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# MITES (ACARI) FROM NESTS OF SEA BIRDS IN NEW-ZEALAND. I. — DESCRIPTION AND DEVELOPMENTAL STAGES OF *PSYLLOGLYPHUS PARAPSYLLUS* N. SP. (WINTERSCHMIDTIIDAE)

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# MITES (ACARI) FROM NESTS OF SEA BIRDS IN NEW-ZEALAND. 1. — DESCRIPTION AND DEVELOPMENTAL STAGES OF *PSYLLOGLYPHUS PARAPSYLLUS* N. SP. (WINTERSCHMIDTIIDAE)

BY A. FAIN * and T. D. GALLOWAY **

TAXONOMY
LIFE HISTORY
ACARI
PHORETIC ON FLEAS
NESTS OF BIRDS
NEW ZEALAND

ABSTRACT : *Psylloglyphus parapsyllus* n. sp. (Acari, Winterschmidtiidae) is described from both adult forms and phoretic deutonymphs (= hypopi) from the nests of the White-Flippered Penguin, *Eudyptula minor albosignata*, in Motunau Island, New Zealand. Hypopi of this species were also found on the fleas, *Parapsyllus longicornis* found in the nest of this bird as well as on the flea *Parapsyllus jacksoni* found in the nest of a Fairy Prion, *Pachyptila turtur*, in the same locality. It is the first time that the adults, male and female, are described in the genus *Psylloglyphus* Fain, 1966, which was known so far only from the deutonymphal stage.

TAXONOMIE
CYCLE ÉVOLUTIF
ACARIENS
PHORÉTIQUES SUR PUCES
NIDS D'OISEAUX DE MER
NOUVELLE-ZÉLANDE

RÉSUMÉ : Les stades adultes et l'hypope (deutonymphe phorétique) de *Psylloglyphus parapsyllus* n. sp. (Acari, Winterschmidtiidae) sont décrits d'après des spécimens trouvés dans les nids de *Eudyptula minor albosignata* dans l'Ile Motunau, Nouvelle Zélande. Les Hypopes de cette espèce furent également rencontrés sur des puces, *Parapsyllus longicornis* récoltées dans le nid de cet oiseau ainsi que sur les puces, *Parapsyllus jacksoni* trouvées dans le nid de *Pachyptila turtur* dans la même localité. C'est la première fois que les stades adultes sont décrits dans le genre *Psylloglyphus* Fain, 1966 ; ce genre n'était connu jusqu'ici que par son stade hypope.

## INTRODUCTION

The genus *Psylloglyphus* Fain (1966) was created for a phoretic deutonymph (= hypopus) found on a flea, *Synopsyllus fonquierniei*, Wagner & Roubaud (Pulicidae) parasitic on an Insectivore, *Setifer setosus* from Madagascar.

Until now 10 species of *Psylloglyphus* have been described, all from their deutonymphal stage attached either to fleas (9 species) or to a *Hemimerus* (1 species). This genus is known from several continents (Central Africa, Madagascar, South and North America, Australia and Vietnam) except Europe.

The adults of this genus were still unknown. The discovery by one of us (T.D.G.) of both adults and hypopi in the nest of a Penguin allows us to describe for the first time the life history of this interesting mite.

All the measurements used herein are in micrometers.

## MATERIAL AND METHODS

All the material originates from Motunau Island. Motunau is a small island (3,6 ha) about 60 km

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north of Christchurch, New Zealand, and about 1 1/2 km offshore. It is home for tens of thousands of sea birds.

Two nests were examined via Tullgren Funnel, one of the White-Flippered Penguin, the other of the Fairy Prion. Both nests contained, not only stages of *Psylloglyphus parapsyllus*, but also mites belonging to other groups. They will be studied in the near future.

## Genus *Psylloglyphus* Fain, 1966

The discovery of the adult forms of *Psylloglyphus* allows us to complete the definition of that genus.

*Female* : Resembling the genus *Calvolia* Oudemans (1911) but the size of the body is much smaller and the eyes are lacking. Idiosoma whitish, cuticle smooth, poorly sclerotized. Sejugal furrow well developed. Propodonotal shield unconspicuous. Dorsal chaetotaxy complete except for the *ve* setae which are lacking. Setae *sc i* much shorter than *sc e*. Setae *s cx* bare, curved. *Venter* : epimera I fused in a well-developed sternum. Epimera II free. Epimera III fused in the midline by means of a thick epigynium. Vulva in an inverted Y. Genital suckers small and narrow. Three pairs of genital setae. Two pairs of anal setae, the *ae* in front of the *ai*. Bursa opening on the posterior margin of the body, its canal is very long and narrow, describing 5 or 6 loops and ending in an elongate poorly sclerotized spermatheca. *Legs* : Tarsi I-IV with 5 ventriapical inequal spines and 6-5-5-3 simple setae. Tibiae with 2-2-1-1 setae. Genua 2-2-0-0. Femora 1-1-0-0. Trochanters 1-1-1-0. Solenidia : Tarsus I with $\omega 1$ and $\omega 2$ in basal third, $\omega 3$ subapical. All tibiae with a long solenidion. Genu I with 2 subequal solenidia. Genu II and III with one solenidion.

*Male* : Dorsum as in female. *Venter* : epimera I-II as in female. Epimera III free. Epimera IV loosely fused in the midline. Genital organ very complex. The two posterior arms of the penis originate from a large anchor-shaped sclerite situated behind. Anterior part of the complex forming an incomplete chitinous ring. With only one pair of genital setae (*ga*). Anal setae as in female. *Legs* : tarsi I and II with an apicoventral sucker-like organ, and more apically a pair of lateral irregular sclerites (an anterior and a posterior), recurved and bifid at apex. More medially is a pair of very small spines (? or expansions of the lateral sclerites). There is no ventroapical spine. Tarsi III and IV lacking a sucker but with the same apicoventral sclerites and in addition a subapicoventral and median spine. Chaetotaxy of the other segment and solenidiotaxy as in female. Cheliceral digits dentate.

*Hypopus* : Size of body very small, the length varies from 140 to 195 long. Dorsum punctate with or without pattern (lines, pits, rings, spots). Propodonotum long. All dorsal setae short. Setae *ve* lacking. Eyes lacking. Epimera I fused in a rather long sternum, epimera II free, epimera III and IV fused medially to a long median longitudinal sclerite bearing setae *ga*. Setae *gm* vestigial, the *gp* are close to the genital slit. Suctorial plate with 2 pairs of generally subequal suckers, the lateral conoids are at the level of the posterior suckers. Palposoma small, about as long as wide, with 2 small apical articles bearing each a long solenidion and a simple thin seta. *Legs* I to III ending in a claw carried on a rather long pretarsus. Leg IV much shorter than the other legs and lacking an ambulacrum but carrying apically a very long and strong seta. *Chaetotaxy of legs I to IV* : Tarsi with 6-6-8-6 setae. Number of foliate setae on tarsi : 3-3-7-3. Tibiae 2-2-1-1 setae. Genua 2-2-0-0. Femora 1-1-0-0. Solenidia : On tarsus I the $\omega 1$, $\omega 2$ and $\omega 3$, are situated in the basal half of the segment and close to each other. The famulus is either simple or furcate. Tibiae with 1-1-1-1 solenidia. Genu I with one solenidion. In some species a second very short solenidion is present but it is inconstant.

### ***Psylloglyphus parapsyllus*** n. sp.

*Male*, holotype (figs 1-6) : Idiosoma 225 long and 117 wide. In 2 paratypes the length and width are 220 × 105 and 242 × 116. Characters as described above.

*Female* (figs 7-12) : Idiosoma (length and width) in 2 paratypes : 270 × 135 and 258 × 120. General

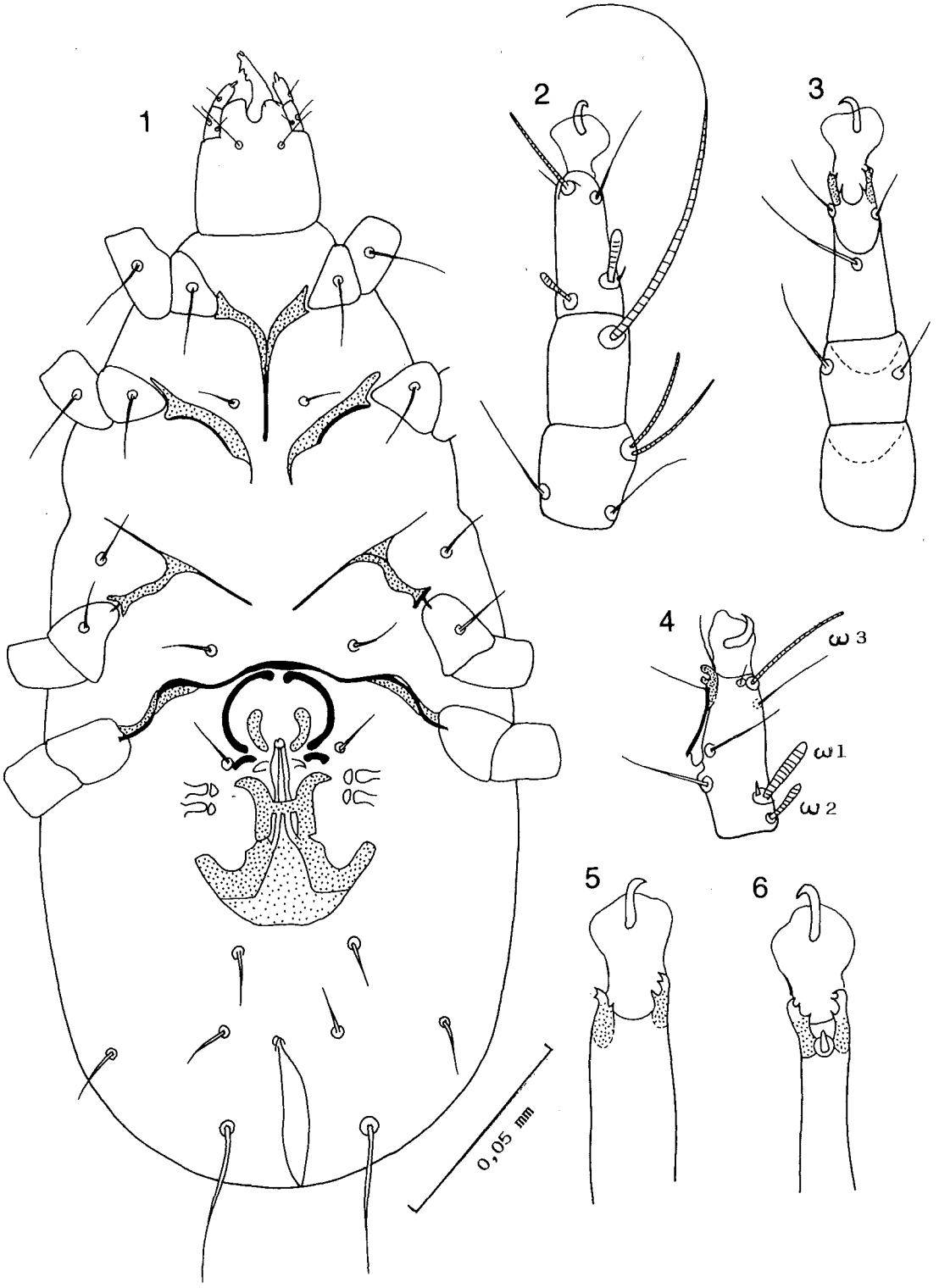
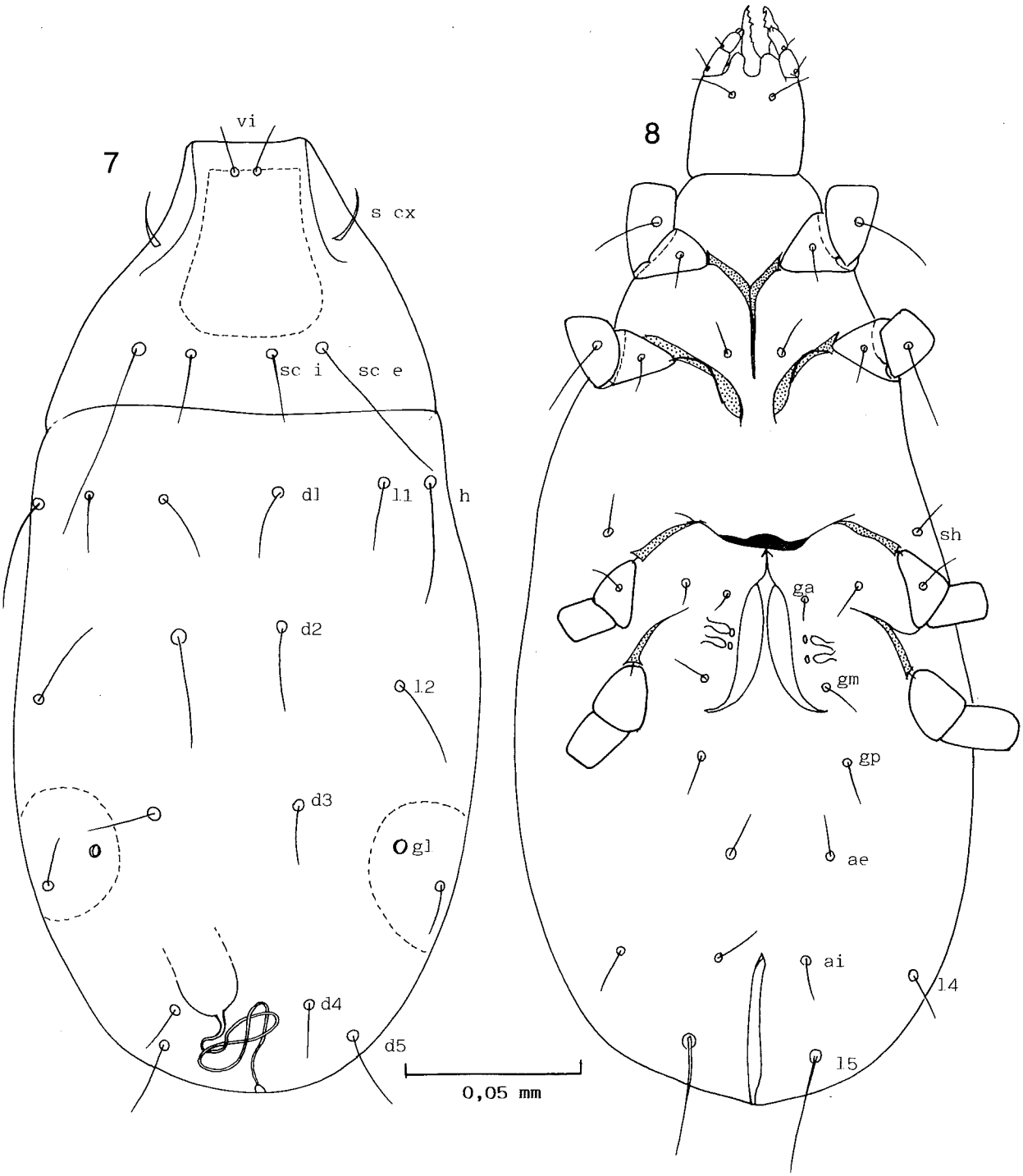



FIG. 1-6 : *Psylloglyphus parapsyllus* n. sp. male

Ventral view (1) ; tarsus, tibia and genu I in dorsal view (2) and in ventral view (3) ; tarsus I in lateral view (4) ; apical extremity of tarsus I (5) and III (6) in ventral view showing the apical sclerites.




FIGS 7-8 : *Psylloglyphus parapsyllus* n. sp. female in dorsal (7) and ventral views (8).

characters as given for the genus. Lengths of setae : *sc i* 20, *sc e* 75, *d1* to *d4* 18 to 20, *d5* 30, *l5* 40, *h* 42. Gnathosoma (palps included) 43 long and 30 wide.

*Hypopus* (figs. 13-18) : Length and width of idiosoma in 5 paratypes : 162 × 97, 165 × 96, 168 × 105, 171 × 99, 177 × 111. Dorsum finely punctate, lacking a pattern of lines or pits or any other superficial structure. Chaetotaxy (length of setae) : *sc e* 7, *sc i* 5-6, *s cx* 10, *d1* to *d5* 7 to 9, *l1* to *l4* 6-7, distance *sce-sce* 20, distance *sci-sci* 37. Venter : palposoma slightly longer (12, including apical article) than wide (10,5-11), the apical article wider (3,6) than long (2,8). Epimera III with a short anterior process. Sclerotized part of suctorial plate 30-33 wide. Diameter of anterior and posterior suckers : 5,8 to 6 and 7 to 8 respectively. Lengths of setae : *sh* 15-16, *h* 12, *l5* 11. Length of tarsi I-IV (excluding ambulacrum) 18-16,5-12-7,2. Ambulacrum (until base of claw) 7,3. Length of claw I 3,6. The seta *e* of tarsus I is more or less rodlike and 18 long. Seta of femur I 20 long. Anteroapical and posteroapical setae of tarsus IV 90 and 22 long respectively. Lengths of solenidia of tarsus I : $\omega 1$ 10-11 ; $\omega 3$ 18-20 ; $\omega 2$ 4,5. Tibia I with solenidion 45 long. Genu I with a solenidion 12 long. In some specimens the genu I bears a second very short solenidion. Leg II : $\omega$ 13 ; $\varphi$ 36 ; $\sigma$ 4,8.

*Habitat and locality*

Holotype male from the nest of *Eudyptula minor albosignata*, from Motunau Island, Plateau region, New Zealand. (Coll. T.D GALLOWAY, 8.XI. 1981) Paratypes : 2 males, 2 females, 20 free hypopi, all with the same data as holotype. This nest contained also 35 fleas *Parapsyllus longicornis* (Enderlein) (Rhopalopsyllidae) (20 males and 12 females) of which 5 carried hypopi. These fleas, all females, had 5,1,5,3 and 6 hypopi each. These hypopi are also paratypes. There were no mites on the 24 male fleas collected from this nest.

In the nest of the *Pachyptila turtur*, from the same locality but in the central area of the plateau, we found 8 free hypopi and 32 fleas (20 males and 12 females) *Parapsyllus jacksoni* Smit of which only 2 did not carry hypopi of *Psylloglyphus parapsyllus*. Two of these fleas carried 23 and 28 hypopi.

No mites were found on any of the fleas collected from Penguin or Prion nests from the cliff faces or shoreline on Motunau Island. Perhaps the rich organic soils of the plateau are more favourable to these mites.

Holotype male, one paratype female and 10 paratypes hypopi are deposited in the Museum of Natural History of New Zealand, Wellington, New Zealand. Other paratypes, adults and hypopi, in the Institut royal des Sciences naturelles de Belgique or hypopi in the collections of the authors.

*Remarks*

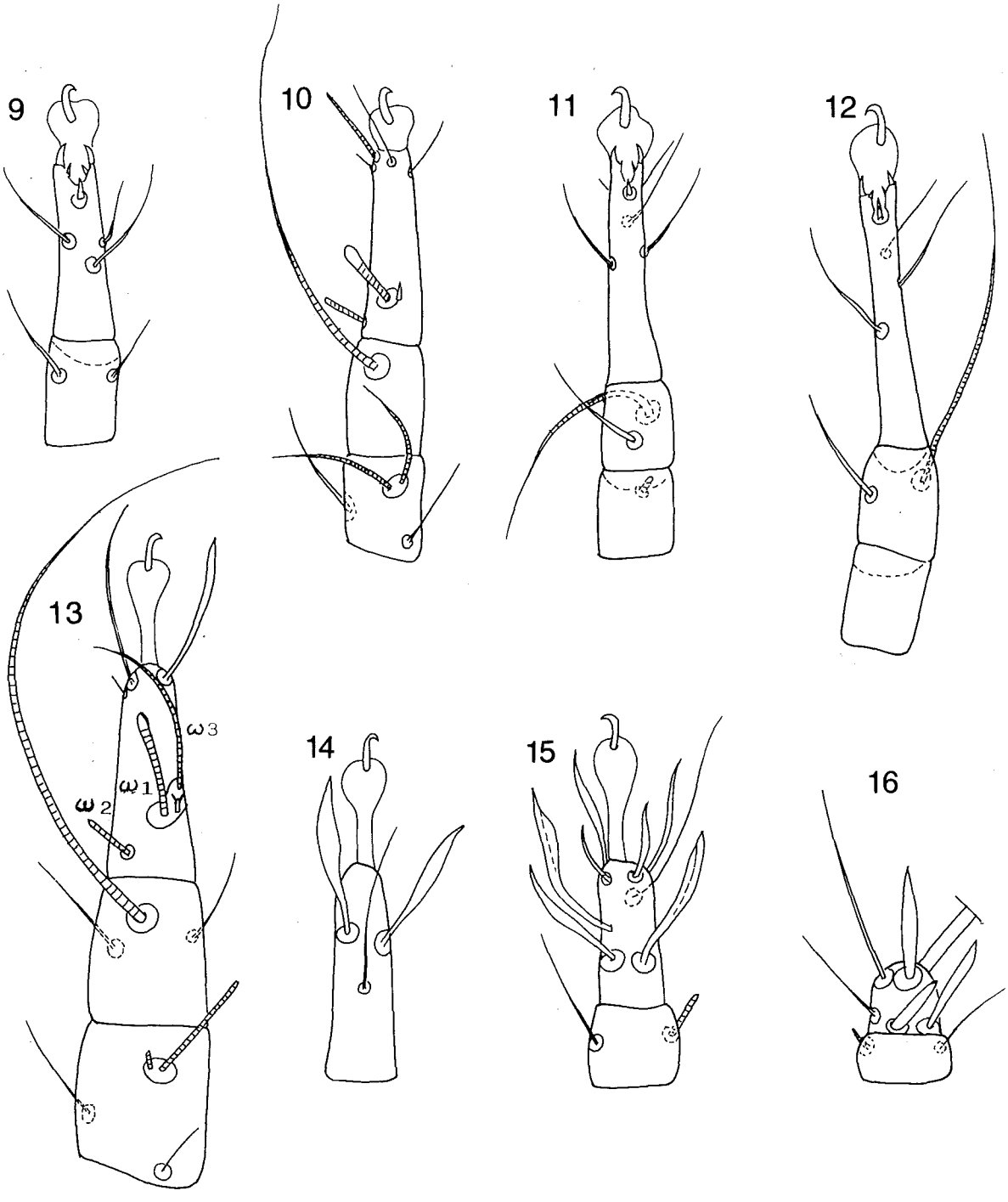
1. *Status of the genus Psylloglyphus* :

The adults of *Psylloglyphus parapsyllus* are the closest to those of the genus *Calvolia* Oudemans (1911) at least to the species assigned to this genus because the adults of *Calvolia hagensis* Oudemans (1911), the type species of *Calvolia*, are still unknown. The hypopus of *C. hagensis* differs markedly from *Psylloglyphus* by important characters mainly the presence of pigmented eyes, the elongate shape of tarsus IV and the very different chaetotaxy of the legs (FAIN, 1972).

In the adults of the species assigned to *Calvolia* (e.g. *C. romanovae* Zachvatkin (1941), *C. kneissli* Krausse (1919) etc...) the tarsi lack well-developed ventroapical spines and the males have no elaborated genital complex. These males, however possess a sucker on tarsi I and II.

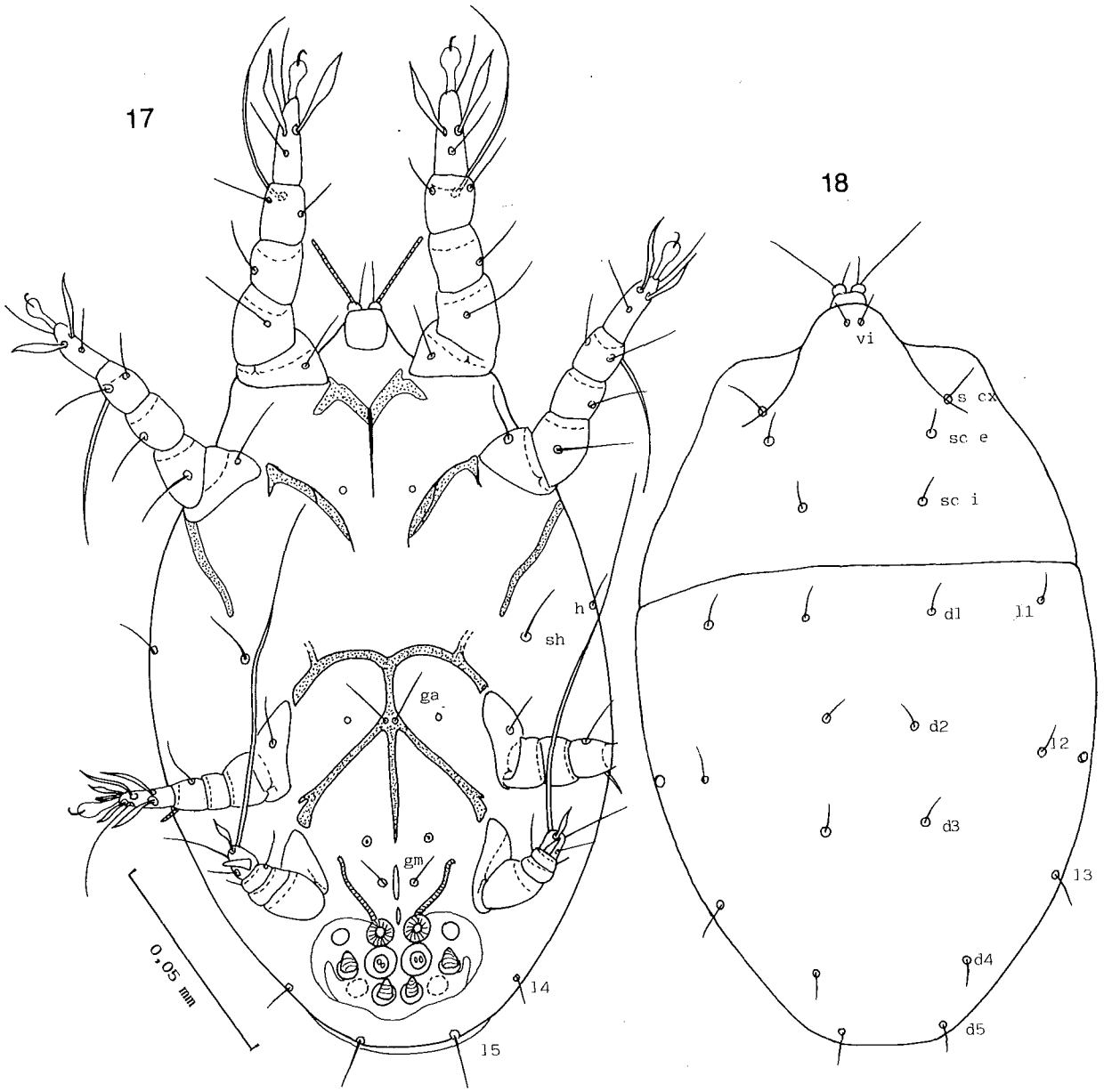
HUGHES and TILBROOK (1966) described a new species, *Calvolia antarctica* from the antartic region. The male differed from the other species of *Calvolia* by an elaborated genital complex and the presence of well-formed apicoventral spines on the tarsi. In 1970, HUGUES described *Neocalvolia claggi* a new species and genus from South Georgia and characterized mainly by the absence of tarsal suckers in the male. She included *Calvolia antarctica* in this new genus.

More recently FAIN (1974) described 2 new species of *Neocalvolia* from adult stages and redepicted the male of *N. claggi* showing that tarsal suckers are also present in that species. Finally another new species, *Neocalvolia inermis* Fain and Schuster, 1983, was described from Bermuda




FIGS 9-16 : *Psylloglyphus parapsyllus* n. sp.

FEMALE (figs 9-12) : tarsus and tibia in ventral view (9) ; tarsus, tibia and genu I in dorsal view (10) ; tarsus, tibia and genu III (11) and IV (12) in ventral view. HYPOPUS (figs 13-16) : tarsus, tibia and genu I in dorsal view (13), tarsus I in ventral view (14) ; tarsus and tibia III (15) and IV (16) in ventral view.




FIGS 17-18 : *Psylloglyphus parapsyllus* n. sp. hypopus in ventral (17) and dorsal (18) views.

Island. This species differs from other species of *Neocalvolia* by its smaller size and the absence of eyes. It more closely resembles *Psylloglyphus parapsyllus* than all the other species of *Neocalvolia*. *P. parapsyllus* differs from all the *Calvolia* and *Neocalvolia* species, except *N. inermis*, by the structure of the apical sclerites of tarsi in the males, the absence of eyes and the small size of the body in the adults and the hypopi. *N. inermis* differs from *P. parapsyllus* in both sexes by the strong reduction of the teeth on the cheliceral digits, the much greater inequality in length of the two solenidia of genu I, in the male by the normal aspect of the apicotarsal spines.

2. *Status of the species Psylloglyphus parapsyllus* (from hypopi) :

The genus *Psylloglyphus* has been divided into 4 subgenera based on the characters of the hypopi : *Psylloglyphus* Fain, 1966, *Hemimeropus* Fain and Beaucournu, 1976, *Tetrapsyllopus* Fain and Beaucournu, 1986 and *Psyllobia* Fain *et al.* 1990 *P. parapsyllus* belongs to the typical subgenus which includes, at present, 6 species It differs from all these species, except *P. vietnamensis* Fain and Beaucournu, 1972, by the aspect of the dorsal shields which are finely punctate and completely devoid of lines, pits, spots or rings. It differs from *P. vietnamensis* by the following characters : apical article of palposoma wider (3,6) than long (2,8), whilst in *P. vietnamentsis* this article is longer (3,4) than wide (2,5) ; anterior margin of epimerites III with a short sclerotized process (absent in *P. vietnamensis*) ; sclerotized part of suctorial plate wider (30-34 instead of 24 in *P. vietnamensis*) ; anteroapical and posteroapical setae of tarsus IV 90-100 and 25 long respectively, whilst in *P. vietnamensis* these lengths are 125 and 14 long respectively ; seta *e* of tarsus I short (18-20) and rodlike, whilst in *P. vietnamensis* this seta is 45-50 long and finely attenuated apically ; seta of femur I shorter (20), whilst 35-40 in P. vietnamensis ; setae *sh* longer (14-16) than in *P. vietnamensis* (9-10) ; distances *sc e* — *sc e* and *sc i* — *sc i* 36-38 and 18-19, whilst in *P. vietnamensis* 42 and 25 respectively.

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