in Surinam : 1) Lelydorp, on 10 January 1970 (animal n° 92) (holo-

type and 10 paratypes females ; allotype and 8 paratypes males, numerous nymphs, and larvae) ;
2) Coronie, 29 November 1969 and 12 February 1970 (animals n° 51 and 432) (19 females para-
types, 10 males paratypes and numerous immatures).

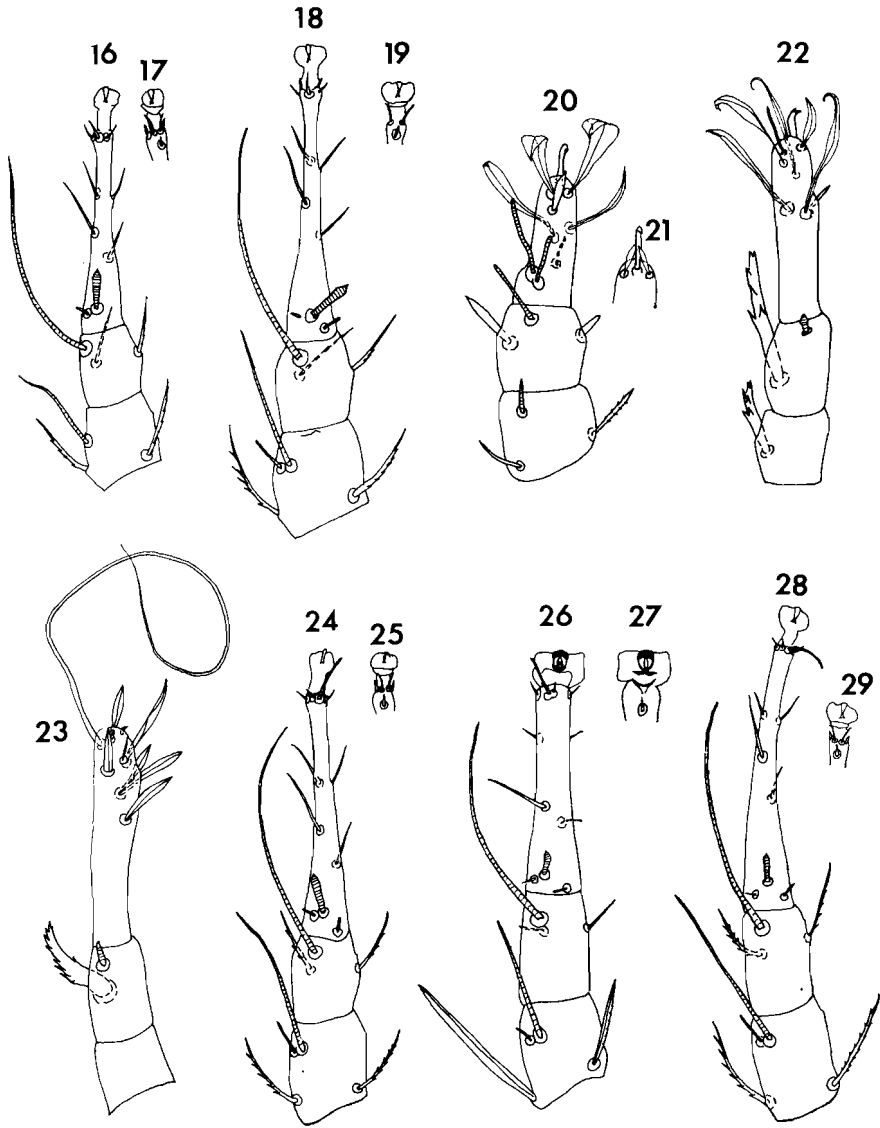


FIG. 16-29 : *Marsupialichus marsupialis* sp. n.

Leg I of larva dorsally (16) ; ventrally (17) ; of protonymph (18, 19) ; of hypopus (20, 21) Leg III of hypopus dorsally (22). Leg IV of hypopus dorsally (23). Leg I of tritonymph dorsally (24) and ventrally (25) ; of ♂ (26, 27) and ♀ (28, 29).

Hypopi were found on the same host from Brokobaka, Surinam, 21 February 1970 (animal n° 182).

Holotype, allotype and paratypes in the Rijksmuseum van Natuurlijke Historie, Leiden. Paratypes in the collections of the authors.

TABLE I : MEASUREMENTS OF THE IDIOSOMA AND THE LEG TARSI
OF *Marsupialichus marsupialis* sp. n.
(in microns).

(N.B. : The length of tarsi is including the pretarsus).

	♀	♂	L	Hy	PrN	TrN
<i>Number of specimens</i>	20	14	15	10	2	21
<i>Idiosoma :</i>						
— Length : average	426	310	146	246	—	306
min.	340	276	131	226	—	212
max.	506	340	172	272	—	368
— Width : average	340	239	102	202	—	229
min.	276	220	85	179	—	166
max.	396	276	124	218	—	276
<i>Leg tarsus :</i>						
— Length : tarsus I	109/113	80/80				
tarsus II	111/111	81/81				
tarsus III	120/112	90-85				
tarsus IV	130/135	92/100				

TABLE II : LENGTH, in microns, OF THE SETAE AND THE SOLENIDIA
IN *Marsupialichus marsupialis* sp. n.
(in one specimen of the different stages).

	♀	♂	L	PrN	TrN
<i>v i</i>	93/93	69/71	30/30	50/43	53/51
<i>v e</i>	66/66	32/35	19/19	39/37	37/37
<i>s cx</i>	41/42	48/41	15/15	20/22	25/25
<i>sc i</i>	156/148	138/136	30/31	58/61	69/69
<i>sc e</i>	139/134	108/108	27/30	54/54	65/67
<i>h</i>	169/178	162/162	39/37	80/80	76/80
<i>d 1</i>	220/220	196/198	26/27	69/69	74/x
<i>d 2</i>	360/350	348/334	131/130	217/219	234/237
<i>d 3</i>	190/190	182/184	22/23	45/46	44/41
<i>d 4</i>	310/310	315/315	—	193/195	207/205
<i>d 5</i>	306/320	264/272	67/64	52/54	80/78
<i>l 1</i>	180/176	159/163	33/32	69/70	69/71
<i>l 2</i>	232/230	216/230	33/36	78/80	74/71
<i>l 3</i>	292/287	288/264	44/42	128/125	115/115
<i>l 4</i>	268/284	179/170	—	—	85/81

	♀	♂	L	Prn	Trn
<i>l</i> 5.....	185/190	111/107	32/35	24/24	42/43
<i>cx</i> I.....	35/37	18/18	11/11	16/18	21/23
<i>cx</i> III.....	34/34	22/24	16/14	15/16	21/22
<i>g</i> a.....	31/31	13/13	—	11/12	14/14
<i>g</i> m.....	24/26	16/16	—	—	17/19
<i>g</i> <i>p</i>	28/28	18/20	—	—	12/14
<i>s</i> <i>h</i>	91/87	62/63	17/15	29/31	24/24
<i>a</i> 1.....	13/13	15/16	—	10/11	13/14
<i>a</i> 2.....	24/24	—	—	—	—
<i>a</i> 3.....	78/78	53/56	—	—	24/26
<i>a</i> 4.....	146/142	74/74	—	29/32	28/31
<i>a</i> 5.....	68/63	52/56	—	—	—
<i>phi</i> I.....	89/83	64/67	41/44	45/50	58/60
<i>phi</i> II.....	65/62	50/50	32/30	40/42	50/50
<i>phi</i> III.....	52/46	36/37	31/29	34/36	35/40
<i>phi</i> IV.....	33/x	25/25	—	—	17/19
sigma I-I.....	59/57	35/37	20/21	25/25	40/40
sigma II.....	15/15	14/15	8/8	7/7	12/12
sigma III.....	29/32	25/27	16/17	24/24	21/23
omega I-I.....	10/9	6/6	8/	7/7	9,5/9,5
omega I-II.....	13/13	11/11	7/8	6/7	13/13

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