

# A review of feather mites of the *Rhytidelasma* generic group (Pterolichoidea Pterolichidae), specific parasites of parrots (Aves Psittaciformes)

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## Abstract

A systematic review of all currently recognized genera and species of the *Rhytidelasma* generic group (Pterolichidae: Pterolichinae) representing specific ectoparasites of parrots Psittaciformes is presented. Four new genera are established within the generic group: *Cacatolichus* gen. n. with the type species *Pterolichus (Pseudalloptes) spathuliger* TROUËSSART, 1884; *Neorhytidelasma* gen. n. with the type species *Rhytidelasma cornigera* ATYEO & PÉREZ, 1988; *Kakapolichus* gen. n., with the type species *Kakapolichus strigopis* sp. n. from the Kakapo *Strigops habroptilus*; *Psittrichobius* gen. n. with the type species *Psittrichobius eclecticus* sp. n. from the Pesquet's Parrot *Psittrichas fulgidus*. Diagnosis of the genus *Rhytidelasma* GAUD, 1966 is redefined. Two new species belonging to this genus are described from psittacids of the Old World: *Rhytidelasma aprosmictis* sp. n. from the Red-winged Parrot *Aprosmictis erythropterus* and *R. lanceolata* sp. n. from the Masked Shining Parrot *Prosopiea personata*. According to the results of the taxonomic review, the *Rhytidelasma* generic group now includes 33 species and 9 genera. Identification keys for all genera and species of the generic group are presented. Currently known host-parasite associations of the *Rhytidelasma* generic group are briefly analyzed. We conclude that this group of feather mites demonstrates obvious traces of co-evolutionary relationships with their hosts.

Key words: feather mites, Pterolichidae, *Rhytidelasma*, systematics, new taxa, Psittaciformes, host-parasite associations

## Introduction

The pterolichid feather mites associated exclusively with Psittaciformes are represented by three morphologically distinct generic groups belonging to the subfamily Pterolichinae (GAUD & ATYEO, 1996; MIRONOV et al., 2003). Among these, the *Rhytidelasma* group takes second place by the number of known taxa and currently includes 29 species arranged into 5 genera. In ecological aspects, mites of the *Rhytidelasma* group are typical representatives of the morphoecological type adapted to inhabit the plumage feathers with large and hard vanes (MIRONOV, 1987; DABERT & MIRONOV, 1999). These medium and small-sized elongated mites commonly occupy narrow and low corridors formed by barbs in the ventral surface of vanes. This group of feather mites is widely distributed in both hemispheres and associated with all families and most tribes of parrots recently recognized (MIRONOV et al. 2003).

Mites of the *Rhytidelasma* group are characterized by the following combination of morphological features: in

both sexes, the idiosoma is distinctly elongated and usually parallel-sided, vertical setae *vi* absent; males are smaller in size than females; in males, the opisthosomal lobes are usually provided with a pair of leaf-like terminal lamellae having several transverse crests on dorsal surface, the anal discs are surrounded by very large striated membranes, corollae of the discs without indentations, the genital apodemes are formed by enlarged epimerites IVa, legs I-III not hypertrophied, legs IV slightly thickened, and tarsi IV with large claw-like process on paraxial surface of the segment. Taxonomically, this group apparently might warrant treatment as a tribe within the subfamily Pterolichinae. There are no doubts of the monophyly of this group (GAUD & ATYEO, 1996); however, any formal ranking of this group should be made in the frame of general revision of Pterolichidae which is a task for a separate study.

The genus *Rhytidelasma* GAUD, 1966 was originally based on single species *Rhytidelasma grammophylla* (GAUD & MOUCHET, 1959). In further investigations of African feather mites, GAUD (1980) described 3 new *Rhytidelasma* species and also included in this genus 8 species formerly described by TROUËSSART (1884) within the conglomerate genus *Pterolichus* Robin, 1877. Subsequent investigations of the *Rhytidelasma* group were not extensive. ATYEO and coauthors (ATYEO et al. 1988; ATYEO & PÉREZ 1988a-b) explored *Rhytidelasma* species associated with some groups of South American parrots and recognized five species groups within this complex of mites. These authors also noted that species of large-sized parrots, such as *Ara* LACÉPÈDE and *Aratinga* SPLX, may simultaneously harbor representatives of several species groups. Exploring pterolichids from parrots of the Old World, ATYEO & GAUD (1991) established the new genus *Lorilichus* ATYEO & GAUD, 1991, which unites pterolichine mites specific to lorries and lorikeets (Psittacidae: Loriinae). Later on, in their global generic revision of feather mites of the World, GAUD & ATYEO (1996) established three new monotypic genera belonging to the group in question: *Arhytidelasma* GAUD & ATYEO, 1996, *Coracopsobius* GAUD & ATYEO, 1996, and *Psittocolus* GAUD & ATYEO, 1996. Summarizing the results of these investigations, it is possible to state that systematic

study of *Rhytidelasma* group mites is still in its early stage. An additional problem for continuing the exploration of the *Rhytidelasma* group is the paucity of keys to most currently known species.

The main goals of the present study include a taxonomic review of all currently known species of the *Rhytidelasma* generic group, description of new genera and species recognized in the course of this study, creation of identification keys, and brief analysis of host-parasite associations of these mites with the Psittaciformes.

### Material and methods

The main part of the material used in the present study was borrowed in a loan from the University of Georgia (Athens, USA). Other sources of the examined material are the feather mite collections deposited in the Zoological Institute, Russian Academy of Sciences (Saint Petersburg, Russia) and in the Instituto de Biología, Universidad Nacional Autónoma de México (Mexico City, Mexico).

Mite specimens used for light microscope study were mounted on slides in Hoyer's medium (EVANS, 1992). Diagnoses of genera and descriptions of new species are given in the standard formats used for pterolichine taxa of respective ranks (ATYEO et al., 1988; ATYEO & GAUD, 1991). The general morphological terms, leg and idiosomal chaetotaxy follow GAUD & ATYEO (1996). All measurements in the descriptions are given in micrometers ( $\mu\text{m}$ ). Since the number of specimens in most type series was restricted, for the sake of consistency a full set of measurements is given only for the holotype (male) and one paratype (female). The range of idiosomal size (length, width) is displayed for other paratype specimens. Scientific names of birds and supraspecific systematics of parrots used in the present study follow "Handbook of the Birds of the World" (DELHOYO et al. 1997).

Abbreviations used in collection data and to point out an origin of materials and institutions, where type materials of new species are deposited: AMNH - American Museum of Natural History, New York, USA; CNAC or TMP (abbreviations for museum and field collection numbers respectively) - Instituto de Biología, Universidad Nacional Autónoma de México, Mexico City, Mexico; FMNH - Field Museum of Natural History, Chicago, USA; QM - Queensland Museum, Brisbane, Australia; UMMZ - Museum of Zoology, University of Michigan, Ann Arbor, USA; NU - Nebraska University, Lincoln, USA; UGA - University of Georgia, Athens, USA; YSU Youngstown State University, Youngstown, Ohio, USA; VECH - University of Vechta, Vechta, Germany; ZISP - Zoological Institute, Saint Petersburg, Russia. Where a sample is provided with two numbers having different letter abbreviations, the first refers to a collection number of a mite specimen, the second is a collection number of a respective host specimen.

### Notes to the idiosomal chaetotaxy

A characteristic evolutionary tendency observed within the *Rhytidelasma* generic group is loss of certain hysterosomal setae in most derived genera. When one compares application of idiosomal chaetotaxy in different taxa of the *Rhytidelasma* group there is clear discordance in nomenclature of obviously homologous setae in different genera of the group (ATYEO et al., 1988; ATYEO & GAUD, 1991; GAUD & ATYEO, 1996). Therefore, it is necessary to discuss here this problem and provide a basis for the chaetotaxy concept used for the *Rhytidelasma* group in the present study. In genera having the most archaic chaetome within the group (*Psittrichobius* gen. n., *Kakapolichus* gen. n., *Neorhytidelasma* gen. n.), the hysterosoma carries 12 pairs of dorsal and lateral setae (including humeral setae *cp*), which is one pair less than in the maximum set of 13 pairs observed in the most early derivatives of Pterolichidae, for example *Opisthocoma-carus* DUBININ, 1955 and *Struthiopterolichus* Dubinin, 1955. In derived genera, such as *Arhytidelasma* and *Lorilichus*, only 10 pairs of these setae are present. However, it is quite obvious that certain homologous setae receive different designations in recent taxonomic papers.

There are two principal problems in applying setal nomenclature in the *Rhytidelasma* group. The first question concerns the nomenclature for the pairs of setae situated lateral to macrochetae *h2* on the lateral margins of the body. These setae occur in all taxa of the *Rhytidelasma* group. In males, the position of these setae in relation to the transverse level of setae *h2* varies and most commonly they are slightly posterior to *h2* (Figs. 1, 4, 11, 52, 73), while in females, these setae are always slightly anterior to this level (Figs. 7, 9, 14, 16, 64, 95). GAUD & ATYEO (1991) examined species having only one pair of setae in the named places and concluded that these setae are *f2*. However, in the two unique species, *Rhytidelasma punctata* MIRONOV et al., 2003 and *Psittrichobius eclecticus* sp. n., there are two setae in these places near the margins of the opisthosoma. Among these, the larger pair of setae that occurs in all representatives of the *Rhytidelasma* group always occupies in males a slightly posterior position with the setae directed downward (Figs. 11, 34). In females, these setae are equal in size; the anterior pair occupies either a dorsal or lateral position, while the posterior pair is always on the lateral margins in both unique species (Figs. 14, 16). A disposition of these pairs of setae clearly shows that the "additional" pair of setae occurring only in the unique species is really setae *f2*, while the setae always existing in the *Rhytidelasma* group are setae *ps2*.

The second question concerns the nomenclature for several dorsal pairs of setae (1-3 pairs) situated between the levels of the hysteronotal gland openings *gl* and terminal complex of setae. In all species except the unique species mentioned above this terminal complex includes four setae (*h2*, *h3*, *ps1*, *ps2*) disposed on the apices of opisthosomal lobes in males and on the rounded posterior margin or lobe-like extensions in females. In the genera *Neorhytidelasma* and *Kakapolichus*, the area between

openings *gl* and terminal complex of setae carries three pairs of setae and nomenclature for them is indisputable, these are setae *e1*, *e2* and *h1* (Figs. 1, 7, 11, 14). In the females, the setae *e2* are situated slightly posterior to the level of trochanters IV and close to the lateral margins of the hysteronotal shield, particularly near the longitudinal grooves, and the setae *e1* and *h1* are arranged into a rectangle, trapezoid, or transverse row. In two latter cases the setae *h1* occupy lateral position in relation to *e1*. In the males of these genera, the setae *e2* have the same position as in the females, the setae *e1* are at the level of trochanters IV and close to the midline of the body, and the setae *h1* are commonly situated slightly anterior and mesal to the macrochaetae *h2*. Comparison of the hysteronotal setal arrangement in *Neorhytidelasma* and *Rhytidelasma* (Figs. 28, 44, 52, 64) clearly shows that in the latter genus the setae *e2* have been lost. The cases of derived *Lorilichus* and *Arhytidelasma* are more complicated, because there is only one pair of setae between the levels of the openings *gl* and terminal complex of setae, while two other pairs have been lost (Figs. 73, 95). ATYEO & GAUD (1991) concluded for unknown reasons that this single pair corresponds to the setae *e2*. As it was shown above, the normal position of setae *e2* both in the males and females is slightly posterior to the level of trochanters IV and near the lateral margins of the hysteronotal shield. However in *Lorilichus* and *Arhytidelasma*, the dorsal areas normally carrying setae *e2* in the *Rhytidelasma* group are empty. At the same time in the males and females of these derived genera, the setae referred by ATYEO & GAUD as setae *e2* occupy the positions normally occupied by setae *h1*. In the males of *Lorilichus*, these setae are slightly anterior to macrochaetae *h2* (Fig. 73), as is common for most other genera of the *Rhytidelasma* group (Figs. 1, 28, 52). In the females (Figs. 95-102), these setae obviously correspond to the lateral pair of setae of those cases, for example in *Rhytidelasma* and *Neorhytidelasma*, where setae *e1* and *h1* are arranged in a transverse row (Figs. 47, 64, 66). Therefore, in contrast to the concept of ATYEO & GAUD (1991) we refer to this pair of setae as *h1*.

#### Key to genera of the *Rhytidelasma* generic group

1. Idiosomal setae *dl*, *e1* absent ..... 2
  - Idiosomal setae *dl*, *e1* present ..... 4
2. Setae *e2* present (Figs. 4, 7) .. *Cacatolichus* gen. n.
  - Setae *e2* absent (Fig. 73) ..... 3
3. Tibial setae *kT* IV present. Distal margin of ambulacral disc smooth or with very weak indentations (Figs. 75, 77) ... *Lorilichus* ATYEO & GAUD, 1991
  - Tibial setae *kT* IV absent. Distal margin of ambulacral disc with acute apical extension (Fig. 94) ..... *Arhytidelasma* GAUD & ATYEO, 1996.
4. Tibial setae *kT* IV absent ..... *Psittocolus* GAUD & ATYEO, 1996
  - Tibial setae *kT* IV present ..... 5
5. Setae *e2* present ..... 6
  - Setae *e2* absent ..... 7
6. Humeral shields entire. In males, prodorsal shield fused with scapular shields; opisthosoma with angle-like or semi-rounded lateral extensions; with or without terminal lamellae; setae *h1* hair-like, very short (Figs. 52, 54). In females, setae *e1* and *h1* arranged into transverse row or low trapezoid (Figs. 64-71) .. *Neorhytidelasma* gen. n.
  - Humeral shields separated into anterior and posterior plates. In males, prodorsal shield clearly separated from scapular shields; opisthosomal lobes widely rounded, without lateral extensions, without terminal lamellae, setae *h1* thick, needle-like (Fig. 1). In females, setae *e1* and *h1* arranged into long longitudinal rectangle (Fig. 7) ..... *Kakapolichus* gen. n.
7. Setae *f2* present ..... 8
  - Setae *f2* absent ..... 9
8. Epimerites I free. In males, setae *h1* situated anterior to bases of opisthosomal lobes, terminal lamellae without transverse crests (Figs. 11, 12) ..... *Psittrichobius* gen. n.
  - Epimerites I fused to form a V. In males, setae *h1* situated near bases of setae *h2*; terminal lamellae with transverse crests (Fig. 34) ..... *Rhytidelasma* GAUD, 1966 (part)
9. In males, opisthosomal lobes greatly elongated, about 3 times longer than wider, with short and wide terminal lamellae without transverse crests (Fig. 42) ... *Coracopsobius* GAUD & ATYEO, 1996
  - In males, opisthosomal lobes short, usually bluntly rounded, with leaf-like or obtuse triangular terminal lamellae, with dorsal transverse crests (Figs. 18, 19, 21, 22) ..... *Rhytidelasma* GAUD, 1966 (part)

#### *Kakapolichus* MIRONOV & PÉREZ gen. n.

TYPE SPECIES: *Kakapolichus strigopis* sp. n.

BOTH SEXES. Pterolichine mites with quadrate subcapitulum. Prodorsal shield trapezoidal, encompassing bases of scapular setae, not fused with scapular shields. Vertical setae *vi* absent. Dorsal hysterosomal setae *f2* absent. Scapular setae *si* simple, setiform. Subhumeral setae *c3* lanceolate. Hysteronotal gland openings *gl* and cupules *ia*, *im* visible. Humeral shields separated into anterior and posterior fragments. Epimerites I fused to form a Y, with short sternum. Bases of epimerites I-IV not enlarged, coxal fields I-IV without large sclerotized areas. Setae *ba* equidistant from solenidion  $\sigma 1$  and seta *d* on tarsi I, II. Solenidion  $\sigma 2$  of genu I absent. Tibial setae *kT* III and *kT* IV present. Ambulacral discs circular, with fine indentations on distal margin.

MALE. Opisthosomal lobes very short and wide, with bluntly rounded posterior ends, without lateral extensions (Fig. 1). Terminal cleft obtuse-angular. Supranal concavity fused with terminal cleft. Narrow and sclerotized interlobar membrane spreads along margin of terminal cleft and

lobar apices. Setae *h1* situated near bases of setae *h2*, enlarged, needle-like. Hysteronotal shield not fused with lateral sclerites of epimerites IV. Genital apparatus between levels of trochanters III and IV. Genital apodemes formed by enlarged epimerites IVa, extending by anterior ends to base of genital apparatus (Fig. 2). Anal discs circular, small, surrounded by wide, usually striated membranes; corolla without indentations. Adanal and genital shields absent. Legs IV slightly thicker than legs III, segments of legs I-III not modified. Tarsus IV with claw-like apical process on paraxial surface of the segment. Setae *e* of tarsus IV absent, seta *d* button-like (Fig. 3).

**FEMALE.** Posterior margin of opisthosoma widely rounded, without extensions. Hysteronotal shields entire, extending to posterior margin of opisthosoma. Supranal concavity well expressed. All dorsal hysteronotal setae simple, setiform. Setae *e1* situated at level of trochanters IV; setae *e1*, *h1* arranged into longitudinal rectangle (Fig. 7). Epigynium bow-like, situated at level of posterior ends of scapular shields (Fig. 8).

**DIFFERENTIAL DIAGNOSIS.** *Kakapolichus* differs from all genera of the *Rhytidelasma* group, including other new genera described below, by the following combination of characters: in both sexes, all five pair of dorsomedian setae (*c1*, *d1*, *e1*, *h1*, *h3*) and lateral setae *e2* are present, epimerites I are fused to form a Y; in males, the opisthosoma is without angular lateral extensions and terminal lamellae, setae *h1* are enlarged, needle-like or narrowly lanceolate; in females setae *e1* and *h1* are arranged into very long longitudinal rectangle. The new genus coincides by the set of idiosomal chaetome with the genus *Neorhytidelasma* gen. n. (see below) encompassing all species associated exclusively with South American parrots of the tribe Arini and formerly referred to the genus *Rhytidelasma*. However, the males of *Kakapolichus* are distinguished from the latter genus by the structure of prodorsal and hysteronotal shields, which are clearly separated respectively from scapular shields and lateral sclerites between trochanters III and IV, by having the enlarged setae *h1* and by the absence of lateral extension in opisthosomal lobes; the females differ by the position of setae *e1*, which are distant from setae *h1* and situated approximately at the level of trochanters IV.

The genus is monotypic.

**HOSTS.** Kakapo *Strigops habroptilus* GRAY (Psittacinae: Strigopini).

**ETYMOLOGY.** Contraction of Kakapo, a common name of the host of type species, and *Pterolichus* ROBIN, 1877.

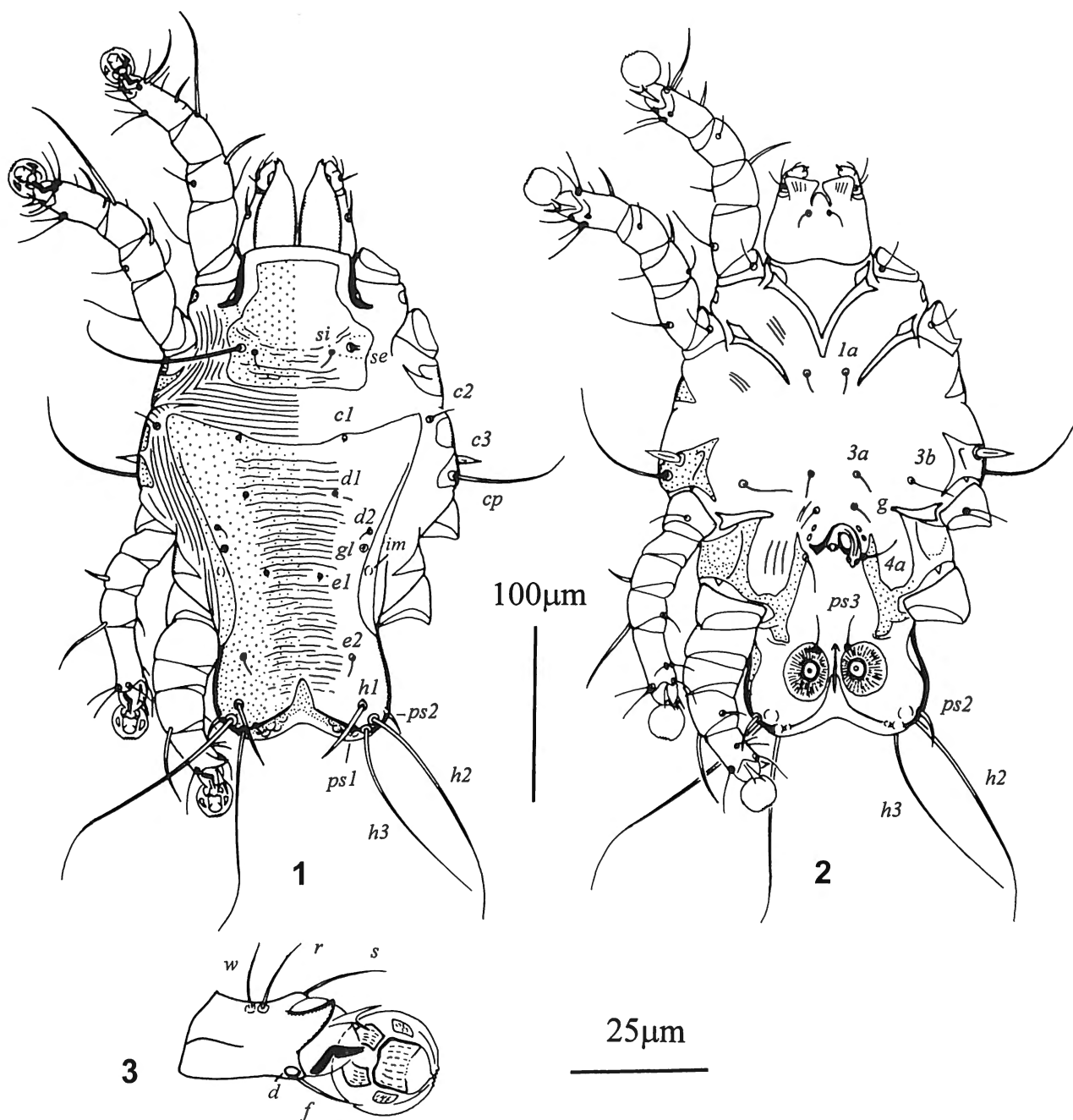
***Kakapolichus strigopis* MIRONOV & PÉREZ gen. n.**  
(Figs. 1-3, 7, 8)

**TYPE MATERIAL.** Male holotype, 8 male and 5 female paratypes from the Kakapo *Strigops habroptilus* GRAY

(Psittacinae: Strigopini), Milford Sound, South Is., New Zealand, circa 1890, unknown coll. (YSU 2546, AMNH 623841); 3 males from the same host, Otago, South Is., New Zealand, circa 1890, unknown coll. (YSU 2547, AMNH 623843). Holotype and paratypes - UMMZ, paratypes - ZISP, CNAC.

**DESCRIPTION.** Male (holotype). Idiosoma length excluding membranes 285, width 187 (idiosomal size in 8 paratypes 280-295 x 180-192). Prodorsal shield: greatest length 75, width at posterior margin 71, without extending anterolateral projection, with weak transverse striation in posterior part; posterior angles rounded (Fig. 1). Distance between scapular setae: *se-se* 57, *si-si* 42. Hysteronotal shield: greatest length 184, width of anterior part 146, anterior margin concave, surface in median part with transverse striation. Hysteronotal gland openings *gl* slightly posterior to setae *d2*. Setae *h1* thick needle-like, 33 in length, about 3 in width. Opisthosoma with almost parallel lateral margins, without lateral extensions, opisthosomal lobes wide and short, terminal cleft wide and shallow, supranal concavity fused with terminal cleft, total length of the cleft 31. Interlobar membrane spreading along margin of terminal cleft and lobar apices narrow, about 8-10, with scale-like sclerotized pattern on dorsal surface; incision in the membrane 11. Dorsal measurements (distances between setae or between setal rows): *c1-c1* 62, *d1-d1* 51, *e1-e1* 31, *h1-h1* 73, *h3-h3* 71, *c1-d2* 54, *c2-d2* 62, *d2-e1* 33, *d2-h1* 105. Epimerites I fused in a Y-shape, with short sternum. Genital apparatus with finger-like curved aedeagus about 30 in length and very short tips of genital arch (Fig. 2). Genital apodemes with acute anterior ends, extending to level of genital acetabulae. Setae *3a* slightly anterior to *3b*. Setae *4a* on genital apodemes, near level of genital apparatus base. Anal discs ovate, with wide punctured and striated membrane. Ventral measurements: *3a-g* 22, *g-4a* 28, *4a-ps3* 53. Tarsus IV 24 in length along antaxial surface, with distal paraxial claw (Fig. 3).

**FEMALE (PARATYPE).** Idiosomal length 470, width 254 (idiosomal size in 4 other paratypes 460-472 x 248-258). Prodorsal shield as in male, but without striation, length 102, width 100 (Fig. 7). Distance between scapular setae *se-se* 78, *si-si* 60. Hysteronotal shield: greatest length 390, width of anterior part 197, anterior margin concave, surface with numerous transverse striations in anterior 2/3, pygidial part of the shield with lateral shallow incisions. Cupules *im* posterior to hysteronotal gland openings *gl*; setae *e1* situated at level of posterior margins of trochanters IV, setae *e1* and *h1* arranged into longitudinal rectangle about 75 in length. Supranal concavity ovate. Opisthosoma between setae *h3* shallowly concave. Dorsal measurements: *c1-c1* 88, *d1-d1* 64, *e1-e1* 48, *h1-h1* 38, *h3-h3* 31, *c1-d2* 90, *c2-d2* 102, *d2-e1* 57, *d2-h1* 135. Epimerites I fused in a Y-shape. Epigynium bow-like, 15 x 57 (in other females 14-17 x 54-58) (Fig. 8). Solenidion  $\phi$  of tibia IV about one quarter length of tarsus IV.



Figs. 1-3 — *Kakapolichus strigopis*, male. 1: dorsal view, 2: ventral view, 3: dorsal view of tarsus IV.

ETYMOLOGY. Specific epithet derives from the generic name of the host.

***Cacatolichus* MIRONOV & PÉREZ gen. n.**

TYPE SPECIES: *Pterolichus (Pseudaloptes) spathuliger* TROUSSART, 1884.

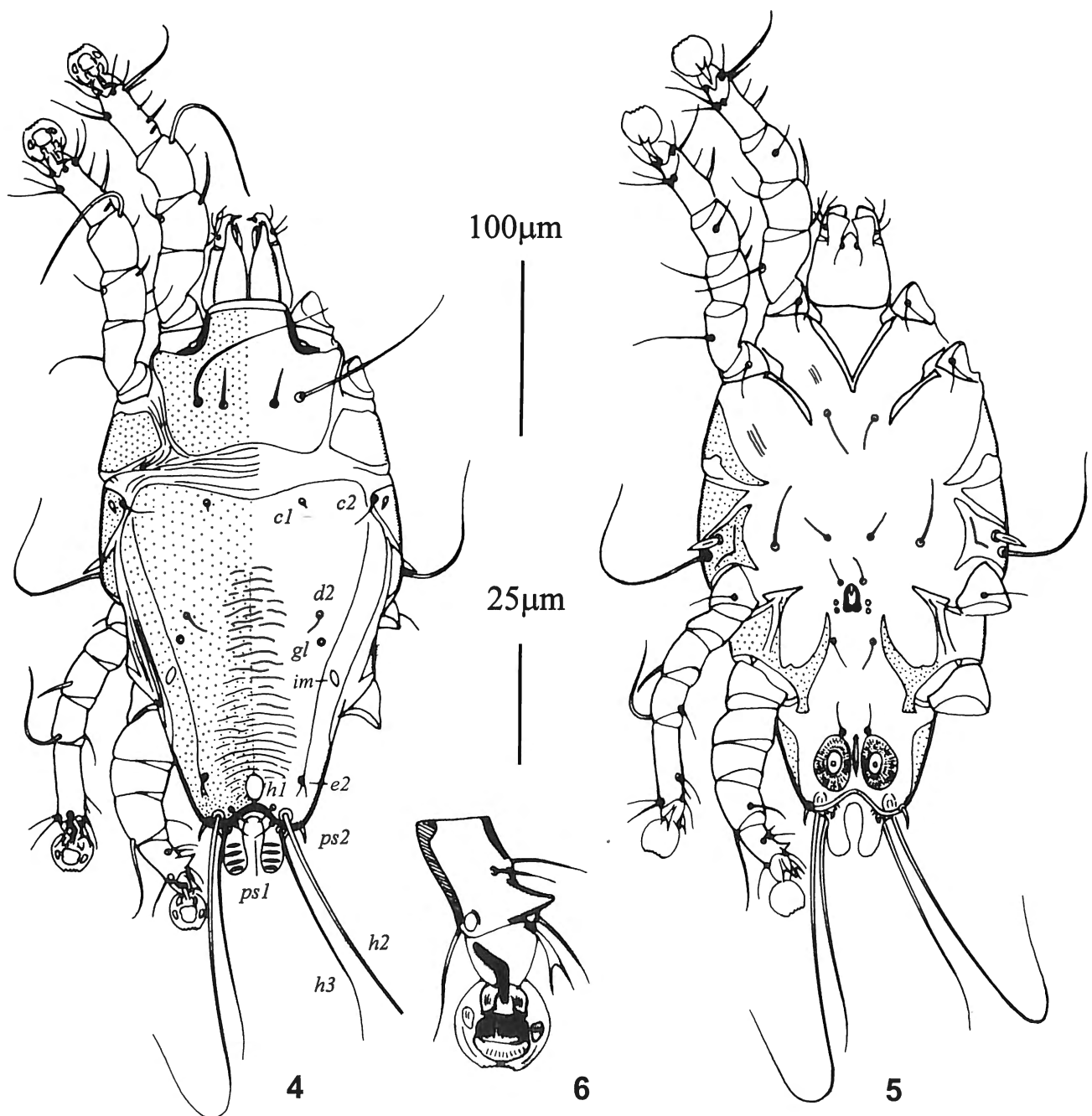
BOTH SEXES. Pterolichine mites with quadrate subcapitulum. Prodorsal shield trapezoidal, occupying most part of

prodorsum, encompassing bases of scapular setae, with anterolateral projections extending to margin of the body and rudiments of epimerites Ia, not fused with scapular shields (Fig. 4). Vertical setae *vi* absent. Dorsal hysterosomal setae *d1*, *e1*, *f2* absent. Scapular setae *si* simple, thin needle-like. Subhumeral setae *c3* lanceolate. Hysteronotal glands and cupules *ia*, *im* visible. Humeral shield separated into anterior and posterior fragments. Epimerites I fused to form a V. Bases of epimerites I-IV not enlarged, coxal fields I-IV without large sclerotized areas. Setae *ba* approximately equidistant from soleni-

dion  $\omega 1$  and seta  $d$  on tarsi I, II. Solenidion  $\sigma 2$  of genu I absent. Tibial setae  $kT$  III and  $kT$  IV present. Ambulacral discs ovate, distal margin with indentations.

**MALE.** Opisthosoma slightly attenuate to posterior end, opisthosomal lobes very short, with bluntly rounded posterior ends, without lateral extensions. Terminal cleft shallow. Supranal concavity closed, ovate. Posterior ends of opisthosomal lobes with leaf-like terminal lamellae carrying several transverse crests on dorsal surface. Setae  $h1$  setiform, situated near and mesal to bases of setae  $h2$ .

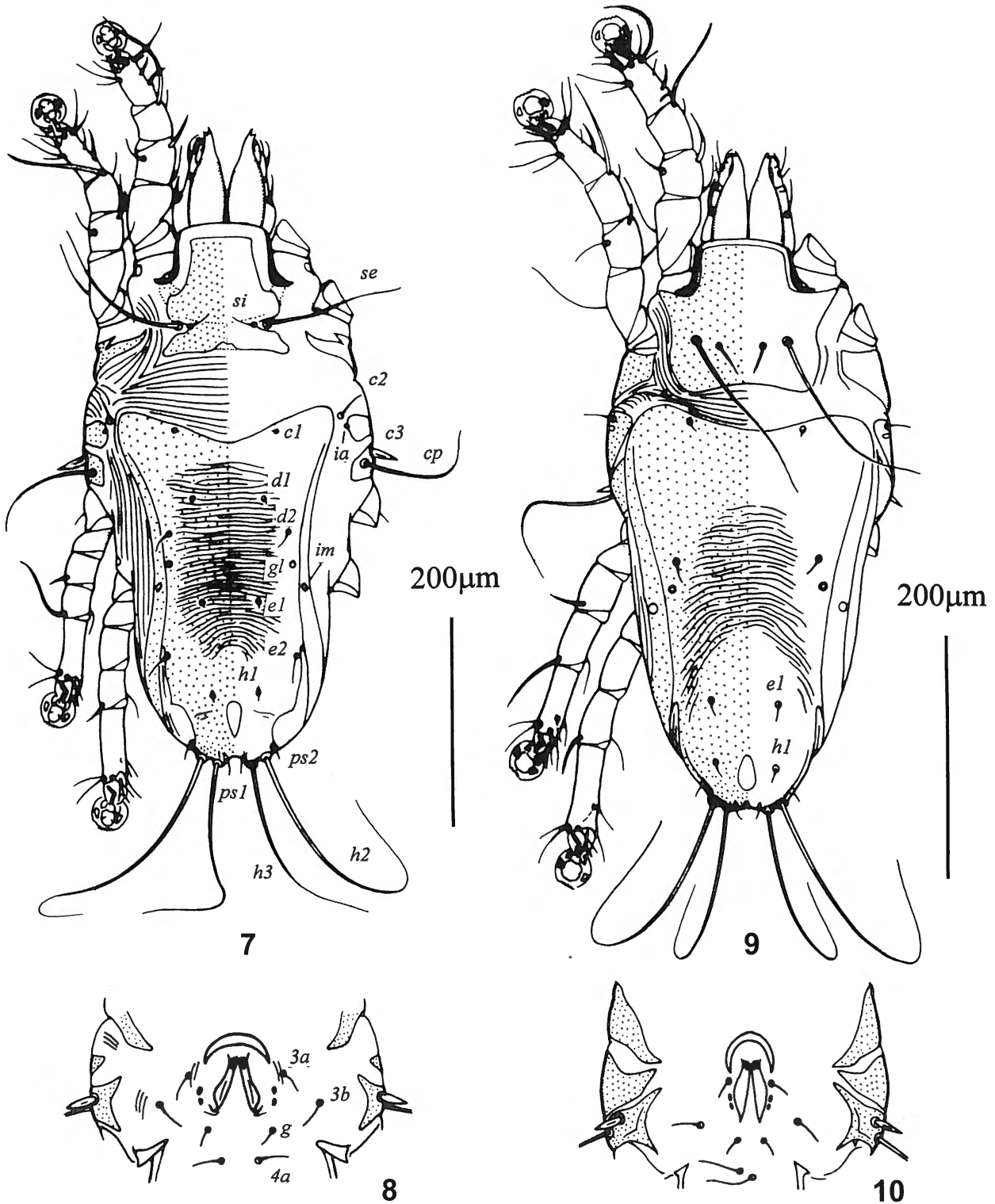
Hysteronotal shield not fused with lateral sclerites of epimerites IV. Genital apparatus slightly posterior to level of trochanters III. Genital apodemes formed by enlarged epimerites IVa, extending by anterior ends to base of genital apparatus. Anal discs ovate, with wide punctured and striated membranes, corolla without indentations. Adanal and genital shields absent. Legs IV enlarged, slightly thicker than legs III, segments of legs I-III not modified. Tarsus IV with claw-like apical process on paraxial surface of the segment. Seta  $e$  of tarsus IV absent, seta  $d$  button-like.



Figs. 4-6 — *Cacatolichus spathuliger*, male. 4: dorsal view, 5: ventral view, 6: dorsal view of tarsus IV.

FEMALE. Posterior margin of opisthosoma widely rounded, without extensions. Hysteronotal shields entire, extending to posterior margin of opisthosoma. Supranal concavity present, ovate. All dorsal hysteronotal setae

simple, setiform. Setae *e1*, *h1* in posterior one third of hysterosoma, arranged into rectangle. Epigynum bow-like, situated at level of posterior ends of epimerites IIa, tips not extending to level of genital discs.



Figs. 7-10 — Females of *Kakapolichus* and *Cacatolichus*. 7: *Kakapolichus strigopis*, dorsal view, 8: idem, oviporus, 9: *Cacatolichus spathuliger*, dorsal view, 10: idem, oviporus.

**DIFFERENTIAL DIAGNOSIS.** By the general appearance, this monotypic genus is most similar to the genus *Rhytidelasma* (in the restricted concept proposed in the present study) by having the leaf-like terminal lamellae with transverse crests in the males (Figs. 4, 18, 21). *Cacatolichus* differs from *Rhytidelasma* and all other genera of the group in question by the simultaneous absence of setae *d1* and *e2*. These setae are also absent in *Lorilichus* and *Arhytidelsama*, but in two latter genera the absence of setae *d1* and *e2* is combined with the lack of setae *e1* (Fig. 73).

**HOSTS.** Cockatoos of the genus *Calyptorhynchus* DESMAREST (Calyptorhynchinae).

**ETYMOLOGY.** Contraction of Cacatuidae, the family name of hosts, and *Pterolichus*.

***Cacatolichus spathuliger* (TROUESSART, 1884) comb. n.**  
(Figs. 4-6, 9, 10)

*Pterolichus* (*Pseudalloptes*) *spathuliger* TROUESSART, 1884: 577; CANESTRINI & KRAMER, 1899: 63.

*Pseudalloptes spathuliger*: FAVETTE & TROUESSART, 1904: 125.

*Rhytidelasma spathuligera*: GAUD, 1980: 32; ATYEO et al., 1988: 187.

**MATERIAL EXAMINED:** 1 male, 1 female from the Red-tailed Cockatoo *Calyptorhynchus banksii macrorhynchus* GOULD (Cacatuidae: Calyptorhynchinae), New South Wales, Australia, no other data (CNAC 001376; 001377); 2 males, 4 females from *Calyptorhynchus banksii* (LATHAM), Australia, no other data (VECH 73/Os).

This species is known only from the Red-tailed Cockatoo *C. banksii* in Australia (TROUESSART, 1884; ATYEO et al., 1988); originally it was described from the subspecies *C. banksii macrorhynchus*.

***Psittrichobius* MIRONOV & PÉREZ gen. n.**

**TYPE SPECIES:** *Psittrichobius eclecticus* sp. n.

**BOTH SEXES.** Pterolichine mites with quadrate subcapitulum. Prodorsal shield occupying most part of prodorsum, with lateral incisions around setae *se*, not fused with scapular shields. Vertical setae *vi* absent. Dorsal hysterosomal setae *e2* absent. Scapular setae *si* simple, setiform. Subhumeral setae *c3* lanceolate. Hysteronotal gland openings *gl* and cupules *ia*, *im* visible. Humeral shield separated into anterior and posterior fragments. Epimerites I free. Bases of epimerites I-IV not enlarged, coxal fields I-IV without large sclerotized areas. Setae *ba* equidistant from solenidion  $\omega 1$  and seta *d* on tarsi I, II. Solenidion  $\sigma 2$  of genu I absent. Tibial setae *kt* III and *kt* IV present. Ambulacral discs circular, without indentations on distal margin.

**MALE.** Opisthosomal lobes elongated, with attenuate and rounded posterior ends, without lateral extensions (Fig. 11). Terminal cleft V-shaped, with rounded anterior end. Supranal concavity fused with terminal cleft. Lobar apices with small leaf-like terminal lamellae without crests. Setae *h1* setiform, situated anterior to bases of opisthosomal lobes. Hysteronotal shield not fused with lateral sclerotized fields of epimerites IV. Genital apparatus posterior to level of trochanters III. Genital apodemes formed by enlarged epimerites IVa, not extending to base of genital apparatus (Fig. 12). Anal discs ovate, with wide striated membranes, corolla without indentations. Adanal and genital shields absent. Legs IV two times thicker than legs III, segments of legs I-III not modified. Tarsus IV with claw-like apical process on paraxial surface of the segment. Seta *e* of tarsus IV absent, seta *d* button-like.

**FEMALE.** Posterior margin of opisthosoma widely rounded, without terminal extension. Hysteronotal shields entire, extending to posterior margin of opisthosoma. Supranal concavity present. All dorsal hysteronotal setae simple, setiform. Setae *e1*, *h1* situated in posterior one quarter of hysterosoma, arranged in transverse bow curved anteriorly. Epigynium as weakly curved transverse sclerite, situated at level of ventral angles of scapular shields, not extending to level of genital discs.

**DIFFERENTIAL DIAGNOSIS.** This genus is closely related to *Rhytidelasma* (in the present concept) by the set of idiosomal chaetome, however it differs from this genus and other taxa of the *Rhytidelasma* group by the following combination of characters: in both sexes, setae *f2* is present, the epimerites I are free; in the males, the terminal lamellae lack dorsal crests, setae *h1* are anterior to the bases of opisthosomal lobes. The presence of setae *f2* is the most clear differential feature of this genus.

**REMARK.** It is worthy to note, that each differentiating character listed in previous paragraph may be found as rare exceptions in some species of the genera *Rhytidelasma*, *Neorhytidelasma*, and *Lorilichus*, but any combination of two or more of these characters never occurs in the representatives of these genera. It is possible to suggest that all listed features apparently represent plesiomorphic states of respective characters, and the single species of the genus *Psittrichobius* represents a very archaic form among the *Rhytidelasma* generic group.

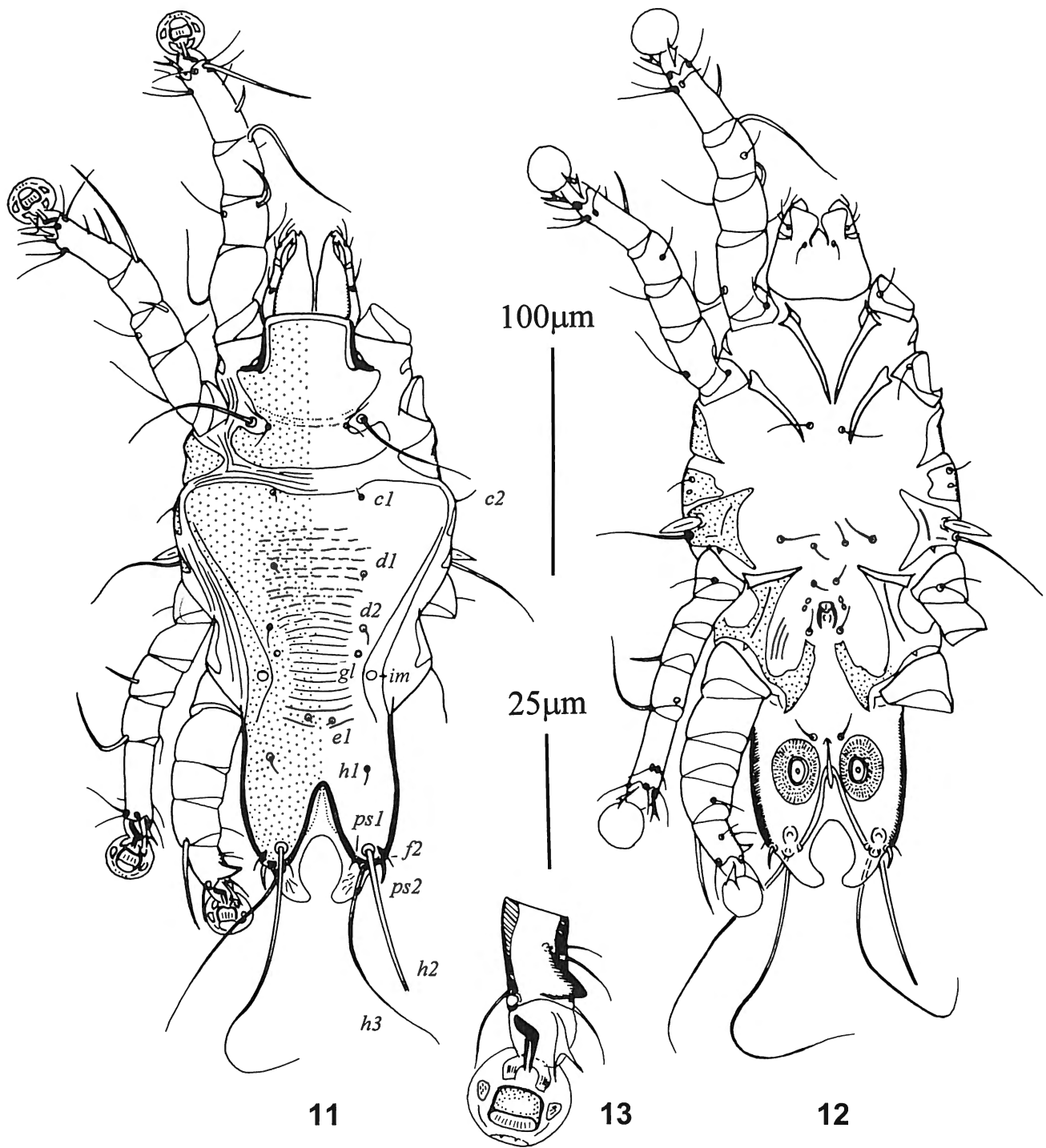
**HOSTS.** Pesquet's parrot *Psittrichas fulgidus* (LESSON) (Psittacinae: Psittrichadini).

**ETYMOLOGY.** Contraction of the generic name of host and *bios* (Gr., life).

***Psittrichobius eclecticus* MIRONOV & PÉREZ gen. n.**  
(Figs. 11-15)

**TYPE MATERIAL.** Male holotype, 1 male paratype from the

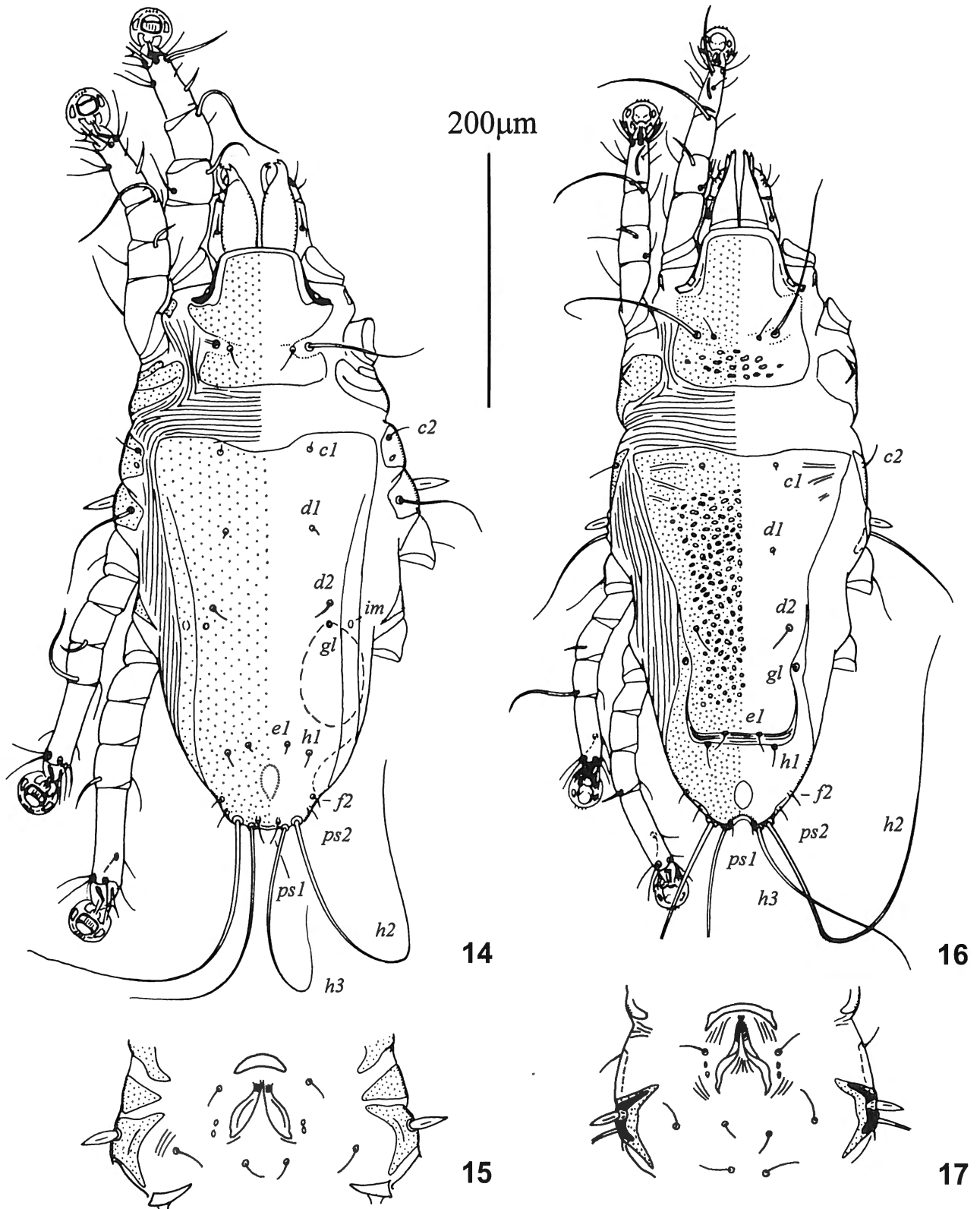




Figs. 11-13 — *Psittrichobius eclecticus*, male. 11: dorsal view, 12: ventral view, 13: dorsal view of tarsus IV.

Pesquet's Parrot *Psittrichas fulgidus* (Psittacinae: Psittrichadini), British New Guinea, 19 X 1928, coll. R. H. BECK (NU 5662, AMNH 166968), 1 male and 1 female paratypes, same host species and location, 6 XII 1928, coll. R. H. BECK (NU 5661, AMNH 266967), 1 female paratype, same host species, New Guinea 14 VII 1928, coll. E. MAYR (NU 5663, AMNH 293598). Holotype, paratypes - UMMZ, paratypes - ZISP.

MALE (HOLOTYPE). Idiosoma length excluding terminal lamellae 245, width 117 (idiosomal size in 2 paratypes 240-248 x 115-120). Prodorsal shield: greatest length 75, width at posterior margin 70, without extending anterolateral projection, without ornamentation; posterior angles rounded (Fig. 11). Distance between scapular setae: *se-se* 45, *si-si* 27. Hysteronotal shield: greatest length 173, width of anterior part 113, anterior margin slightly



Figs. 14-17 — Females of *Psitrichobius* and *Rhytidelasma*. 14: *Psitrichobius eclecticus*, dorsal view, 15: idem, oviporus, 16: *Rhytidelasma punctata*, dorsal view, 17: idem, oviporus.

concave in median part, surface in median 1/3 with transverse striation. Hysteronotal gland openings *gl* posterior to setae *d2*. Setae *h1* thin, situated anterior to base of opisthosomal lobes, approximately at level of articulation between femur and genu IV, setae *f2* slightly anterior to bases of setae *ps2*. Opisthosomal lobes slightly attenuate posterior, with rounded apices; terminal cleft V-shaped, with rounded anterior end, 60 in length. Terminal lamellae tongue-shaped, slightly convergent by distal ends, length from base of *h3* 16-18, greatest width 9-10; incision between lamellae as longitudinal oval, 26 in length, 22 in width. Dorsal measurements: *c1-c1* 40, *d1-d1* 36, *e1-e1* 11, *h1-h1* 40, *h3-h3* 33, *c1-d2* 68, *c2-d2* 70, *d2-e1* 29, *d2-h1* 50. Epimerites I free, without sclerotizations around arms. Genital apparatus small, genital arch 12 x 10, aedeagus shorter than arch. Genital apodemes extending to level of setae *4a*. Setae *3a*, *3b* approximately at the same transverse level. Anal discs ovate, with wide punctured and striated membrane (Fig. 12). Ventral measurements: *3a-g* 20, *g-4a* 22, *4a-ps3* 44. Tarsus IV 22 in length, with distal paraxial claw (Fig. 13).

FEMALE (PARATYPE). Idiosomal length 425, width 218 (idiosomal size in other paratype 430 x 220). Prodorsal shield as in the male, length 102, width 93. Distance between scapular setae *se-se* 62, *si-si* 45. Hysteronotal shield: greatest length 285, width of anterior part 160, anterior margin concave in median part, surface uniformly dotted, without ornamentation. Cupules *im* at level of openings *gl*; setae *e1* and *h1* arranged into very low trapezium; distance between rows of these setae 2-4 (Fig. 14). Supranal concavity ovate, weakly expressed. Opisthosoma between setae *h3* slightly convex. Dorsal measurements: *c1-c1* 64, *d1-d1* 64, *e1-e1* 29, *h1-h1* 56, *h3-h3* 27, *c1-d2* 117, *c2-d2* 117, *d2-e1* 106, *d2-h1* 110. Epimerites I free as in the male. Epigynium as slightly curved transverse sclerite, 12 x 44 (Fig. 15).

ETYMOLOGY. From *electos* (Gr. selected), to point out the combination of different archaic features which also occur in other genera.

### *Rhytidelasma* GAUD, 1966, redefined

*Rhytidelasma* GAUD, 1966: 126; 1980: 38, ATYEO et al., 1988: 176; ATYEO & PÉREZ, 1988a: 86, 1988b: 83.

TYPE SPECIES: *Pseudalloptinus grammophyllus* GAUD & MOUCHET, 1959.

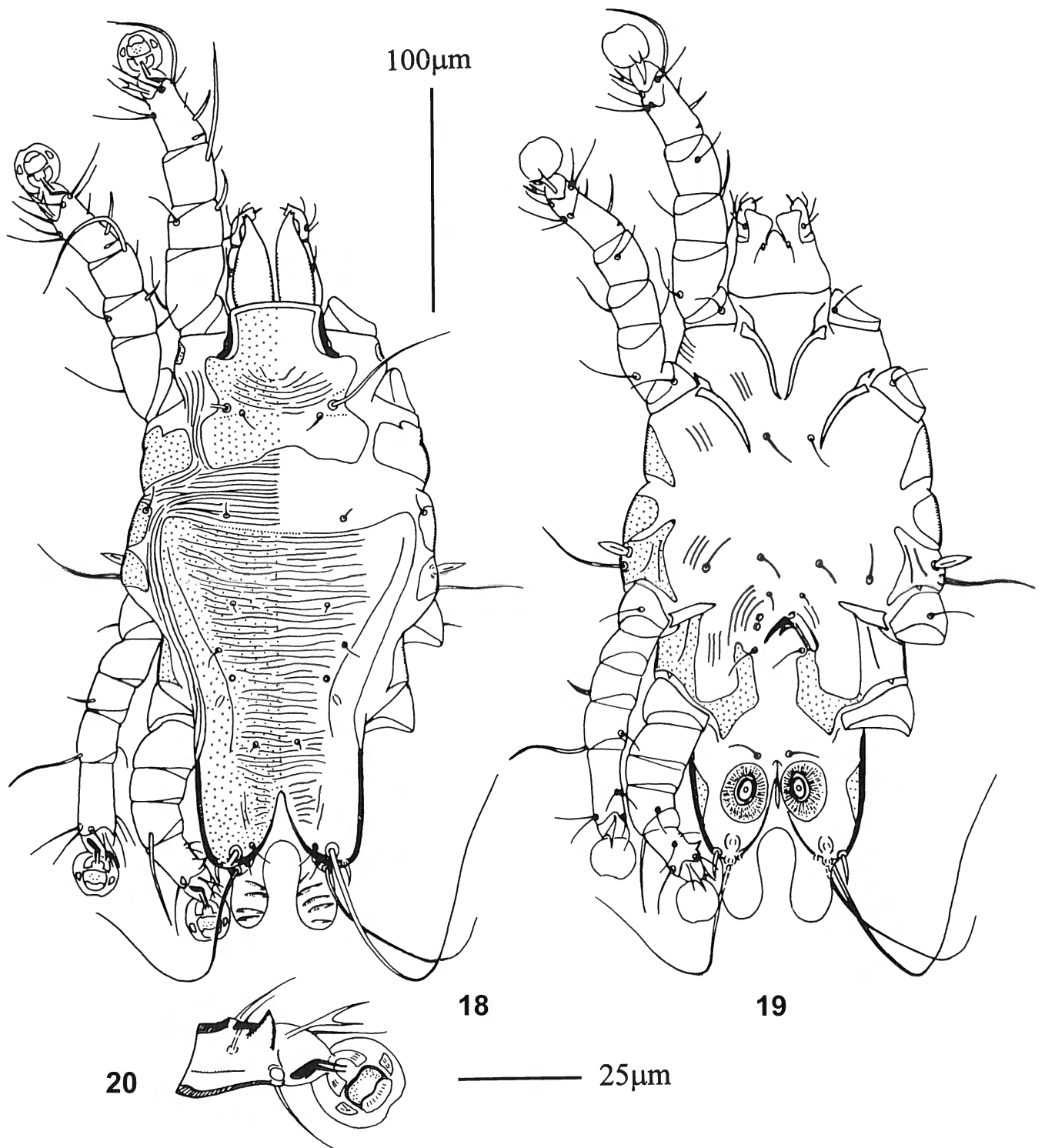
BOTH SEXES. Pterolichine mites with quadrate subcapitulum. Prodorsal shield covering most part of prodorsum, encompassing both pair of scapular setae or with lateral incisions around setae *se*, usually with rounded anterolateral extensions, not fused with scapular shields (Figs. 18, 21). Vertical setae *vi* absent. Dorsal hysterosomal setae *e2*, *f2* absent (*f2* present in *R. punctata*). Scapular

setae *si* simple, setiform. Subhumeral setae *c3* lanceolate. Hysteronotal gland openings *gl* and cupules *ia*, *im* usually visible (openings *gl* or cupules *im* invisible in some species). Humeral shields separated into anterior and posterior fragments. Epimerites I Y- or V-shaped, rarely free with almost contiguous tips (Figs. 19, 22). Bases of epimerites I-IV not enlarged, coxal fields I-IV without large sclerotized areas. Setae *ba* approximately equidistant from solenidion  $\omega 1$  and seta *d* on tarsi I, II. Solenidion  $\sigma 2$  of genu I absent. Tibial setae *kT* III and *kT* IV present. Ambulacral discs circular, with or without indentations on distal margin.

MALE. Opisthosomal lobes usually short, with attenuate and rounded posterior ends, without lateral extensions. Terminal cleft V-shaped, with angular or rounded anterior end. Supranal concavity present, usually ovate in form, or absent because of complete fusion with terminal cleft. Lobar apices with small leaf-like or obtuse-angular terminal lamellae carrying transverse crests on dorsal surface. Setae *h1* setiform or lanceolate, situated slightly anterior and usually mesal to bases of macrochaetae *h2*. Hysteronotal shield not fused with lateral sclerites of epimerites IV. Genital apparatus between levels of trochanters III and IV. Genital apodemes formed by enlarged epimerites IVa, extending by anterior ends to level of genital apparatus and often flanking it from lateral sides. Anal discs ovate, with wide punctured and striated membranes, corolla without indentations. Adanal and genital shields absent. Legs IV thicker than legs III, segments of legs I-III not modified. Tarsus IV with claw-like apical process on paraxial surface of the segment. Seta *e* of tarsus IV absent, seta *d* button-like (Figs. 20, 23).

FEMALE. Posterior end of opisthosoma widely rounded, or posterior end with attenuate terminal extension, usually cone like in form; opisthosomal margin between setae *h3* either shallowly concave or convex. Hysteronotal shields extending to posterior margin of opisthosoma, one-pieced, or its pygidial part (posterior one quarter of hysterosoma) partly or completely separated from the rest part of the shields by transverse lacuna or band of soft striated tegument (Figs. 24, 26, 44-47). Supranal concavity absent or present, ovate if present. All dorsal hysteronotal setae simple, setiform. Setae *e1*, *h1* situated in posterior one quarter of hysterosoma, variously arranged, usually in trapezoid arrangement or transverse row. Epigynium as transverse bow-like sclerite, situated at level of ventral angles of scapular shields, not extending to level of genital discs (Figs. 25, 27).

REMARK. Before the present study, the genus *Rhytidelasma* included most representatives of the *Rhytidelasma* generic group (ATYEO et al., 1988). In the present concept it includes only 9 species associated with Psittacidae of the Old World, while *Rhytidelasma spathuligera* is moved into a separate new genus *Cacatolichus*, and species associated with South American parrots are ar-



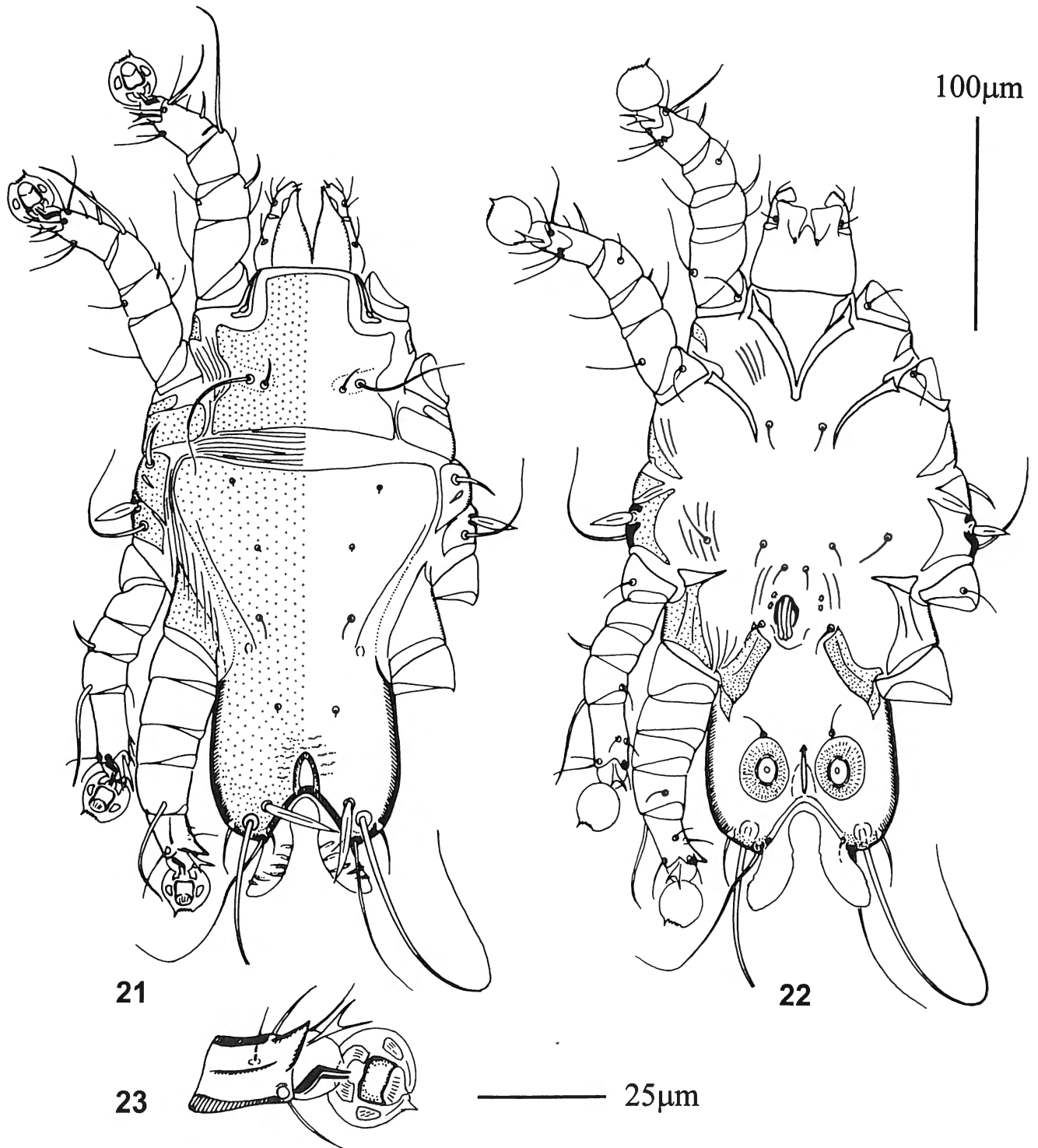
Figs. 18-20 — *Rhytidelasma aprosmictis*, male. 18: dorsal view, 19: ventral view, 20: dorsal view of tarsus IV.

ranged into a new genus *Neorhytidelasma* (see below). Even in the restricted concept, the genus *Rhytidelasma* is rather diverse in morphological features and represents several species groups. These groups may be characterized by following features.

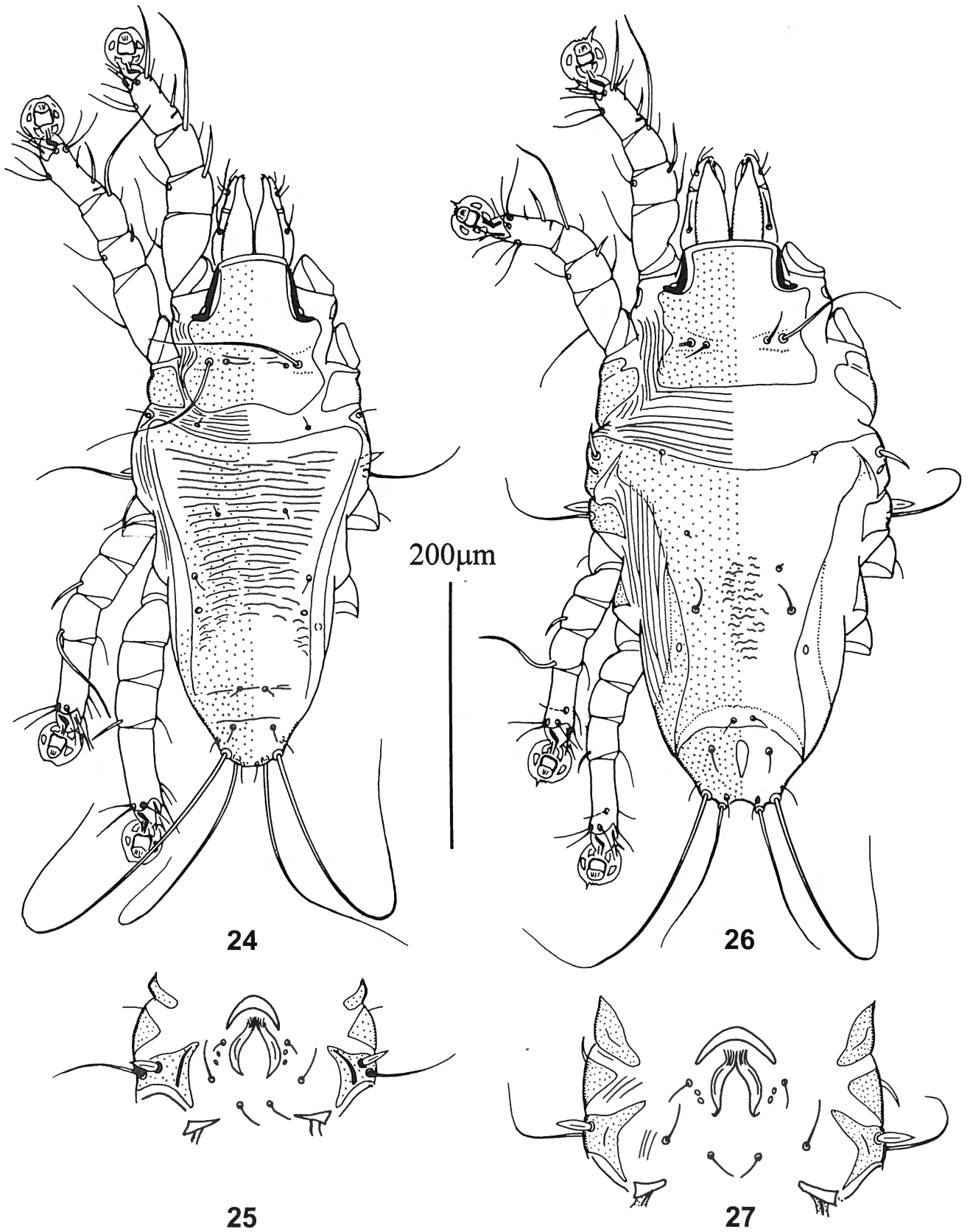
The *aprosmictis* group (3 species): in both sexes, epimerites I not fused; in males, setae *h1* setiform.

The *lanceolata* group (2 species): in both sexes, epimerites I fused to form a Y or V; in males setae *h1* lanceolate.

The *grammophylla* group (4 species): in both sexes epimerites I fused to form a Y or V; in males setae *h1* setiform. This group is probably more closely related to the *aprosmictis* than to the *lanceolata* group.



Figs 21-23 — *Rhytidelasma lanceolata*, male. 21: dorsal view, 22: ventral view, 23: dorsal view of tarsus IV.



Figs. 24-27 — Females of *Rhytidelasma*. 24: *Rhytidelasma aprosmictis*, dorsal view, 25: idem, oviporus, 26: *R. lanceolata*, dorsal view, 27: idem, oviporus.

**Key to *Rhytidelasma* species***Males*

1. Setae *h1* lanceolate or thick needle-like . . . . . 2
- Setae *h1* short hair-like . . . . . 3
2. Setae *f2* present. Hysteronotal shield with numerous pit-like lacunae. Setae *c2* hair-like (Fig. 34) . . . . .  
. . . . . *R. punctata* MIRONOV, et al., 2003.
- Setae *f2* absent. Hysteronotal shield uniformly dotted. Setae *c2* as thin spine (Fig. 21) . *R. lanceolata* sp. n.
3. Terminal lamellae short and wide, as obtuse angles (Fig. 28) . . . . . 4
- Terminal lamellae longer than wider, ovate or leaf-like (Figs. 18, 37) . . . . . 5
4. Hysteronotal shield with transverse striation. Setae *3a*, *3b* at the same transverse level (Figs. 28, 29) . . . . .  
. . . . . *R. eurycerca* GAUD, 1980
- Hysteronotal shield without striation. Setae *3a* anterior to setae *3b* (Fig. 31) . . . . .  
. . . . . *R. grammophylla* (GAUD & MOUCHET, 1959)
5. Terminal lamellae widely separated, distance between their bases 2.5-3 times larger than width of lamellae (Fig. 33) . . . . . *R. zebra* GAUD, 1980.
- Distance between terminal lamellae approximately equal to lamella width . . . . . 6
6. Genital apodemes long, extending by anterior tips beyond the level of the genital acetabulae. Epimerites I fused to form a Y (Fig. 32) . . . . .  
. . . . . *R. allochaeta* GAUD, 1980.
- Genital apodemes not extending to level of genital discs. Epimerites I almost touching at posterior tips . . . . . 7
7. Genital apodemes in a form of parallelogram (Fig. 38) . . . . . *R. striata* MIRONOV et. al., 2003.
- Genital apodemes L-shaped, thick . . . . . 8
8. Length and width of opisthosomal lobes at bases approximately equal. Setae *c1* on striated tegument (Fig. 18) . . . . . *R. aprosmictis* sp. n.
- Opisthosomal lobes about two times longer, than their width at base. Setae *c1* on anterior margin of hysteronotal shield (Fig. 40) . . . . . *R. stenura* GAUD, 1968

*Females*

1. Setae *f2* present. Hysteronotal shield with numerous little pit-like lacunae (Fig. 16) . . . . .  
. . . . . *R. punctata* MIRONOV et al., 2003.
- Setae *f2* absent. Hysteronotal shield with another pattern . . . . . 2
2. Setae *c2* as thin spines. Central part of hysteronotal shield with sinuous transverse striation, anterior angles of the shield connected with humeral shield (Fig. 26) . . . . .  
. . . . . *R. lanceolata* sp. n.
- Setae *c2* hair-like. Other structure and ornamentation of hysteronotal shield . . . . . 3
3. Anterior half of hysteronotal shield with transverse striation . . . . . 4
- Hysteronotal shield without striation . . . . . 7

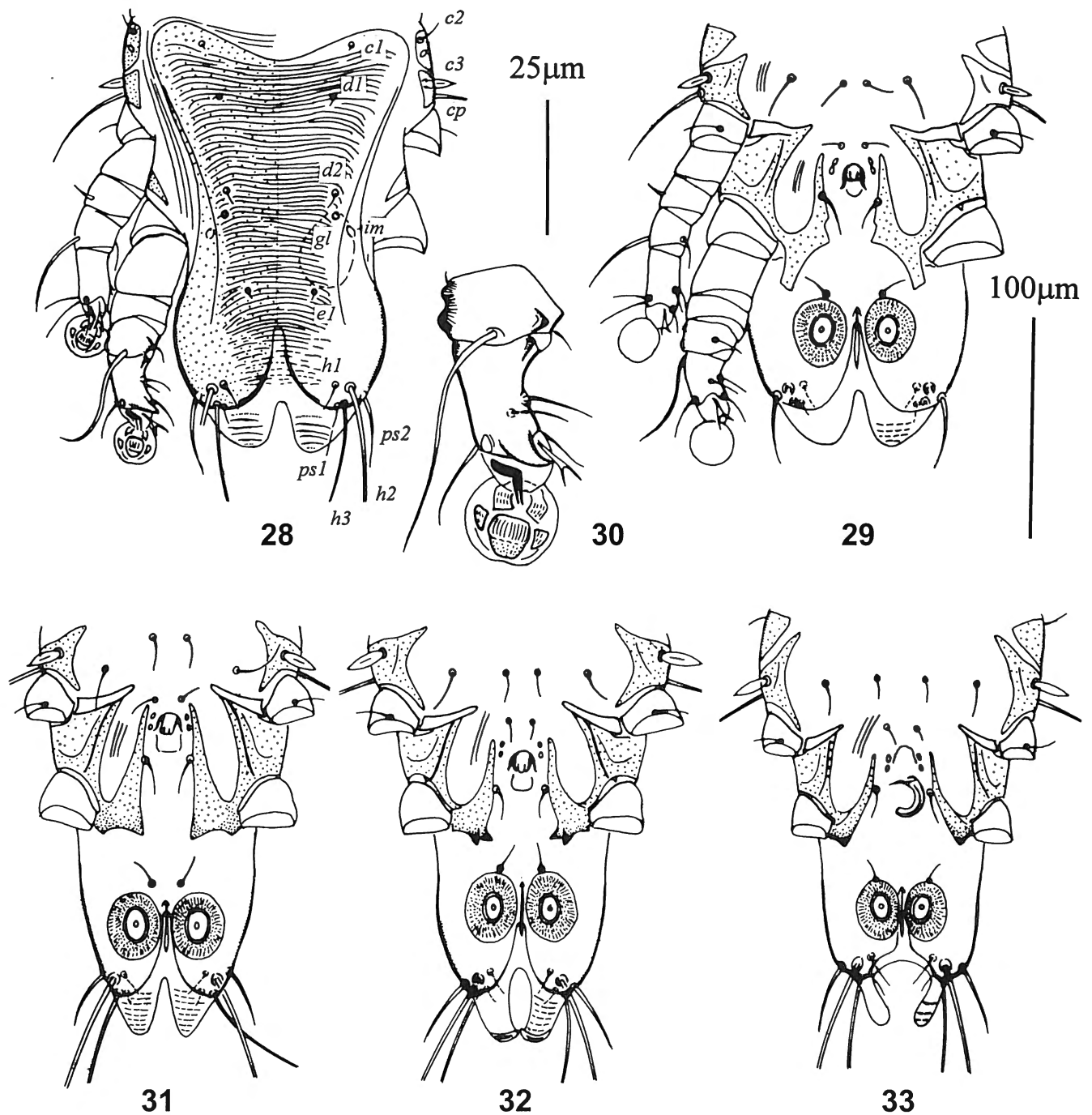
4. Setae *e1*, *h1* arranged into transverse row (Fig. 47) . . . . .  
. . . . . *R. zebra* GAUD, 1980
- Setae *e1*, *h1* arranged into trapezium or rectangle . . . . . 5
5. Distance between pairs *e1* and *h1* two times longer than between setae *h1*. Pygidial part of the hysteronotal shield weakly sclerotized . . . . .  
. . . . . *R. stenura* GAUD, 1968
- Distance between seta rows *e1* and *h1* equal or 1.5 times longer than between setae *h1*. Pygidial part of hysteronotal shield well sclerotized . . . . . 6
6. Pygidial part of hysteronotal shield completely separated from the rest part by narrow bow-like furrow of soft tegument (Fig. 48) . . . . .  
. . . . . *R. striata* MIRONOV et. al., 2003
- Pygidial part of hysteronotal shield not separated (Fig. 24) . . . . . *R. aprosmictis* sp. n.
7. Setae *e1*, *h1* on band of soft tegument separating pygidial part from the rest part of hysteronotal shield . . . . .  
. . . . . *R. allochaeta* GAUD, 1980
- Setae *e1* on transverse band of soft teguments, setae *h1* on pygidial part of hysteronotal shield . . . . . 8
8. Pygidial part of hysteronotal shield longer than wide. Distance between setae *h1* equal or slightly less than distance between setae *e1* (Fig. 45) . . . . .  
. . . . . *R. grammophylla* (GAUD & MOUCHET, 1959)
- Pygidial part of hysteronotal shield wider than long. Distance between setae *h1* two times longer than distance between setae *e1* (Fig. 44) . . . . .  
. . . . . *R. eurycerca* GAUD, 1980

**Group *aprosmictis******Rhytidelasma aprosmictis* MIRONOV & PÉREZ sp. n.  
(Figs. 18-20, 24, 25)**

TYPE MATERIAL. Male holotype, 4 male and 1 female paratypes from the Red-winged Parrot *Aprosmictus erythropterus* (GMELIN) (Psittacinae: Psittaculini), Maba-duane, Papua New Guinea, 16 IV 1936, coll. ARCHBOLD, RAND & TATE (YSU 2587, AMNH 425843). Holotype, paratype - UMMZ, paratypes - ZISP.

ADDITIONAL MATERIAL. 3 males from the same host species, Cape York, Queensland, Australia, 14 VI 1912, coll. R. KEMP (YSU 2585, AMNH 621767).

MALE (HOLOTYPE). Idiosoma length excluding terminal lamellae 275, width 150 (idiosomal size in 4 paratype 265-278 x 145-154). Prodorsal shield: greatest length 80, width at posterior margin 78, without extending anterolateral projections, with bow-like transverse striation anterior to scapular setae; posterior angles rounded. Distance between scapular setae: *se-se* 51, *si-si* 33. Hysteronotal shield: greatest length 162, width of anterior part 119, anterior margin slightly concave, surface except lateral areas marked by lateral grooves with irregular transverse striation (Fig. 18). Cupules *im* visible, posterior to gland openings *gl*. Setae *f2* absent; setae *h1* thin

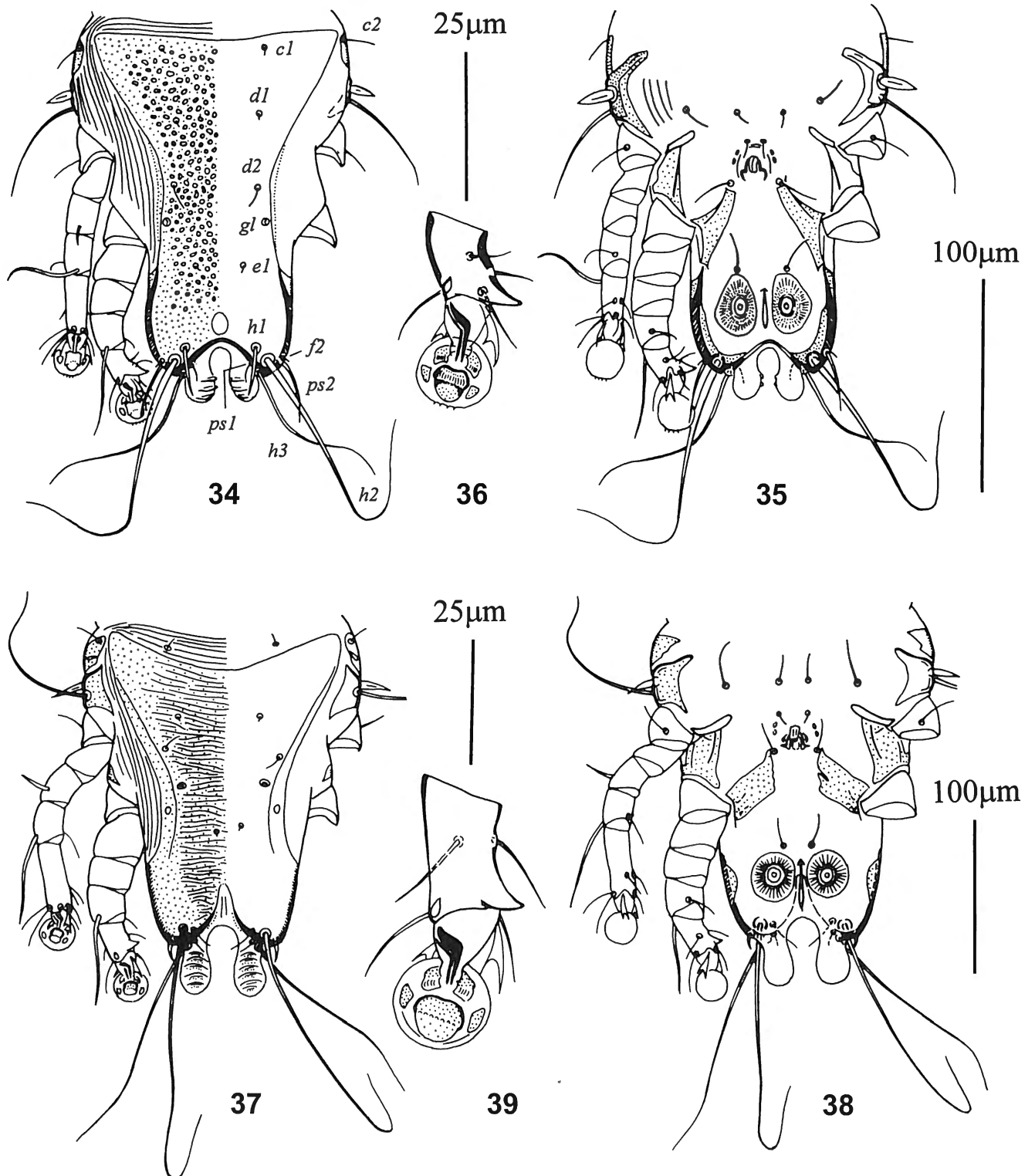


Figs. 28-33 — Males of *Rhytidelasma*. 28: *Rhytidelasma eurycerca*, dorsal view of hysterosoma, 29: idem, ventral view of hysterosoma, 30: idem, dorsal view of tibia and tarsus IV, 31: *R. grammophylla*, ventral view of hysterosoma, 32: *R. allochaeta*, ventral view of hysterosoma, 33: *R. zebra*, ventral view of hysterosoma. (31-33 — after: GAUD, 1980, modified).

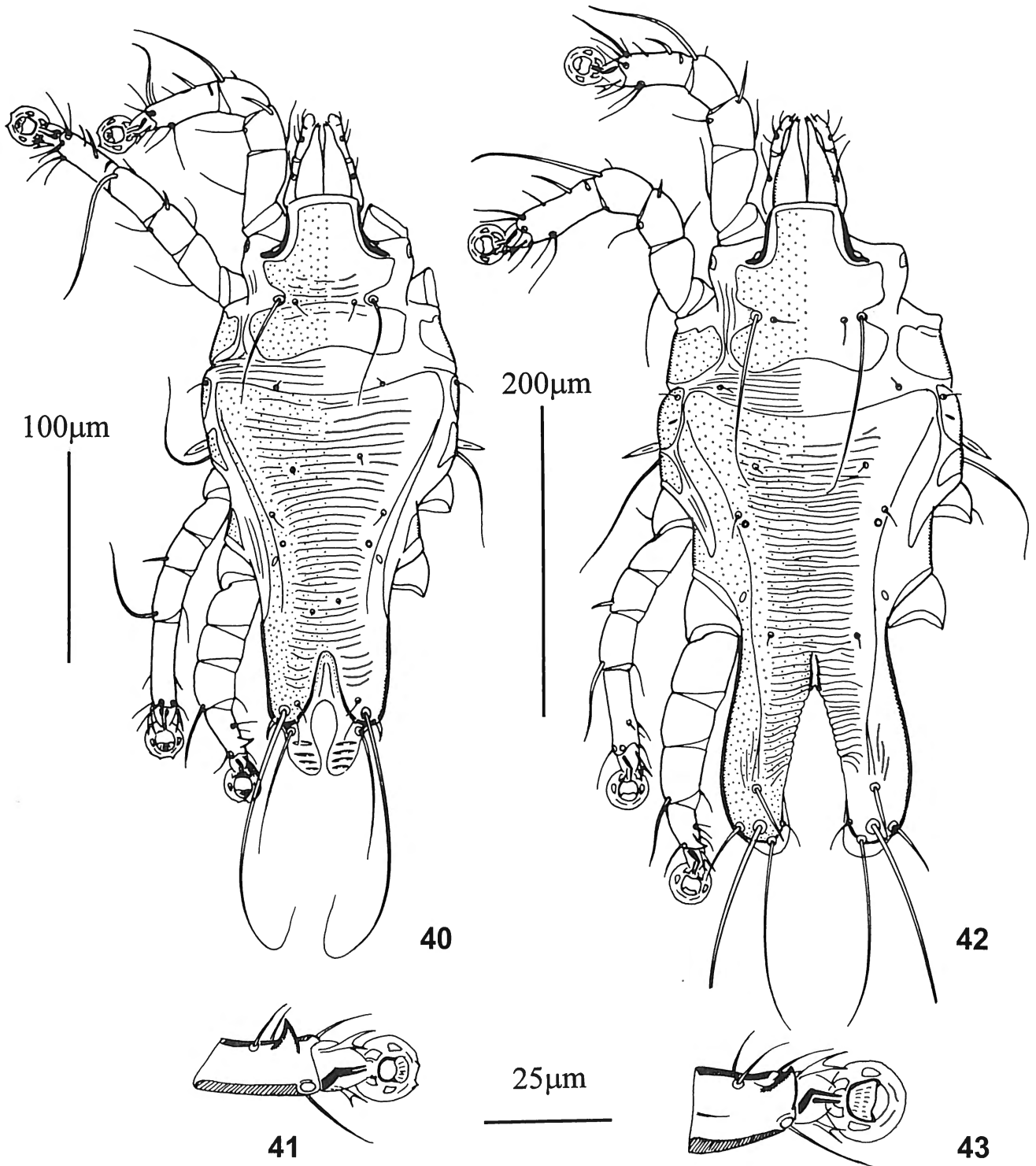
setiform, situated mesal to macrochaetae *h2*; setae *ps2* spine-like, thin. Opisthosoma with almost parallel lateral margins, without lateral extensions, terminal cleft V-shaped, supranal concavity completely fused with terminal cleft, length of the cleft 33. Terminal lamellae leaf-shaped, with 4-5 transverse crests, length from base of *h3* 20-24, width 16-18; incision between lamel-

lae as wide key-hole, 40 in length, 17 in width in anterior part. Dorsal measurements: *c1-c1* 48, *d1-d1* 40, *e1-e1* 20, *h1-h1* 33, *h3-h3* 44, *c1-d2* 66, *c2-d2* 80, *d2-e1* 47, *d2-h1* 88. Epimerites I free, posterior tips almost contiguous, without sclerotizations around arms. Genital apparatus represented by finger-like slightly curved structure about 20 in length and containing aedeagus; branches of genital





Figs. 34-39 — Males of *Rhytidelasma*. 34: *Rhytidelasma punctata*, dorsal view of hysterosoma, 35: idem, ventral view of hysterosoma, 36: idem, dorsal view of tarsus IV, 37: *R. striata*, dorsal view of hysterosoma, 38: idem, ventral view of hysterosoma, 39: idem, dorsal view of tarsus IV.



Figs. 40-43 — Males of *Rhytidelasma* and *Coracopsobius*. 40: *Rhytidelasma stenura*, dorsal view, 41: idem, dorsal view of tarsus IV, 42: *Coracopsobius lambda*, dorsal view, 43: idem, dorsal view of tarsus IV.

arch short and very thin (Fig. 19). Genital apodemes extending to level of setae *4a*. Setae *3a* slightly anterior to *3b*. Anal discs ovate, with wide punctured and striated membrane (Fig. 19). Ventral measurements: *3a-g* 15, *g-4a* 24, *4a-ps3* 51. Tarsus IV 24 in length, with distal paraxial claw (Fig. 20). Ambulacral discs slightly concave on distal margin, without indentations.

FEMALE (PARATYPE). Idiosomal length 402, width 180. Prodorsal shield as in male, but without transverse striation, length 120, width 100 (Fig. 17). Distance between scapular setae *se-se* 66, *si-si* 45. Hysteronotal shield: greatest length 267, width of anterior part 150, anterior margin slightly concave, surface with irregular transverse striation in anterior 2/3, pygidial part of

the shield not separated. Hysteronotal gland openings *gl* posterior to setae *d2*; cupules *im* posterior to gland openings; setae *f2* absent; setae *e1* and *h1* arranged in trapezoid, distance between these pairs 28-31 (Fig. 24). Supranal concavity invisible. Opisthosoma between setae *h3* slightly convex. Dorsal measurements: *c1-c1* 90, *d1-d1* 53, *e1-e1* 24, *h1-h1* 33, *h3-h3* 22, *c1-d2* 120, *c2-d2* 128, *d2-e1* 86, *d2-h1* 115. Epimerites I free, as in the male. Epigynium crescent-shaped, 24 x 42 (Fig. 25). Ambulacral discs as in the male.

**DIFFERENTIAL DIAGNOSIS.** The new species is very closely related to *Rhytidelasma striata* MIRONOV et al., 2003 by free tips of epimerites I in both sexes and the structure of terminal lamellae in males (Figs. 17, 18, 37, 38). The males of *R. aprosmictis* differ from that species by having L-shaped genital apodemes (Figs. 18) and lacking striations on the posterior part of the prodorsal shield, the females are distinguished by entire hysteronotal shield, without any separation of pygidial part (Fig. 24). In the males of *R. striata*, the genital apodemes are wide and resembling oblique parallelograms, all areas of prodorsal shield with transverse striation (Fig. 38); in females the pygidial part of hysteronotal shield is completely separated by bow-like narrow band of striated tegument (Fig. 48).

**ETYMOLOGY.** Specific epithet derives from the generic name of the host.

***Rhytidelasma striata* MIRONOV,  
DABERT & PROCTOR, 2003  
(Figs. 37-39)**

*Rhytidelasma striata* MIRONOV et al., 2003: 9, Figs. 14-16, 18, 20.

**MATERIAL EXAMINED.** Holotype male, 7 male, 10 female paratypes from the Australian King Parrot *Alisterius scapularis* (LICHTENSTEIN) (Psittacinae: Psittaculini), Beechmont, Queensland, Australia, 8 V 1998, coll. M. SHAW. Holotype, paratypes - QM S48364 and S48365; paratypes - ZISP 4276.

This species is known only from the type host in Australia (MIRONOV et al., 2003).

***Rhytidelasma stenura* GAUD, 1968  
(Figs. 40, 41)**

*Rhytidelasma stenura* GAUD, 1968: 147, Fig. 15.

**MATERIAL EXAMINED.** 1 male from the Red-cheeked Parrot *Geoffroyus geoffroyi* (BECHSTEIN) (Psittacinae: Psittaculini), Obi, Moluccas, Indonesia, 13 X 1953, no other data (VECH 43/Br).

This species was originally described from the Singing Parrot *Geoffroyus heteroclitus hyacinthinus* MAYR from

Rennel Island (GAUD, 1968). Type material was not available for the present study. The original description is probably incorrect in part. The author pointed out, that specimens had the prodorsal shield separated into two parts at level of scapular setae. This feature never occurs in any other taxa of the *Rhytidelasma* group. It is quite possible, that the author dealt with just moulted specimens with weak sclerotization.

**Group *grammophylla***

***Rhytidelasma grammophylla*  
(GAUD & MOUCHET, 1959)  
(Figs. 31, 45)**

*Pseudalloptinus grammophyllus* GAUD & MOUCHET, 1959: 637, Figs. 23A, 24C.

*Rhytidelasma grammophylla*: GAUD, 1966: 126, 1980: 38, Fig. 13c; ATYEO et al., 1988: 187.

This species is known only from the type host, Grey Parrot *Psittacus erythacus* LINNAEUS (Psittacinae: Psittacini), in Africa (GAUD & MOUCHET, 1959; GAUD, 1980). Among the *grammophylla* group, this species and *Rhytidelasma eurycerca* represent a subgroup, males of which have obtuse-angular terminal lamellae in contrast to other species having leaf-like lamellae. The material was not available for the present study.

***Rhytidelasma allochaeta* GAUD, 1980  
(Figs. 32, 46)**

*Rhytidelasma allochaeta* GAUD, 1980: 33, Figs. 11a, 12a, 13a; ATYEO et al., 1988: 187.

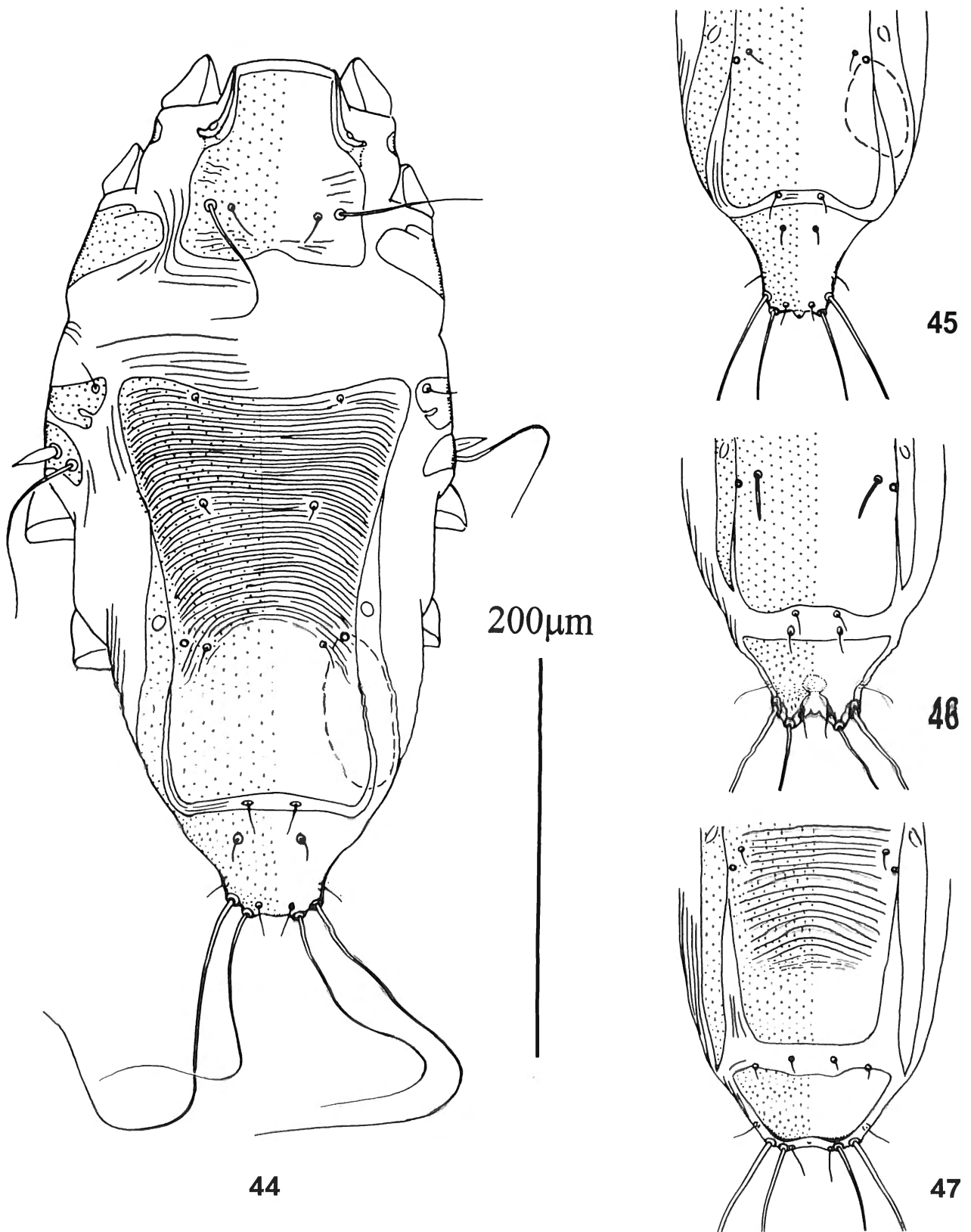
This species is known only from the type host, Black-collared Lovebird *Agapornis swinderiana* (KUHLE) (Psittacinae: Psittacini) in Zaire (GAUD, 1980). The material was not available for the present study.

***Rhytidelasma eurycerca* GAUD, 1980  
(Figs. 28-30, 44)**

*Rhytidelasma eurycerca* GAUD, 1980: 33, Figs. 11b, 12b, 13b; ATYEO et al., 1988: 187; GAUD & ATYEO, 1996: 397, Fig. 408a.

**MATERIAL EXAMINED.** 1 male from the Brown-headed Parrot *Poicephalus cryptoxanthus* (PETERS) (Psittacinae: Psittacini), Kidudwe hill, Morogoro, Tanzania, XII 1887, coll. W.L. ABBOTT (UGA 10966, USNM 117887); 1 female, same host species, Sokoe Forest, near Kilifi, SE Kenya, 28 XI 1964, coll. A.D. FORBES-WATSON (UGA 10964, USNM 519228).

This species is known from 5 species of the genus *Poicephalus* SWAINSON in Central Africa (Table 1); the type



Figs. 44-47 — Females of *Rhytidelasma*, dorsal view. 44: *Rhytidelasma eurycerca*, idiosoma, 45: *R. grammophylla*, opisthosoma, 46: *R. allochaeta*, opisthosoma, 47: *R. zebra*, opisthosoma. (45-47 — after: GAUD, 1980, modified).

host is the Brown-necked Parrot *P. robustus* (GMELIN) collected in Zaire (GAUD, 1980).

***Rhytidelasma zebra* GAUD, 1980**  
(Figs. 33, 47)

*Rhytidelasma zebra* GAUD, 1980: 33, Figs. 12e, 13d; ATYEO et al., 1988: 187.

*Pseudalloptinus discifer*: GAUD & MOUCHET, 1959: 637 (misidentification).

This species is known from 3 species of the genus *Agapornis* SELBY (Psittacinae: Psittaculini) in Africa (Table 1), the type host is the Red-faced Lovebird *Agapornis pullarius* (LINNAEUS) from Cameroon (GAUD, 1980). The material was not available for the present study.

**Group lanceolata**

***Rhytidelasma lanceolata* MIRONOV & PÉREZ sp. n.**  
(Figs. 21-23, 26, 27)

TYPE MATERIAL. Male holotype, 3 male, 5 female paratypes from the Masked Shining Parrot *Prosopeia personata* (GRAY) (Psittacinae: Platycercini), Suva, Viti Levu Island, Fiji Islands, 30 VI 1924, coll. J.G. CORREIA (YSY 2582, AMNH 206478). Holotype, paratypes - UMMZ, paratypes - ZISP.

MALE (HOLOTYPE). Idiosoma length excluding terminal lamellae 263, width 155 (idiosomal size in 3 paratypes 255-265 x 145-156). Prodorsal shield: greatest length 72, width at posterior margin 78, with extending anterolateral projection, without ornamentation; posterior angles extending, rounded (Fig. 21). Distance between scapular setae: *se-se* 48, *si-si* 34. Hysteronotal shield: greatest length 173, width of anterior part 122, anterior margin almost straight, surface uniformly dotted, without ornamentation. Hysteronotal gland openings *gl* invisible, cupules *im* posterior to setae *d2*. Setae *f2* absent; setae *h1* narrowly lanceolate, 28-30 in length; setae *c2* as thin spines. Opisthosoma with almost parallel lateral margins, without lateral extensions, supranal concavity closed, terminal cleft almost semicircular, 55 in length. Terminal lamellae leaf-like, divergent, with 6-7 transverse crests, length from base of *h3* 26-28, width 13-15; incision between lamellae as wide key-hole, 40 in length, 15 in width in anterior part. Dorsal measurements: *c1-c1* 66, *d1-d1* 44, *e1-e1* 27, *h1-h1* 36, *h3-h3* 39, *c1-d2* 62, *c2-d2* 58, *d2-e1* 52, *d2-h1* 86. Epimerites I fused in a V-shape, without sclerotizations around arms. Genital apparatus represented by finger-like curved structure about 25 in length and containing aedeagus; branches of genital arch very short. Genital apodemes extending to level of setae *4a*. Setae *3a*, *3b* approximately at the same transverse level. Anal discs ovate, with wide punctured and striated membrane (Fig. 22). Ventral

measurements: *3a-g* 15, *g-4a* 24, *4a-ps3* 51. Tarsus IV 20 in length, with distal paraxial claw. Distal margin of ambulacral discs with spine like extension slightly moved from longitudinal axis of the disc (Fig. 23).

FEMALE (PARATYPE). Idiosomal length 425, width 223 (idiosomal size in other 4 paratypes 420 x 225). Prodorsal shield as in male, length 110, width 106. Distance between scapular setae *se-se* 66, *si-si* 42. Hysteronotal shield: greatest length 276, width of anterior part 186, anterior margin concave, anterior angles fused with anterior fragments of humeral shields, surface with sinuous transverse ornamentation in central area of the shield between levels of trochanters III and IV, transverse anteriorly convex crescent of soft cuticle almost completely separates the shield into anterior and pygidial fragments. Hysteronotal gland openings *gl* invisible, cupules *im* posterior to setae *d2*; setae *f2* absent; setae *c2* as thin spines; setae *e1* and *h1* arranged in low trapezium, distance between row of these setae about 25; setae *e1* on soft cuticle, setae *h1* on pygidial fragment (Fig. 26). Supranal concavity ovate, weakly expressed. Opisthosoma between setae *h3* shallowly concave. Dorsal measurements: *c1-c1* 115, *d1-d1* 71, *e1-e1* 13, *h1-h1* 36, *h3-h3* 26, *c1-d2* 119, *c2-d2* 122, *d2-e1* 88, *d2-h1* 108. Epimerites I fused in a V-shape. Epigynium bow-shaped, 26 x 55 (Fig. 27). Ambulacral discs as in the males.

DIFFERENTIAL DIAGNOSIS. The new species is most closely related to *Rhytidelasma punctata* by having setae *h1* of lanceolate form in males (Figs. 21, 34). Both sexes of *R. lanceolata* easily differ from the latter species by setae *c2* represented by thin spines and the ornamentations of hysteronotal shields. In the males, this shield is uniformly dotted (Fig. 21); in the females, central part of hysteronotal shield has a patch of sinuous transverse striation (Fig. 26). In *R. punctata* setae *c2* are thin hair-like and most part of hysteronotal shield in both sexes is covered with numerous little pit-like lacunae (Figs. 16, 34).

ETYMOLOGY. Specific epithet refers to the form of setae *h1* in males.

***Rhytidelasma punctata* MIRONOV**  
**DABERT & PROCTOR, 2003**  
(Figs. 16, 17, 24-36)

*Rhytidelasma punctata* MIRONOV et al., 2003: 7, Figs. 11-13, 17, 18).

MATERIAL EXAMINED. Male holotype, 7 male and 8 female paratypes from the Pale-headed Rosella *Platycercus adscitus* (LATHAM) (Psittacinae: Platycercini), St Lucia, Queensland, Australia, 16.04.1999, coll. H. PROCTOR. Holotype, paratypes - QM S48362 and S48363; paratypes - ZISP 4274.

This species is known only from the type host in Australia (MIRONOV et al., 2003).

***Coracopsobius* GAUD & ATYEO, 1996**

*Coracopsobius* GAUD & ATYEO, 1996: 123.

This monotypic genus is very closely related to *Rhytidelasma* and in practice differs from the latter genus only by having extraordinary long opisthosomal lobes in males, which are approximately three times longer than wider, and by the absence of transverse crests on terminal lamellae (Fig. 42). This structure of the opisthosomal lobes within the *Rhytidelasma* group is unique, because in the males of other genera the opisthosomal lobes are very short; their length commonly does not exceed their width.

***Coracopsobius lambda* (TROUESSART, 1899)**  
(Figs. 42, 43, 49)

*Pseudalloptes lambda* TROUESSART, 1899b: 13.

*Rhytidelasma lambda*: ATYEO et al., 1988: 187.

*Coracopsobius lambda*: GAUD & ATYEO, 1996: 345, Fig. 356.

MATERIAL EXAMINED. 1 male, 1 female from the Black Parrot *Coracopsis nigra nigra* (LINNAEUS) (Psittacinae: Psittacini), Manombo, Madagascar, 26 IX 1929, coll. RAND & ARCHBOLD (YSU 2714, AMNH 411078).

This species is restricted to parrots of the genus *Coracopsis* WAGLER distributed in Madagascar and neighbouring archipelagos (GAUD & ATYEO, 1996) (Table 1). Type host is the Vasa Parrot, *C. vasa comorensis* (SHAW).

***Neorhytidelasma* MIRONOV & PÉREZ gen. n.**

*Rhytidelasma*: ATYEO, et al., 1988: 176 (part.)

TYPE SPECIES: *Rhytidelasma cornigera* ATYEO & PÉREZ, 1988.

BOTH SEXES. Pterolichine mites with quadrate subcapitulum. Prodorsal shield covering most part of prodorsum, encompassing both pairs of scapular setae, with anterolateral extension, commonly fused with scapular shields by posterior angles. Vertical setae *vi* absent. Dorsal hysterosomal setae *f2* absent. Scapular setae *si* simple, setiform. Subhumeral setae *c3* lanceolate. Hysteronotal gland openings *gl* and cupules *ia*, *im* visible. Humeral shields not separated into anterior and posterior fragments. Epimerites I Y-shaped. Bases of epimerites I-IV not enlarged, coxal fields I-IV without large sclerotized areas. Setae *ba* approximately equidistant or closer to solenidion  $\omega 1$  than seta *d* on tarsi I, II. Solenidion  $\sigma 2$  of genu I absent. Tibial setae *kT* III and *kT* IV present. Ambulacral discs circular, with indentations on distal margin.

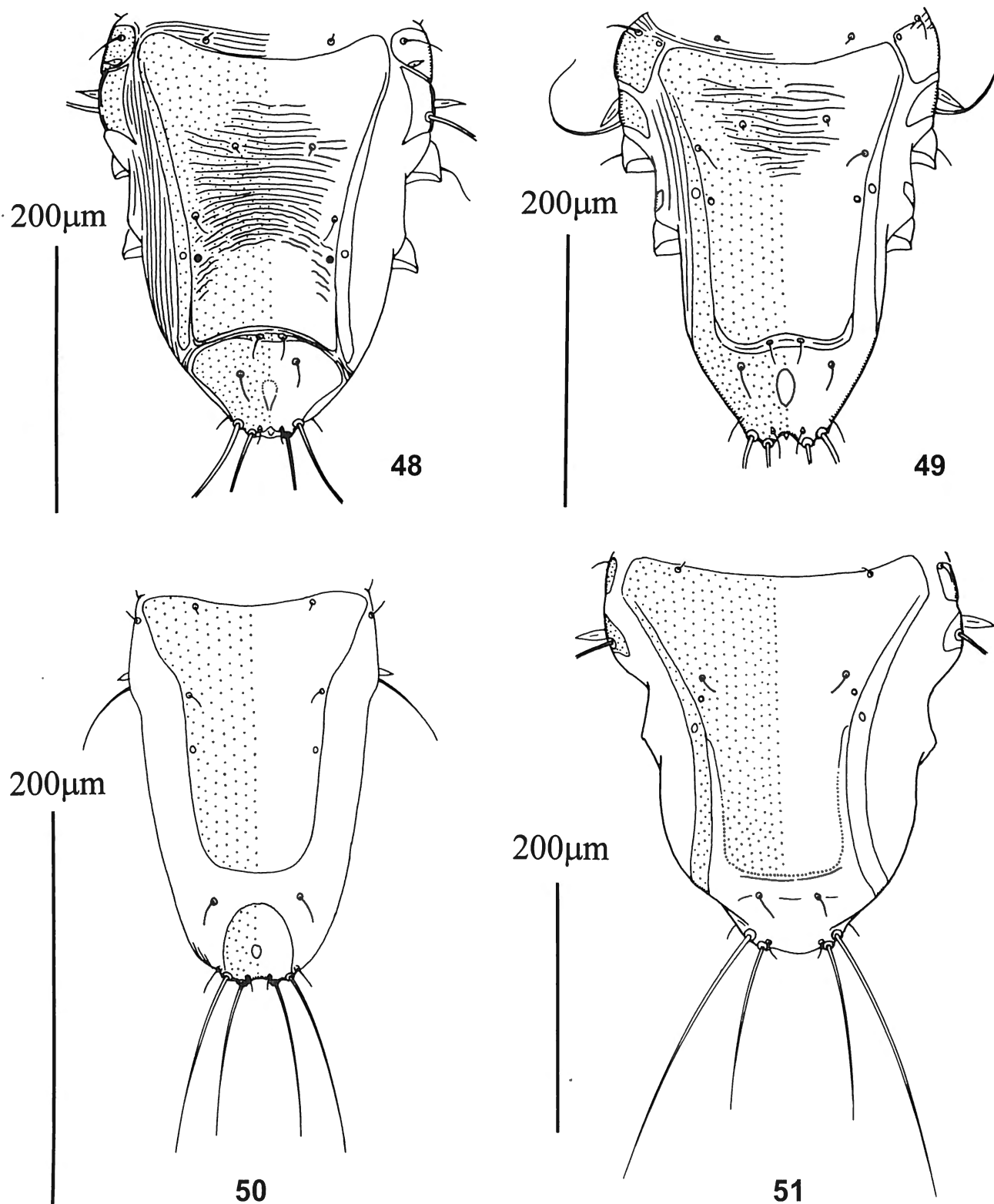
MALE. Opisthosomal lobes usually short and broad, with bluntly rounded apices, with semiround or obtuse-angular

lateral extensions (Figs. 52, 53, 55-59). Terminal cleft V-shaped, with angular or rounded anterior end. Supranal concavity present, narrowly ovate in form, or absent since complete fusion with terminal cleft. Terminal cleft and posterior margin of lobes with narrow membrane; on lobar apices this membrane may be extended into leaf-like or tongue-like terminal lamellae; if lamella present, their dorsal surface with crests or not. Setae *h1* setiform, very short, situated near to macrochaetae *h2* (moved to level of terminal cleft end in the *ulocerca* group). Lateral margins of hysteronotal shield fused to lateral sclerites of epimerites IV and with humeral shields. Genital apparatus between levels of trochanters III and IV. Genital apodemes formed by enlarged epimerites IVa, usually extending by anterior ends to apex of genital apparatus and flanking it from lateral sides. Anal discs circular, with wide striated membranes, corolla without indentations. Adanal and genital shields absent. Legs IV thicker than legs III, segments of legs I-III not modified. Tarsus IV with claw-like apical process on paraxial surface of the segment. Seta *e* of tarsus IV absent, seta *d* button-like.

FEMALE. Posterior end of opisthosoma with median pygidial cone-like extension carrying pair of shot lobes on its apex; in few species (e.g. *N. urophila*) opisthosoma rounded, without pronounced extension. Hysteronotal shield entire, extending to posterior margin of opisthosoma, pygidial part usually with transverse lacuna or some weakly sclerotized area (Figs. 64-67). Supranal concavity absent or weakly expressed, ovate if present. All dorsal hysteronotal setae simple, setiform. Setae *e1*, *h1* situated in posterior one quarter of hysterosoma, usually arranged in trapezium or transverse row. Epigynium bow-like, situated at level of ventral angles of scapular shields, tips of epigynium not extending to level of genital discs.

DIFFERENTIAL DIAGNOSIS. The genus *Neorhytidelasma* is most similar by the set of idiosomal chaetome to the genera *Psittocolus* and *Kakapolichus*. The new genus differs from two latter genera and all other representatives of the *Rhytidelasma* group by the combination of following characters: in both sexes setae *e2* present; in males, the humeral shields are entire, the prodorsal shield is fused with scapular shields and the hysteronotal shield is fused with lateral sclerites of epimerites IV, the opisthosomal lobes are provided with semi-round or angle-like lateral extensions (Figs. 52, 53, 64). Among the *Rhytidelasma* group, all listed characters, except the first one, are unique features of *Neorhytidelasma*.

REMARK. The genus *Neorhytidelasma* unites a group of species formerly considered and reviewed within the genus *Rhytidelasma* (ATYEO & PÉREZ, 1988a, 1988b; ATYEO et al, 1988). This grouping of mites is associated exclusively with South American parrots of the tribe Arini and currently includes 8 species. Among these species and numerous undescribed species from South American parrots, ATYEO and coauthors recognized 5



Figs. 48-51 — Females of the *Rhytidelasma* generic group, dorsal view of hysterosoma. 48: *Rhytidelasma striata*, 49: *Coracopsobius lambda*, 50: *Arhytidelasma microtricha*, 51: *Lorilichus discifer* (51 – after: GAUD & ATYEO, 1996, modified).

species groups based on the following morphological features.

The *cornigera* group is characterized by having a pair of spine like process in anterior end of prodorsal shield in both sexes and absence of terminal lamellae in males (Figs. 52, 64). Representatives of other species groups lack such processes and are distinguished from each other based only on certain combinations of male characters.

In the *tritiventris* group, the terminal lamellae are lacking (Fig. 56) as in the *cornigera* group.

In the *ulocerca* group, the terminal lamellae are parallel to each other and provided with transverse dorsal crests, and in contrast to other groups of *Neorhytidelasma*, the setae *h1* are significantly distant from setae *h2* (Figs. 58, 59).

In the *mesomexicana* group, the terminal lamellae are convergent by distal ends and also provided with crests (Fig. 61),

In the *forciventrtris* group, the terminal lamellae are convergent by distal ends, but lack dorsal crests (Fig. 57).

ETYMOLOGY. Contraction on *neo* (L. new) and *Rhytidelasma* to point out the associations of the genus with parrots from the New World.

#### Key to *Neorhytidelasma* species

##### Males

1. Opisthosomal lobes without terminal lamellae . . . 2
- Opisthosomal lobes with leaf-like or tongue-like terminal lamellae . . . . . 4
2. Prodorsal shield with pair anterolateral projections (Fig. 52). Supranal concavity closed. (*cornigera* group) . . . . . 3
- Prodorsal shield without anteromedial projections. Supranal concavity is open posteriorly (Fig. 56). (*tritiventris* group) . . . *N. tritiventris* (ATYEO et al., 1988.)
3. Length of idiosoma in males 370-390 (Fig. 55) . . . . .
- . . . . . *N. dilatata* (TROUESSART, 1899)
- Length of idiosoma in males about 340-360 (Fig. 53) . . . . .
- . . . . . *N. cornigera* (ATYEO & PÉREZ, 1988)
4. Bases of terminal lamellae widely separated, tips of lobes directed toward meson. Setae *h1* near bases of setae *h3* . . . . . 5
- Bases of terminal lamellae approximate, lamellae almost parallel each other. Setae *h1* distant from *h3* (*ulocerca* group) . . . . . 7
5. Terminal lamellae with transverse dorsal ridges. Epimerites I fused to form a V. (*mesomexicana* group) . . . . . 6.
- Terminal lamellae without transverse ridges (Fig 57). Epimerites I fused to form a Y. (*forciventrtris* group) . . . . .
- . . . . . *N. forciventrtris* (TROUESSART, 1884)
6. Prodorsal shield fused with scapular shields . . . . .
- . . . . . *N. mesomexicana* (ATYEO et al., 1988)
- Prodorsal shield separated from scapular shields . . . . .
- . . . . . *N. bicostata* (ATYEO & PÉREZ, 1988)
7. In males, setal row *h1* closer to *e2* than to *h2*. (Fig. 58) . . . . .
- . . . . . *N. ulocerca* (TROUESSART, 1899)
- In males, setal row *h1* closer to *h2* than to *e2*. In females, posterior end of opisthosoma widely rounded, without opisthosomal lobes (Fig. 59) . . . . .
- . . . . . *N. urophila* (ATYEO & PÉREZ, 1988)

##### Females

1. Prodorsal shield with pair of anterolateral projections . . . . . 2
- Prodorsal shield without anteromedial projections . . . . . 3
2. Lacuna in posterior part of hysteronotal shield narrow, as transverse furrow (Fig. 65) . . . . .
- . . . . . *N. dilatata* (TROUESSART, 1899)
- Lacuna in posterior part of hysteronotal shields in form of transverse oval or irregular trapezium, usually with narrow lateral ends (Fig. 64) . . . . .
- . . . . . *N. cornigera* (ATYEO & PÉREZ, 1988)
3. Posterior end of opisthosoma widely rounded (Fig. 69) . . . . .
- . . . . . *N. urophila* (ATYEO & PÉREZ, 1988)
- Posterior end of opisthosoma attenuate, usually with cone-like pygidial extension carrying a pair of little lobes . . . . . 4
4. Lacuna in posterior part of hysteronotal shield absent (Fig. 68) . . . . .
- . . . . . *N. ulocerca* (TROUESSART, 1899)
- Lacuna in posterior part of hysteronotal shield present . . . . . 5
5. Setae *e1* and *h1* arranged in transverse row (Fig. 66) . . . . .
- . . . . . *N. tritiventris* (ATYEO et al., 1988.)
- Setae *e1* situated posterior to setae *h1* (Fig. 67, 70) . . . . . 6
6. Hysteronotal gland openings *gl* and cupules *im* approximately at the same transverse level (Fig. 67) . . . . .
- . . . . . *N. forciventrtris* (TROUESSART, 1884)
- Hysteronotal gland openings *gl* posterior to cupules *im* . . . . . 7
7. Setae *e1* adjacent, separated by 10-15 (Fig. 70) . . . . .
- . . . . . *N. mesomexicana* (ATYEO et al., 1988)
- Setae *e1* distant from each other, separated by 25-30 (Fig. 71) . . . . .
- . . . . . *N. bicostata* (ATYEO & PÉREZ, 1988)

#### Group *cornigera*

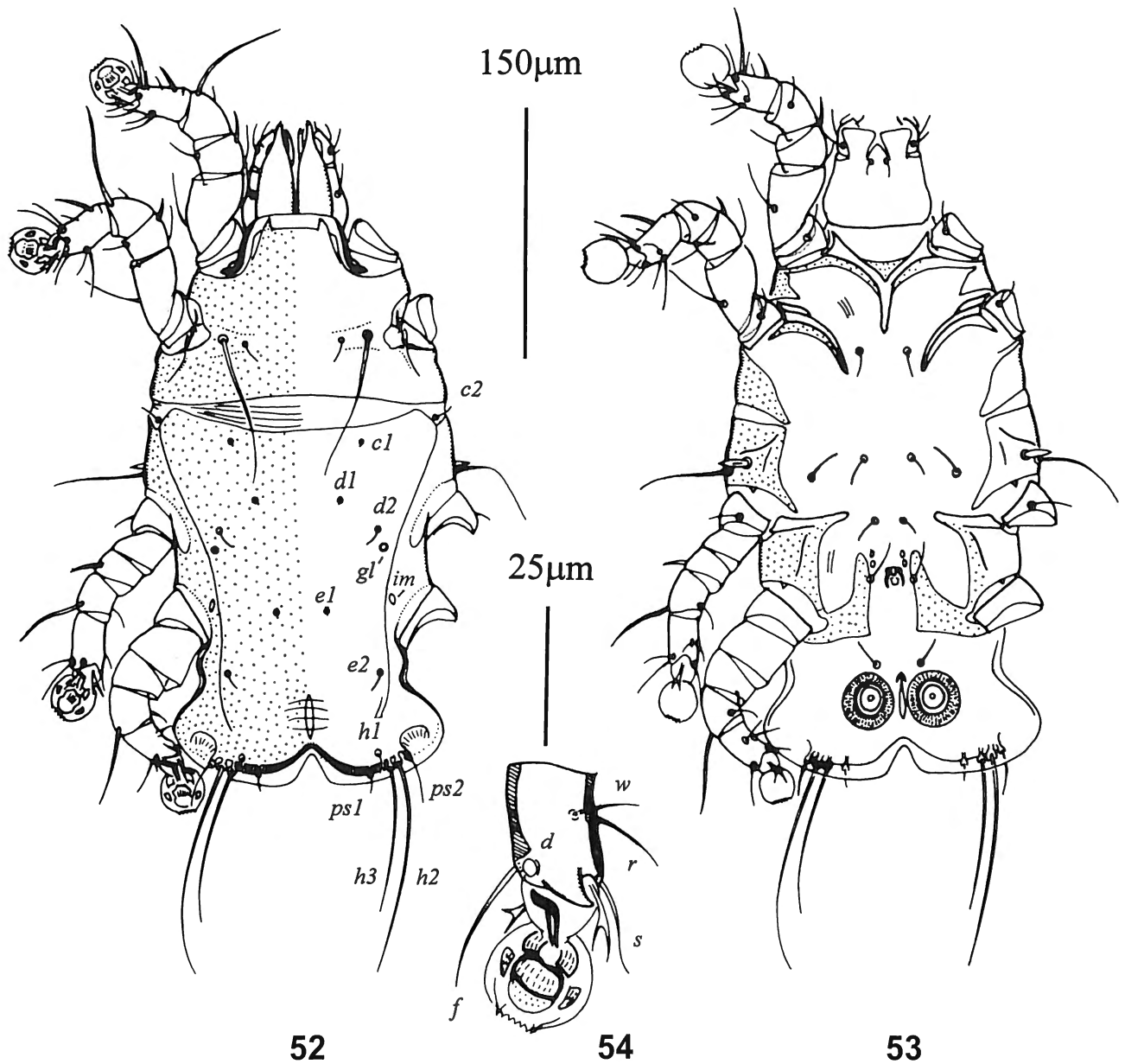
*Neorhytidelasma cornigera* (ATYEO & PÉREZ, 1988)  
comb. n.  
(Figs. 52-54, 64)

*Rhytidelasma cornigera* ATYEO & PÉREZ, 1988a: 86, Figs. 1-3.

MATERIAL EXAMINED. 2 male, 3 female paratypes from *Aratinga holochlora holochlora* (SCLATER) (Psittacinae: Arini), Soto la Maria, Mexico, 15 VI 1888, unknown coll. (UGA 10376, AMNH 80097).

This species is known from two subspecies of the Green Conure, *Aratinga holochlora* (SCLATER), in Central America (ATYEO & PÉREZ, 1988a) (Table 1).





Figs. 52-54 — *Neorhytidelasma cornigera*, male. 52: dorsal view, 53: ventral view, 54: dorsal view of tarsus IV.

***Neorhytidelasma dilatata* (TROUSSERT, 1899) comb. n.**  
(Figs. 55, 65)

*Pterolichus* (*Pseudalloptes*) *tritiventris dilatatus* TROUSSERT, 1899a: 311, 1899b: 13; CANESTRINI & KRAMER, 1899: 62.

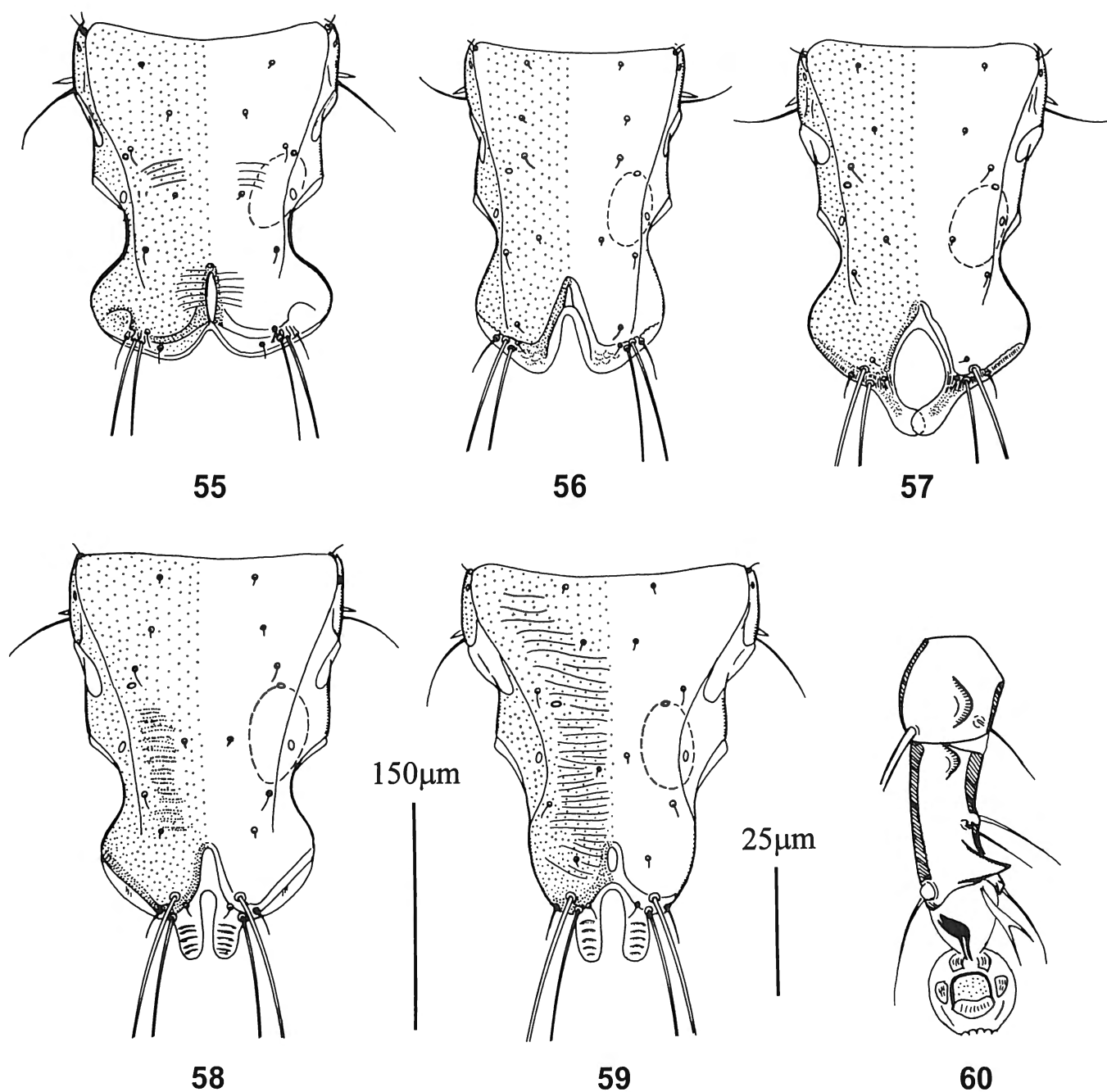
*Pseudalloptes tritiventris dilatatus*: FAVETTE & TROUSSERT, 1904: 125; RADFORD, 1958: 136.

*Protolichus tritiventris dilatatus*: DUBININ, 1956; 304.

*Rhytidelasma dilatata*: ATYEO & PÉREZ, 1988a: 177, Figs. 1-5.

MATERIAL EXAMINED. 4 males, 2 females from *Ara nobilis nobilis* (LINNAEUS), Buxton, East Demerara, Guyana, 3 VI 1937, coll. E.R. BLAKE (UGA 11571, FMNH 43833).

This species was recorded from the type host, Red-shouldered Macaw *A. n. nobilis* in Guyana and Venezuela (ATYEO & PÉREZ, 1988).



Figs. 55-60 — Males of *Neorhytidelasma*, dorsal view. 55: *Neorhytidelasma dilatata*, hysterosoma, 56: *N. tritiventris*, hysterosoma, 57: *N. forficiventris*, hysterosoma, 58: *N. ulocerca*, hysterosoma, 59: *N. urophila*, hysterosoma, 60: idem, tibia and tarsus IV.

### Group *tritiventris*

*Neorhytidelasma tritiventris* (ATYEO,  
GAUD & PÉREZ, 1988.) comb. n.  
(Figs. 56, 66)

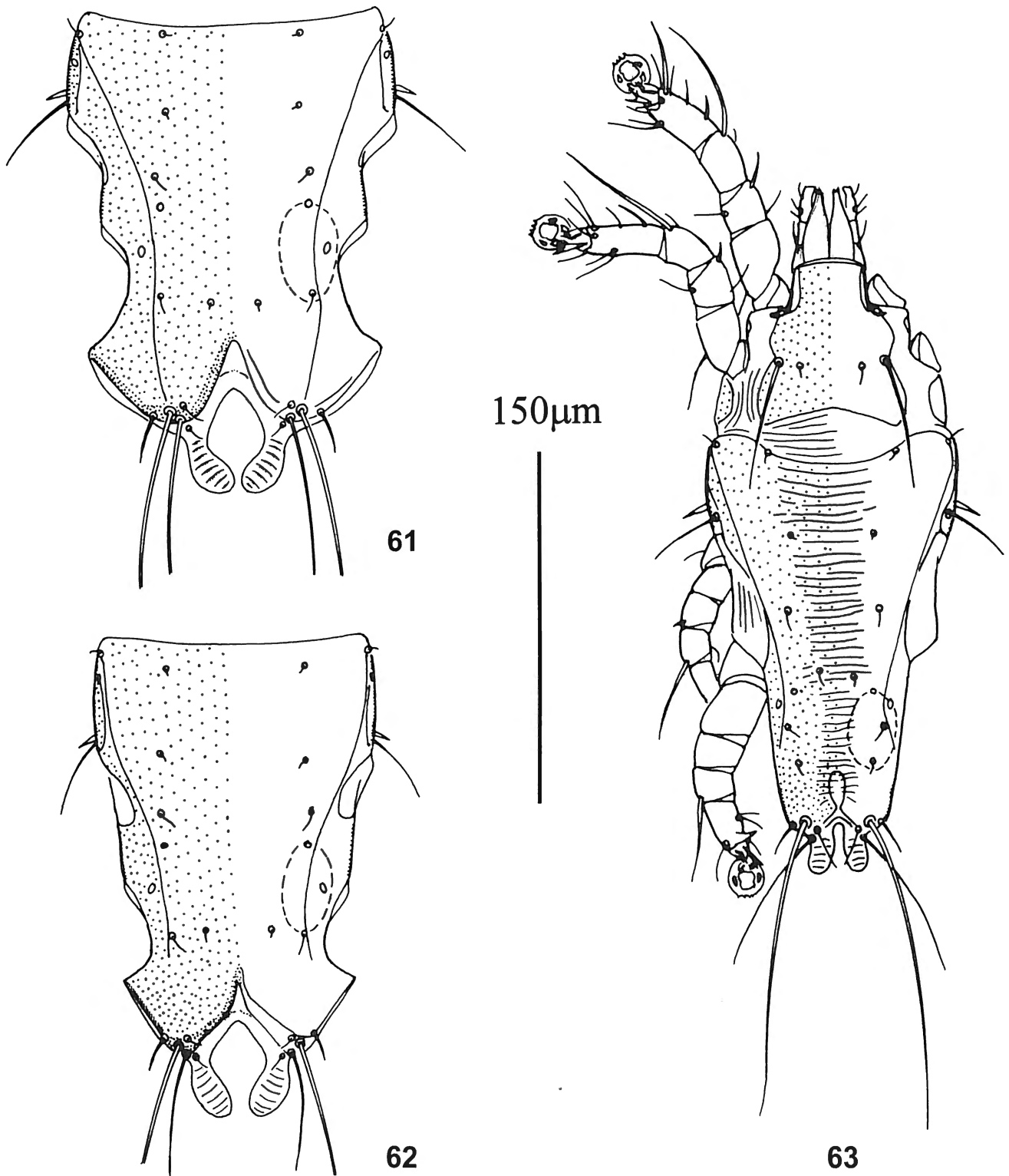
NIN, 1885: 68, Fig. 16; CANESTRINI & KRAMER, 1899:  
62; FAVETTE & TROUSSERT, 1904: 125.

*Protolichus tritiventris dilatatus*: DUBININ, 1956: 304.

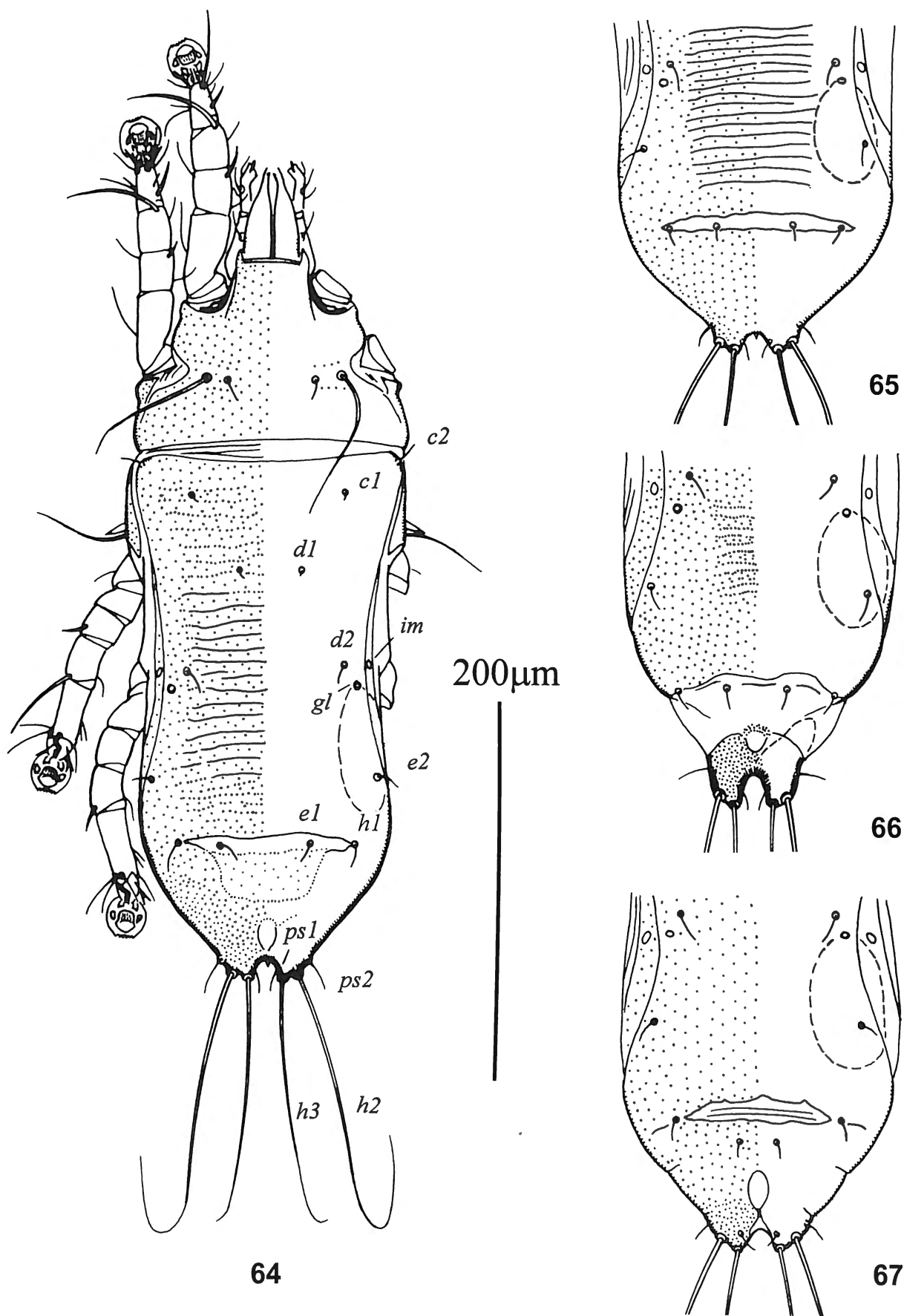
*Rhytidelasma tritiventris*, PÉREZ & ATYEO, 1984: 567;  
ATYEO, 1985: 54; ATYEO et al., 1988.

*Pterolichus (Pseudalloptes) tritiventris* TROUSSERT,  
1884: 575; 1885: 65, Fig. 3a; TROUSSERT & MEG-

MATERIAL EXAMINED. 1 male, 1 female from *Ara chloroptera* GRAY (Psittacinae: Arini), Orope, Tachira, Vene-



Figs. 61-63 — Males of *Neorhytidelasma* and *Psittocolus*. 61: *Neorhytidelasma mesomexicana*, hysterosoma, 62: *N. bicostata*, hysterosoma, 63: *Psittocolus tenuis*, dorsal view.



Figs. 64-67 — Females of *Neorhytidelsama*. 64: *Neorhytidelsama cornigera*, dorsal view, 65: *N. dilatata*, dorsal view of opisthosoma, 66: *N. tritiventris*, dorsal view of opisthosoma, 67: *N. forciventris*, dorsal view of opisthosoma,

zuela, 8 III 1908, coll. N. DEARBORN (UGA 11387, FMNH 34366).

This species is known only from the type host, Green-winged Macaw *A. chloroptera*, from Colombia, Guyana, and Venezuela (ATYEO et al., 1988).

### Group *forciventris*

*Neorhytidelasma forciventris* (TROUSSERT, 1884)  
comb. n.  
(Figs. 57, 67)

*Pterolichus (Pseudalloptes) forciventris* TROUSSERT 1884: 576; 1885: Fig. 3b; TROUSSERT & MEGNIN, 1885: 69, Fig. 16b; CANESTRINI & KRAMER, 1899: 62.

*Pseudalloptes forciventris*: FAVETTE & TROUSSERT, 1904: 125; RADFORD, 1958: 137.

*Protolichus forciventris*: DUBUNIN, 1956: 304.

*Rhytidelasma forciventris*: GAUD, 1980: 32; ATYEO et al., 1988: 184, Figs. 13, 14.

MATERIAL EXAMINED. 2 males, 2 females from *Pionites leucogaster* (KUHLE) (Psittacinae: Arini), Ilha de Taiuna, Para, Brazil, 4 XI 1931, coll. A. OLALLA (UGA 10882, AMNH 430345).

This species is known from different subspecies of the White-bellied Caique *P. leucogaster* in Brazil and Guyana (ATYEO et al., 1988).

### Group *ulocerca*

*Neorhytidelasma ulocerca* (TROUSSERT, 1899)  
comb. n.  
(Figs. 58, 68)

*Pterolichus (Pseudalloptes) tritiventris ulocercus* TROUSSERT, 1899a: 311; 1899b: 12 (*ulocercus*, emendation); CANESTRINI & KRAMER, 1899: 62 (*ulocerca*).

*Pseudalloptes tritiventris ulocercus*: FAVETTE & TROUSSERT, 1904: 125; RADFORD, 1958: 126.

*Protolichus tritiventris ulocercus*: DUBUNIN, 1956: 304.

*Rhytidelasma ulocerca*: PÉREZ & ATYEO, 1984: 567, ATYEO et al., 1988: 181, Figs. 9, 10.

MATERIAL EXAMINED. 1 male from *Ara chloroptera* GRAY (Psittacinae: Arini), Chapada, Mato Grosso, Brazil, 9 X 1883, coll. H.H. SMITH (UGA 10324, AMNH 34525); 2 females from the same host species, Rio Suno, Napo, Ecuador, 14 IV 1923, coll. A. OLALLA (UGA 10340, AMNH 178953)

This species was recorded only on the type host, *A. chloroptera*, in Brazil, Ecuador and Venezuela (ATYEO et al., 1988).

*Neorhytidelasma urophila* (ATYEO & PÉREZ, 1988)  
comb. n.  
(Figs. 59, 69)

*Rhytidelasma urophila* ATYEO & PÉREZ, 1988a: 93, Figs. 19-21, 23-28.

MATERIAL EXAMINED. 2 male, 1 female paratypes from the Green Conure *Aratinga h. holochlora* (SCLATER) (Psittacinae: Arini), Ciudad Mante, Tamaulipas, Mexico, 8 IV 1986, coll. T.M. PÉREZ (TMP 68).

This species is known from the type host, *A. h. holochlora*, in Mexico and from *A. h. rubritorquis* (SCLATER) in Guatemala (ATYEO & PÉREZ, 1988a).

### Group *mesomexicana*

*Neorhytidelasma mesomexicana*  
(ATYEO, GAUD & PÉREZ, 1988) comb. n.  
(Figs. 61, 70)

*Rhytidelasma mesomexicana* ATYEO et al., 1988: 184, Figs. 15, 16; ATYEO & PÉREZ, 1988a: 89, Figs. 10-18, 34).

MATERIAL EXAMINED. 3 male, 3 female paratypes from *Aratinga h. holochlora* (SCLATER) (Psittacinae: Arini), Ciudad Mante, Tamaulipas, Mexico 5 XI 1986, coll. L. MENCHACA (TMP 74).

This species is from the type host, *A. h. holochlora*, in Mexico and from *A. h. rubritorquis* (SCLATER) in Mexico and Honduras (ATYEO, et al., 1988a).

*Neorhytidelasma bicostata* (ATYEO & PÉREZ, 1988)  
comb. n.  
(Figs. 62, 71)

*Neorhytidelasma bicostata* ATYEO & PÉREZ, 1988b: 84, Figs. 1-5.

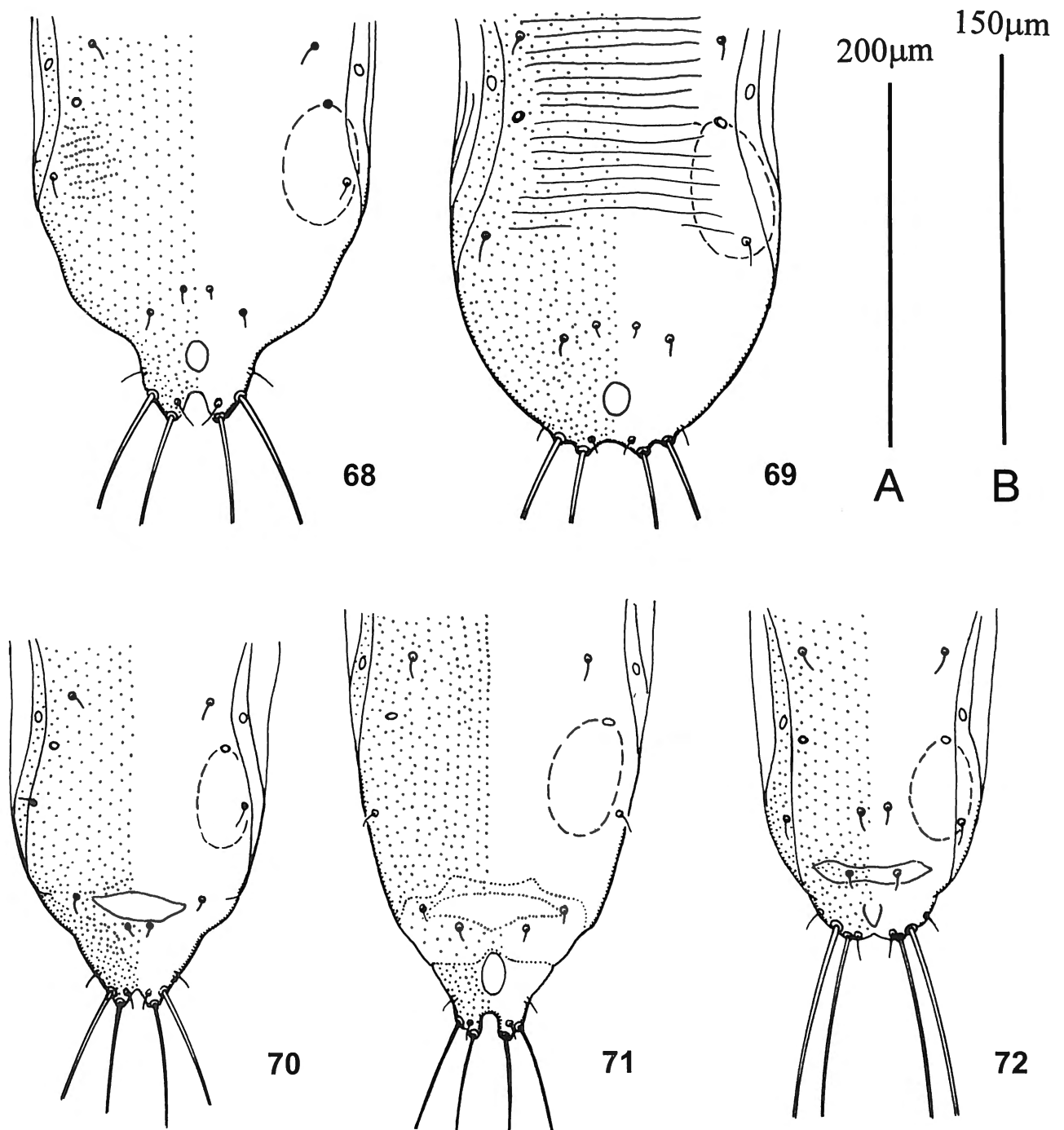
MATERIAL EXAMINED. 1 male, 3 female paratypes from the Orange-fronted Conure *Aratinga canicularis clarae* MOORE (Psittacinae: Arini), Escuinapa, Sinaloa, Mexico, 15 XI 1985, coll. J.H. BATTY (UGA 11238, AMNH 71562).

This species is known from different subspecies of *A. canicularis* and *A. nana* (VIGORS) in many countries of Central and South America (ATYEO & PÉREZ, 1988b) (Table 1).

### *Psittocolus* Gaud & Atyeo, 1996

*Psittocolus* GAUD & ATYEO, 1996: 133.

This monotypic genus is very closely related to *Neorhytidelasma* and reliably differs from it by the absence of seta



Figs. 68-72 — Females of *Neorhytidelasma* and *Psittocolus*, dorsal view of opisthosoma. 68: *N. ulocerca*, 69: *N. urophila*, 70: *N. mesomexicana*, dorsal view of opisthosoma, 71: *N. bicostata*, 72 — *Psittocolus tenuis*. Scale A — 68-70, B — 71-72.

*kT* on tibia IV in both sexes and by the absence of lateral extensions of opisthosoma in males (Fig. 63). This genus is also characterized by significantly smaller body size than in *Neorhytidelasma*. The authors of the genus noted that various undescribed species of *Psittocolus* occurring on South American parrots of the genera *Amazona* LESSON, *Forpus* BOIE and *Pionus* WAGLER also lack tibial seta *kT* III and idiosomal setae *cl* (GAUD & ATYEO, 1996).

***Psittocolus tenuis* (Trouessart, 1884)**  
(Figs. 63, 72)

*Pterolichus (Pseudalloptes) tenuis* TROUSSERT, 1884: 574, 1885: 67; CANESTRINI & KRAMER, 1899: 60.  
*Pseudalloptes tenuis*: FAVETTE & TROUSSERT, 1904: 125; RADFORD, 1958: 137.  
*Protolichus tenuis*: DUBININ, 1956: 304.

*Rhytidelasma tenuis*: ATYEO et al., 1988: 183, Figs. 11, 12.

*Psittocolus tenuis*: GAUD & ATYEO, 1996: 393, Fig. 404.

MATERIAL EXAMINED: 3 males, 2 females from the Blue-headed Parrot *Pionus menstruus* (LINNAEUS) (Psittacinae: Arini), Rio Frio, Cauca, Colombia, 27 XI 1911, coll. A. ALLEN & L. MILLER (UGA 10984, AMNH 111467).

This species was recorded from the type host, *P. menstruus*, in Colombia and Guyana (ATYEO et al., 1988).

### *Lorilichus* ATYEO & GAUD, 1991

*Lorilichus* ATYEO & GAUD, 1991: 140; MIRONOV et al., 2003: 11.

Within the *Rhytidelasma* group, *Lorilichus* and *Arhytidelasma* represent the two most derived genera in regard to the hysterosomal chaetome. In comparison to *Kakapolichus* and *Neorhytidelasma* having maximal idiosomal chaetome in the group, mites of these genera lack 3 pairs of hysteronotal setae, namely *d1*, *e1* and *e2* (Figs. 73, 74, 95). A preliminary systematic review of *Lorilichus* species was carried out by ATYEO & GAUD (1991). According to accumulated data on the host associations of this genus, which currently includes 10 species, it is restricted to lorries and lorikeet Lorinae (Table 1).

Based on the structure of the tarsus IV in males, we recognize two species groups within the genus. In the *lobiger* group, the seta *d* of tarsus IV is reduced to a weakly sclerotized button-like structure (Figs. 75, 77); in the *discifer* group this seta is represented by a short and straight seta (Figs 83, 85).

### Key to *Lorilichus* species

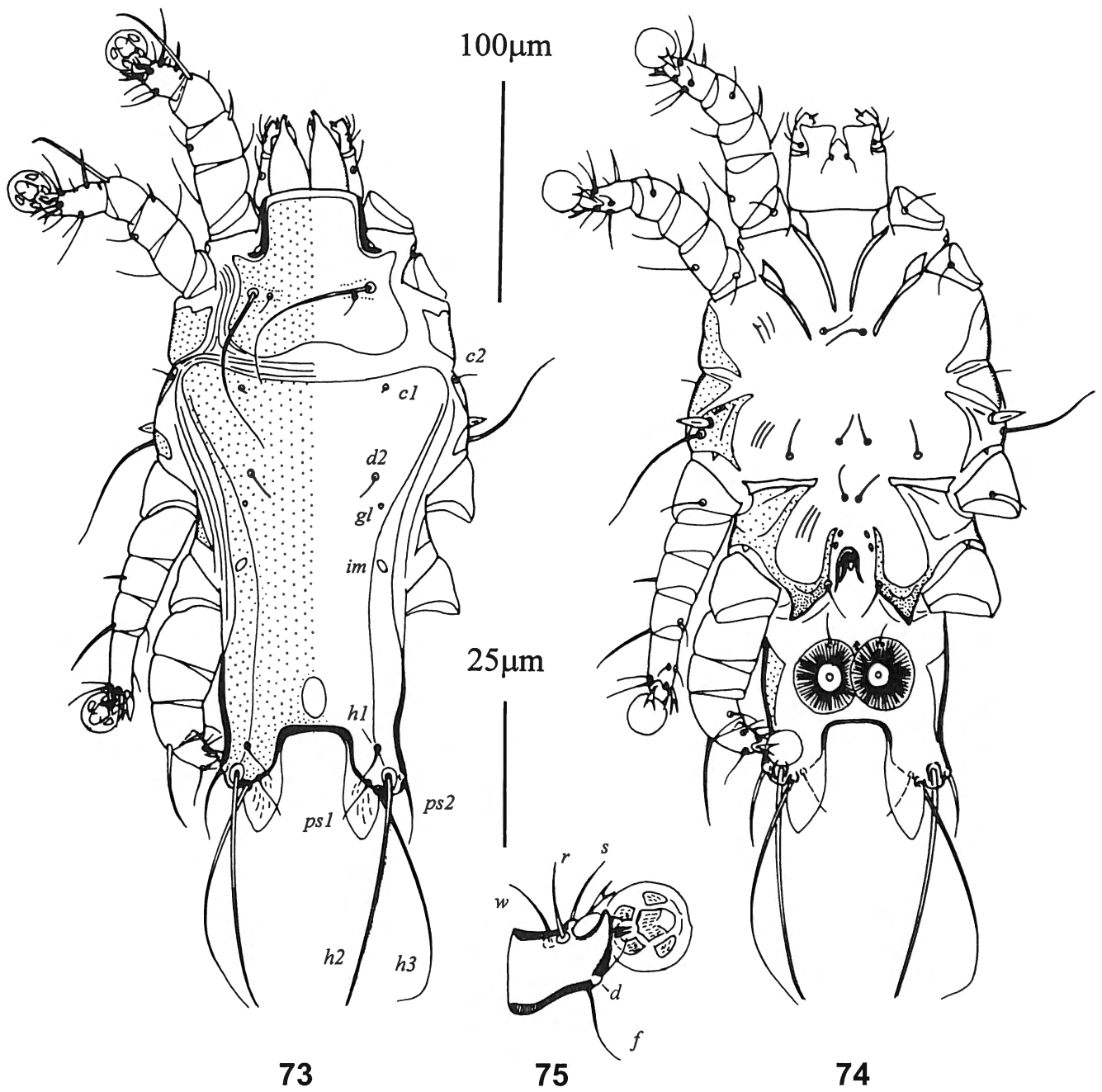
#### Males

1. Opisthosomal lobes without terminal lamellae; margin of terminal cleft with narrow membrane (Fig. 80) . . . . . *L. delibativentris* (TROUESSART, 1884)
- Opisthosomal lobes with variously shaped lamellae (tongue-like, lanceolate, foliate); terminal cleft with or without membrane . . . . . 2
2. Terminal cleft rectangular (Fig. 73, 74), opisthosomal lobes parallel-sided in basal part . . . . . *L. emarginiventris* (TROUESSART, 1884)
- Terminal cleft rounded (semicircular, ovate, U-shaped) . . . . . 3
3. Terminal lamellae large lanceolate, about 84-92 in length, with clear transverse striation on dorsal surface (Fig. 92) . . . . . *L. grandifolius* ATYEO & GAUD, 1991
- Terminal lamellae less than 50 in length . . . . . 4
4. Terminal lamellae large foliate, with widely rounded distal margin, longer than 30, with clear radial and transverse striation (Figs. 82, 84) . . . . . 5

- Terminal lamellae narrow, less than 30 in length, ovate, lanceolate or banana-shaped, with various pattern on dorsal surface . . . . . 6
- 5. Terminal lamellae 45-50 in length, 35-40 in width (Fig. 82) . . . . . *L. discifer* (TROUESSART, 1884)
- Terminal lamellae 30-35 in length, 25-28 in width (Fig. 84) . . . . . *L. securiventris* (TROUESSART, 1884)
- 6. Terminal lamellae tongue-like, situated on margin of terminal cleft, near lobar apices (Fig. 78) . . . . . *L. parvifolius* ATYEO & GAUD, 1991
- Terminal lamellae situated on lobar apices . . . . . 7
- 7. Terminal lamellae curved, banana-shaped (Fig. 88) . . . . . 8
- Terminal lamellae not curved . . . . . 9
- 8. Hysteronotal shield with sinuous transverse striation. Tibia IV with dorsoapical spine (Figs. 88, 89) . . . . . *L. curvilobus* MIRONOV et al., 2003
- Hysteronotal shield uniformly dotted. Tibia IV without dorsoapical spine (Figs. 90, 91) . . . . . *L. cultriventris* (TROUESSART, 1884).
- 9. Terminal lamellae straight, narrowly lanceolate (Fig. 86) . . . . . *L. stenobus* MIRONOV et al., 2003
- Terminal lamellae foliate, rounded on apices and slightly bent to midline (Fig. 76) . . . . . *L. lobiger* (TROUESSART, 1884)

#### Females

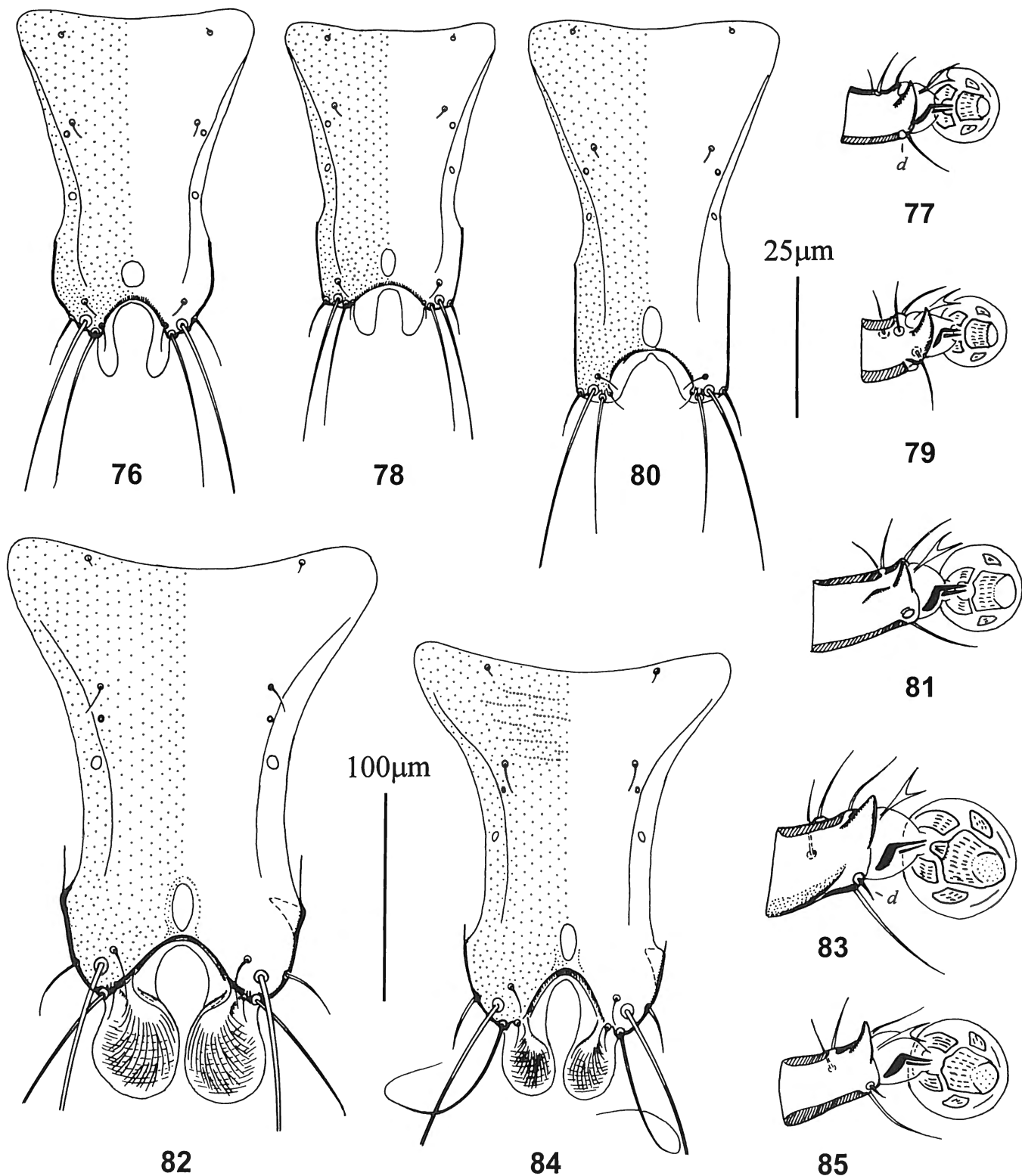
1. Hysteronotal shield entire and without lacuna in posterior one third (Fig. 98) . . . . . *L. grandifolius* ATYEO & GAUD, 1991
- Hysteronotal shield with lacuna in posterior one third, or pygidial part of this shield completely separated from the rest (Figs. 95-97, 99-102), or pygidial part without sclerotization (Fig. 51) . . . . . 2
2. Pygidial part of opisthosoma without shield (Fig. 51), length of idiosoma about 480 . . . . . *L. discifer* (TROUESSART, 1884)
- Pygidial part of opisthosoma covered with shield, length of idiosoma less than 450 . . . . . 3
3. Pygidial part of hysteronotal shield completely separated from the rest part of this shield (Figs. 99, 102) . . . . . 4
- Hysteronotal shield with lacuna of different form (Fig. 95) . . . . . 5
4. Pygidial part of hysteronotal shield ovate, separated from the rest of hysteronotal shield by semicircular band of soft cuticle (Fig. 99) . . . . . *L. parvifolius* ATYEO & GAUD, 1991
- Pygidial part of hysteronotal shield trapezium-like, separated from the rest part of this shield by transverse band of striated cuticle; pair of little ovate sclerites situated on this band near the margins of opisthosoma (Fig. 102) . . . . . *L. securiventris* (TROUESSART, 1884)
5. Lacuna in hysteronotal shield represented by transverse furrow. Supranal concavity is well visible . . 6
- Lacuna in hysteronotal shield U- or H-shaped, with pair of narrow branches extending anterior (Figs. 100, 101). Supranal concavity invisible . . . . . 8



Figs. 73-75 — *Lorilichus emarginiventris*, male. 73: dorsal view, 74: ventral view, 75: dorsal view of tarsus IV.

- |   |  |
|---|--|
| <p>6. Distance between setae <i>h1</i> approximately equal to distance between <i>h2</i> (Fig. 97) . . . . .<br/>         . . . . . <i>L. emarginiventris</i> (TROUESSART, 1884).</p> <p>– Distance between setae <i>h1</i> 1.5-1.8 times longer than between setae <i>h2</i> . . . . . 7</p> <p>7. Anterior part of prodorsal shield with pair of lateral thin crests (Fig. 95) . . . . .<br/>         . . . . . <i>L. stenolobus</i> MIRONOV et al., 2003</p> | <p>– Prodorsal shield without any crests . . . . .<br/>         . . . . . <i>L. lobiger</i> (TROUESSART, 1884).</p> <p>8. Pygidial section of hysteronotal shield well sclerotized, setae <i>h1</i> on shield surface (Fig. 101) . . . . .<br/>         . . . . . <i>L. cultriventris</i> (TROUESSART, 1884)</p> <p>– Central area of pygidial part not sclerotized, setae <i>h1</i> on soft cuticle (Fig. 100) . . . . .<br/>         . . . . . <i>L. curvilobus</i> MIRONOV et al., 2003</p> |
|---|--|





Figs. 76-85 — Males of *Lorilichus*. 76: *Lorilichus lobiger*, hysteronotal shield, 77: idem, dorsal view of tarsus IV, 78: *L. parvifolius*, hysteronotal shield, 79: idem, dorsal view of tarsus IV, 80: *L. delibativentris*, hysteronotal shield, 81: idem, dorsal view of tarsus IV, 82: *L. discifer*, hysteronotal shield, 83: idem, dorsal view of tarsus IV, 84: *L. securiventris*, hysteronotal shield, 85: idem, dorsal view of tarsus IV.

**Group lobiger*****Lorilichus lobiger* (TROUSSERT, 1884)**  
(Figs. 76, 77, 96)

*Pterolichus (Pseudaloptes) lobiger* TROUSSERT, 1884: 577.

*Rhytidelasma discifer*: GAUD, 1980, Fig. 12c (misidentification).

*Lorilichus lobiger*: ATYEO & GAUD, 1991: 141, Figs. 1-3.

MATERIAL EXAMINED. 1 male, 1 female from the Purple-naped Lory *Lorius domicella* (LINNAEUS) (Loriinae), Ceram, S. Moluccas, Indonesia, no other data (YSU 2277, AMNH 617965); 3 male, 2 females, same host species and location, 3 III 1906, coll. H. KUHN (YSU 2278, AMNH 617967).

This species is known only from the type host, *L. domicella*, in Indonesia (TROUSSERT, 1884; ATYEO & GAUD, 1991). Males of this species represent forms with medium-sized terminal lamellae.

***Lorilichus parvifolius* ATYEO & GAUD, 1991**  
(Figs. 78, 79, 99)

*Lorilichus parvifolius* ATYEO & GAUD, 1991: 141, Figs. 4, 6.

MATERIAL EXAMINED. 1 male, 1 female from *Lorius domicella* (Loriinae), Ceram, S. Moluccas, Indonesia, no other data (YSU 2277, AMNH 617965).

This species is known only from the type host, *L. domicella*, in Indonesia (ATYEO & GAUD, 1991). Within the *lobiger* group, this species is characterized by the medium-sized terminal lamellae, which are moved from lobar apices to the margin of terminal cleft (Fig. 78).

***Lorilichus delibativentris* (TROUSSERT, 1884)**  
(Figs. 80, 81)

*Pterolichus (Pseudaloptes) delibativentris* TROUSSERT, 1884: 578.

*Lorilichus delibativentris*: ATYEO & GAUD, 1991: 143, Fig. 7.

MATERIAL EXAMINED. 1 male from *Lorius domicella* (Loriinae), Ceram, S. Moluccas, Indonesia, 19 VII 1911, coll. E. STRESEMANN (YSU 2281, AMNH 617963).

This species is known only from males collected on the type host, *L. domicella*, in Indonesia (TROUSSERT, 1884; ATYEO & GAUD, 1991). Among the *lobiger* group, this species is characterized by the absence of terminal lamellae, which is a unique feature within the genus.

***Lorilichus emarginiventris* (TROUSSERT, 1884)**  
(Figs. 73-75, 97)

*Pterolichus (Pseudaloptes) emarginiventris* TROUSSERT, 1884: 578.

*Lorilichus emarginiventris*: ATYEO & GAUD, 1991: 146.

MATERIAL EXAMINED. 1 male, 1 female from the Tahitian Lory *Vini peruviana* (MULLER) (Loriinae), Scilly Is., Society Islands, 21 XII 1921, coll. E. H. QUAYLE (YSU 2286, AMNH 190136).

This species is known only from the type host from Tahiti, Society Islands and Tuamotu Archipelago (TROUSSERT, 1884; ATYEO & GAUD, 1991). Males of this species are characterized by almost rectangular form of terminal cleft and medium-sized terminal membranes (Fig. 73).

***Lorilichus grandifolius* GAUD & ATYEO, 1991**  
(Figs. 92, 98)

*Lorilichus grandifolius* GAUD & ATYEO, 1991: 145, Figs. 5, 10.

This species is known only from the type host *L. domicella* in Indonesia (ATYEO & GAUD, 1991). Material was not available for the present study.

***Lorilichus stenolobus* MIRONOV, DABERT & PROCTOR, 2003**  
(Figs. 86, 87, 95)

*Lorilichus stenolobus* MIRONOV et al., 2003: 11, Figs. 21-23, 27, 28.

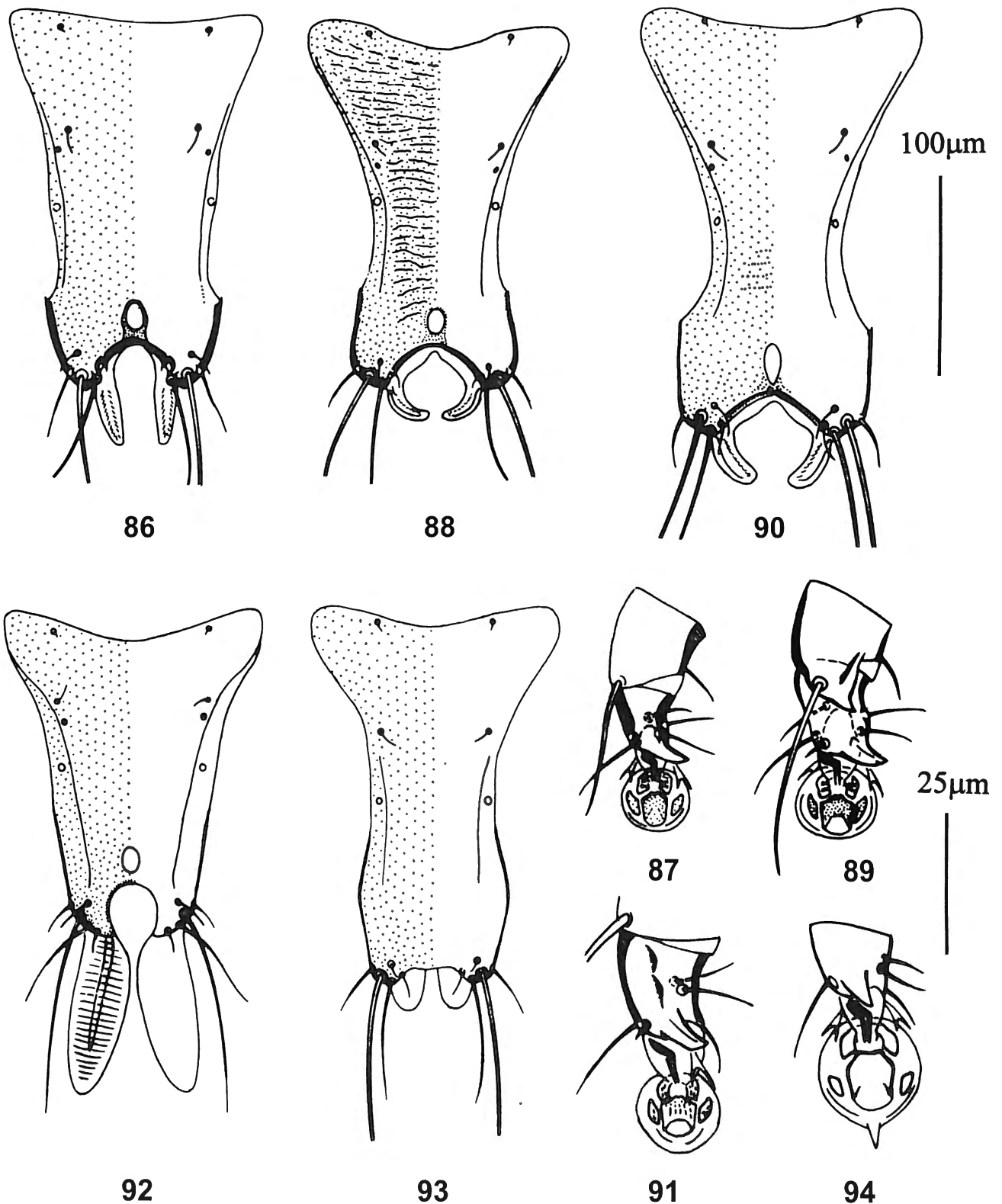
MATERIAL EXAMINED. Holotype male, 4 female paratypes from the Rainbow Lorikeet *Trichoglossus haematodus* (LINNAEUS) (Loriinae), Taringa, Queensland, Australia, 21 I 2000, coll. H. PROCTOR (QM S48366 and S48367).

This species is known only from the type host in Australia (MIRONOV et al., 2003). Males of this species are similar to *L. lobiger* and differ by straight and narrow terminal lamellae (Fig. 86).

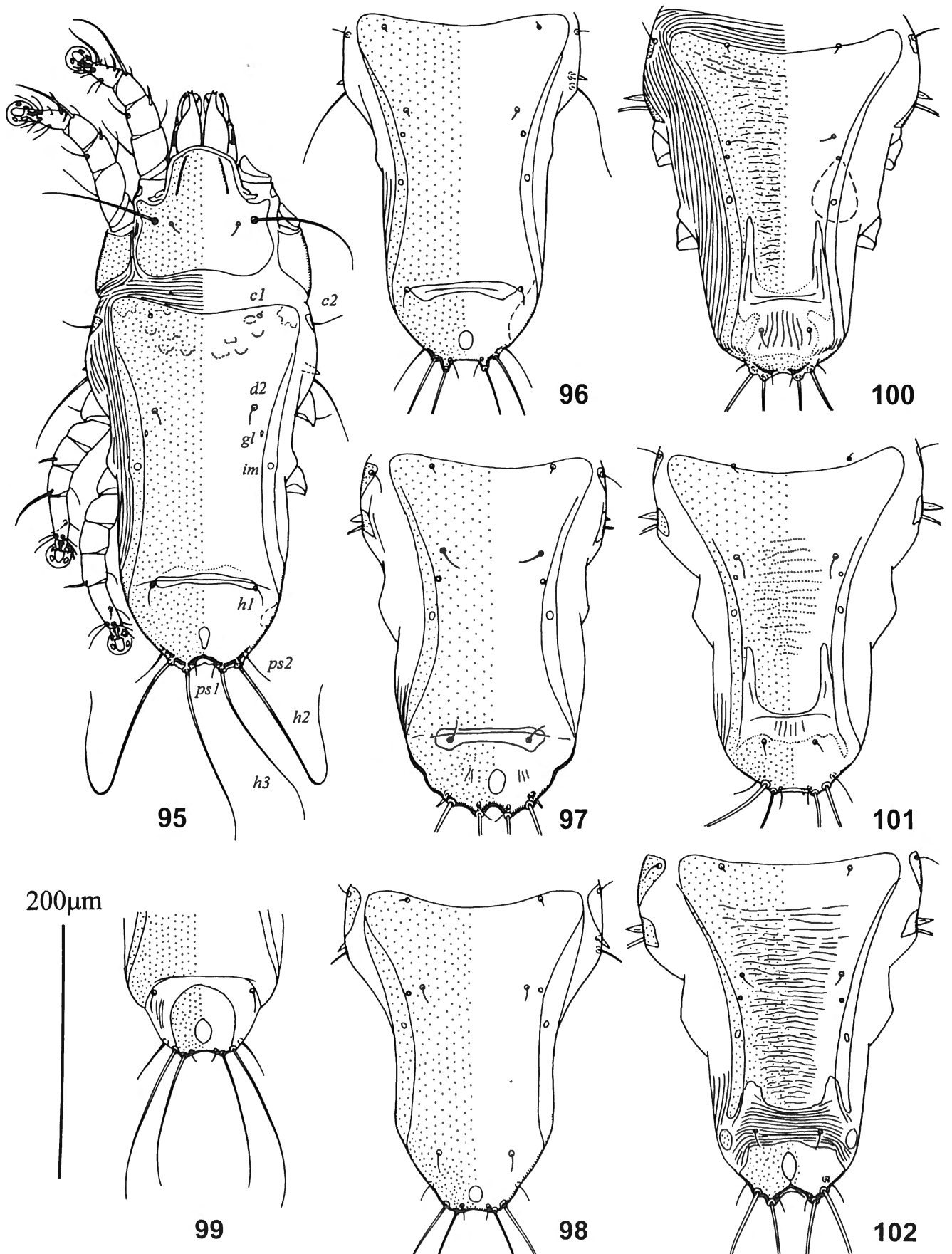
**Group discifer*****Lorilichus discifer* (TROUSSERT, 1884)**  
(Figs. 51, 82, 83)

*Pterolichus (Pseudaloptes) discifer* TROUSSERT, 1884: 578.  
*Lorilichus discifer*: ATYEO & GAUD, 1991: 143, Figs. 8, 9.

MATERIAL EXAMINED. 2 males, 2 females from *Lorius domicella* (Loriinae), Ceram, S. Moluccas, Indonesia,



Figs. 86-93 — Males of *Lorilichus* and *Arhytidelasma*. 86: *Lorilichus stenolobus*, hysteronotal shield, 87: idem, dorsal view of tarsus IV, 88: *L. curvilobus*, hysteronotal shield, 89: idem, dorsal view of tarsus IV, 90: *L. cultriventris*, hysteronotal shield, 91: idem, dorsal view of tarsus IV, 92: *L. grandifolius*, hysteronotal shield, 93: *Arhytidelasma microtricha*, hysteronotal shield, 94: idem, dorsal view of tarsus IV (92 – after: ATYEO & GAUD, 1991, modified; 93, 94 – after: GAUD & ATYEO, 1996, modified).



Figs. 95-102 — Females of *Lorilichus*, dorsal view of idiosoma (95) and hysterosoma (96-102). 95: *Lorilichus stenolobus*, 96: *L. lobiger*, 97: *L. emarginiventris*, 98: *L. grandifolius*, 99: *L. parvifolius*, 100: *L. curvilobus*, 101: *L. cultriventris*, 102: *L. secriventris*. (99 — after: GAUD & ATYEO, 1991, modified).

19 VII 1911, coll. E. STRESEMANN (YSU 2281, AMNH 617963).

This species is known only from the type host in Indonesia (TROUESSART, 1884; ATYEO & GAUD, 1991). Males of this species are characterized by very large leaf-like terminal lamellae (Fig. 82).

***Lorilichus securiventris* (TROUESSART, 1884)**  
(Figs. 84, 85, 102)

*Pterolichus (Pseudaloptes) securiventris* TROUESSART, 1884: 577.

*Lorilichus securiventris*: ATYEO & GAUD, 1991: 146.

MATERIAL EXAMINED. 1 male, 1 female from *Vini peruviana* (Loriinae), Kaukura, Tuamotu Archipelago, French Oceania, S. Pacific, 2 II 1923, coll. R.H. BECK (YSU 2288, AMNH 198931).

This species is known only from the type host from Society Islands and Tuamotu Archipelago (TROUESSART, 1884; ATYEO & GAUD, 1991). This species is closely related to *L. discifer* by the form of terminal lamellae in males (Fig. 84).

***Lorilichus cultriventris* (TROUESSART, 1884)**  
(Figs. 90, 91, 101)

*Pterolichus (Pseudaloptes) cultriventris* TROUESSART, 1884: 577.

*Lorilichus cultriventris*: ATYEO & GAUD, 1991: 145.

MATERIAL EXAMINED. 1 male, 1 female from the Musk Lorikeet *Glossopsitta concinna* (SHAW) (Loriinae), Emu Vale, Mt. Warwick, Queensland, Australia, 4 VIII 1941, coll. S. HENRY (UGA 10839, AMNH 702878).

This species is known only from the type host *G. concinna* from Australia (ATYEO & GAUD, 1991). This and subsequent species are characterized by relatively narrow terminal lamellae curved to midline (Figs. 88, 90).

***Lorilichus curvilobus* MIRONOV,  
DABERT & PROCTOR, 2003**  
(Figs. 88, 89, 100)

*Lorilichus curvilobus* MIRONOV et al., 2003: 197, Figs. 24-26, 29, 30.

MATERIAL EXAMINED. Holotype male, 1 male and 4 female paratypes from *Trichoglossus haematodus* (Loriinae), Bridgeman Downs, Brisbane, Queensland, Australia, 21.XI.2001, coll. D. HOLLOWAY. Holotype, paratypes - QM S48368 and S48369, paratypes - ZISP 4278.

This species is known only from the type host in Australia (MIRONOV et al., 2003).

***Arhytidelasma* GAUD & ATYEO, 1996**

*Arhytidelasma* GAUD & ATYEO, 1996: 119.

This monotypic genus is very similar to *Lorilichus* and reliably differs only by the absence of tibial setae *kT* III and *kT* IV. The genus is known from fig-parrots of the genus *Cyclopsitta* REICHENBACH (Psittacinae: Cyclopsittacini).

***Arhytidelasma microtricha* GAUD & ATYEO, 1996**  
(Figs. 50, 93, 94)

*Arhytidelasma microtricha* GAUD & ATYEO, 1996: 119, Fig. 342.

This species is known only from the type host *Cyclopsitta diophthalmica* (HOMBRON & JAQUINOT) (Psittacinae: Cyclopsittacini) in Indonesia (GAUD & ATYEO, 1996). Material was not available for the present study.

**Discussion**

As a result of the present review and taxonomic revisions of certain taxa, the *Rhytidelasma* generic group includes 33 species arranged in 9 genera (Table 1). In spite of the current study, biodiversity of this generic group and its host associations with parrots are still far from completely explored. Species of the *Rhytidelasma* group are known now from 29 valid species of parrots belonging to 20 genera, which is only a tiny subset of the world biodiversity of parrots. The family Psittacidae includes 332 species and 78 genera, and Cakatuidae 21 species and 6 genera (DEL HOYO et al., 1997). Taking into consideration a high specificity of these feather mites, i.e. monoxenous association of most known species of this group, and a high specialization of a mite species to clearly restricted microhabitats in the plumage of hosts that allows several mite species of one genus being adapted to different microhabitats to coexist on one host species, it is quite reasonable to expect that the real species number of the *Rhytidelasma* group would be equal to or exceed the number of existing parrots species. Nevertheless, currently accumulated data on the *Rhytidelasma* group allow drawing out some preliminary conclusions in regard to certain tendencies in host associations, a host specificity range, and geographical distribution.

Based on wide geographical distribution of three generic groups of pterolichine mites restricted to parrots and their clear morphological differences from other pterolichids (GAUD & ATYEO, 1996; MIRONOV et al., 2003) it is possible to hypothesize, that the *Rhytidelasma* group was formed on the ancestor of Psittaciformes in parallel with

Table 1 — Host associations of the *Rhytidelasma* generic group

Mite species	Host species and subspecies	Locality	Reference
<i>Kakapolichus strigopis</i>	<i>Strigops harboptilus</i> GRAY *	New Zealand	Present study
<i>Cacatolichus spathuliger</i>	<i>Calyptrorhynchus banksii</i> (LATHAM)	Australia	Present study
''	<i>C. banksi macrorhynchus</i> GOULD *	Australia	TROUESSART, 1884
<i>Psittrichobius eclectus</i>	<i>Psittrichas fulgidus</i> (LESSON) *	New Guinea	Present study
<i>Rhytidelasma allochaeta</i>	<i>Agapornis swinderiana</i> (KUHLM) *	Zaire	GAUD, 1980
<i>R. aprosmictis</i>	<i>Aprosmictus erhythropterus</i> (GMELIN) *	Australia, Papua New Guinea	Present study
<i>R. eurycerca</i>	<i>Poicephalus robustus</i> (GMELIN) *	Zaire	GAUD, 1980
''	<i>Poicephalus gulielmi</i> (JARDINE)	Kenya	GAUD, 1980
''	<i>Poicephalus rufiventris</i> (RUPPEL)	Kenya	GAUD, 1980
''	<i>Poicephalus meyeri</i> (CRETZSCHMAR)	Zaire	GAUD, 1980
''	<i>Poicephalus cryptoxanthus</i> (PETERS)	Mozambique, Kenya, Tanzania	GAUD, 1980, Present study
<i>R. grammophylla</i>	<i>Psittacus erythacus</i> LINNAEUS *	Cameroon	GAUD & MOUCHET, 1959
<i>R. lanceolata</i>	<i>Prosopeia personata</i> (GRAY) *	Fiji Islands	Present study
<i>R. punctata</i>	<i>Platycercus adscitus</i> (Latham) *	Australia	MIRONOV et al., 2003
<i>R. stenura</i>	<i>Geoffroyus heteroclitus hyacinthinus</i> MAYR *	Rennell Island	GAUD, 1968
''	<i>Geoffroyus geoffroyi</i> (BECHSTEIN)	Indonesia	Present study
<i>R. striata</i>	<i>Alisterus scapularis</i> (LICHTENSTEIN) *	Australia	MIRONOV et al., 2003
<i>R. zebra</i>	<i>Agapornis pullarius</i> (LINNAEUS) *	Cameroon	GAUD, 1980
''	<i>Agapornis roseicollis</i> (VIEILLOT)	Cameroon, Zaire	GAUD, 1980
''	<i>Agapornis swinderianus</i> (KUHLM)	Zaire	GAUD, 1980
<i>Coracopsobius lambda</i>	<i>Coracopsis vasa comorensis</i> (PETERS) *	Comoro Island	TROUESSART, 1899
''	<i>Coracopsis vasa</i> (SHAW)	Madagascar	GAUD & ATYEO, 1996
''	<i>Coracopsis nigra nigra</i> (LINNAEUS)	Madagascar	GAUD & ATYEO, 1996
<i>Neorhytidelasma cornigera</i>	<i>Aratinga h. holochlora</i> (SCLATER) *	Mexico	ATYEO & PÉREZ, 1988a
''	<i>Aratinga h. rubritorquis</i> (SCLATER)	Nicaragua, Honduras	ATYEO & PÉREZ, 1988a
<i>N. dilatata</i>	<i>Ara n. nobilis</i> (LINNAEUS) *	Guyana, Venezuela,	TROUESSART, 1884; ATYEO et al., 1988
<i>N. tritiventris</i>	<i>Ara chloroptera</i> GRAY *	Colombia, Venezuela	TROUESSART, 1884; ATYEO et al., 1988

Mite species	Host species and subspecies	Locality	Reference
<i>N. ulocerca</i>	<i>Ara chloroptera</i> GRAY *	Guyana, Ecuador, Venezuela, Brazil	TROUSSERT, 1884; ATYEO et al., 1988
<i>N. urophila</i>	<i>Aratinga h. holochlora</i> (SCLATER) *	Mexico	ATYEO & PÉREZ, 1988a
''	<i>Aratinga h. rubritorquis</i> (SCLATER)	Honduras, Guatemala, Nicaragua	ATYEO & PÉREZ, 1988a
<i>N. forficiventris</i>	<i>Pionites l. leucogaster</i> (KUHLE) *	Guyana, Brazil	TROUSSERT, 1884; ATYEO et al., 1988
''	<i>Pionites l. xantomeria</i> (SCLATER)	Peru	ATYEO et al., 1988
''	<i>Pionites l. xanthurus</i> TODD	Brazil	ATYEO et al., 1988
<i>N. bicostata</i>	<i>Aratinga canicularis clarae</i> MOORE *	Mexico	ATYEO & PÉREZ, 1988b
''	<i>A. c. eburnirostrum</i> (LESSON)	Mexico	ATYEO & PÉREZ, 1988b
''	<i>A. c. canicularis</i> (LINNAEUS)	Mexico, Guatemala, Costa Rica	ATYEO & PÉREZ, 1988b
''	<i>A. n. nana</i> (VIGORS)	Jamaica	ATYEO & PÉREZ, 1988b
''	<i>A. n. vicinalis</i> (BANGS & PENARD)	Mexico	ATYEO & PÉREZ, 1988b
''	<i>A. n. astec</i> (SOUANCE)	Mexico, Nicaragua, Costa Rica	ATYEO & PÉREZ, 1988b
<i>N. mesomexicana</i>	<i>A. h. holochlora</i> (SCLATER) *	Mexico	ATYEO et al., 1988
''	<i>A. h. rubritorquis</i> (SCLATER)	Honduras	ATYEO et al., 1988
<i>Psittocolus tenuis</i>	<i>Pionus menstruus</i> (LINNAEUS) *	Colombia, Guyana	ATYEO et al., 1988
<i>Lorilichus lobiger</i>	<i>Lorius domicellus</i> (LINNAEUS) *	Indonesia	TROUSSERT, 1884
<i>L. parvifolius</i>	<i>Lorius domicellus</i> (LINNAEUS) *	Indonesia	ATYEO & GAUD, 1991
<i>L. delibativentris</i>	<i>Lorius domicellus</i> (LINNAEUS) *	Indonesia	TROUSSERT, 1884
<i>L. discifer</i>	<i>Lorius domicellus</i> (LINNAEUS) *	Indonesia	TROUSSERT, 1884
<i>L. grandifolius</i>	<i>Lorius domicellus</i> (LINNAEUS) *	Indonesia	ATYEO & GAUD, 1991
<i>L. cultriventris</i>	<i>Glossopsitta concinna</i> (SHAW) *	Australia	TROUSSERT, 1884
<i>L. curvilobus</i>	<i>Trichoglossus haematodus</i> (LINNAEUS) *	Australia	MIRONOV et al., 2003
<i>L. emarginiventris</i>	<i>Vini peruviana</i> (MULLER) *	Tahiti, Tuamotu Archipelago	TROUSSERT, 1884 ATYEO & GAUD, 1991
<i>L. securiventris</i>	<i>Vini peruviana</i> (MULLER) *	French Oceania, Society Islands Tuamotu Archipelago	TROUSSERT, 1884; ATYEO & GAUD, 1991; Present study
<i>L. stenolobus</i>	<i>Trichoglossus haematodus</i> (LINNAEUS) *	Australia	MIRONOV et al., 2003
<i>Arhytidelasma microtricha</i>	<i>Cyclopsitta diophthalma</i> (HOMBRON & JAQUINOT) *	Indonesia	GAUD & ATYEO, 1996

\* - type host

the two other groups of pterolichines (*Protolichus* and *Psittophagus* groups) and subsequently co-evolved in certain extent with this group of hosts. A great diversity of species and generic forms of the *Rhytidelasma* group has been achieved on Psittacidae, while only one species, *Cacatolichus spathuliger*, occurs on representatives of Cacatuidae. Despite no other representatives of the group in question are currently known from Cacatuidae, it seems more probable that *C. spathuliger* originated on cockatoos in the result of co-evolution with this host group and now represent a relict taxon retained only on cockatoos of the genus *Calyptrorhynchus*. The genus *Cacatolichus* is related by its morphological features to archaic forms of the *Rhytidelasma* group, such as the genera *Kakapolichus*, *Psittrichobius*, and some species of *Rhytidelasma*, but in regard to idiosomal chaetome it obviously represents an independent lineage within the group. None representative of the named archaic genera shows a sufficiently close affinity to *C. spathuliger* to suggest with confidence that the ancestor of this species has migrated onto cockatoos from some psittacids of the Australian region.

Within the family Psittacidae, the *Rhytidelasma* group is represented well on both subfamilies, Psittacinae and Loriinae. Two monotypic genera characterized by numerous archaic features, *Kakapolichus* and *Psittrichobius*, are associated with representatives of archaic and aberrant lineages of psittacines, respectively with the Kakapo *Strigips harboptilus* (Strigopini) in New Zealand and Pesquet's Parrot *Psittrichas fulgidus* (Psittrichadini) in New Guinea.

The genus *Neorhytidelasma* is also an archaic lineage of the group, which was apparently formed on South American parrots of the tribe Arini. Simultaneous occurring of different species groups (up to 4 species from different groups) on large-bodied species of Arini (ATYEO et al., 1988) suggests that these mite groups were formed on the ancestor of this tribe as the result of adaptation to different microhabitats in the plumage of the ancestral host. Thus, these species groups of *Neorhytidelasma* are "potential genera". The genus *Psittocolus* is probably a descendant of such a derived group, which has very early split from the lineage of *Neorhytidelasma*.

The three most numerous, diverse and widely distributed tribes of the Old World parrots (Psittaculini, Psittacini, and Platycercini) are occupied by representatives of

the moderately derived and very diverse genus *Rhytidelasma*. Mites of this genus are distributed on parrots throughout all the Old World, - from Australia, via Indonesia and India, up to Africa. Within the tribe Psittacini, the genus *Coracopsobius* "substitutes" for *Rhytidelasma* on the vasa parrots *Coracopsis* which are restricted to Madagascar and neighbouring archipelagos. As it was noted in the systematic part, *Coracopsis* is very closely related to *Rhytidelasma*. It has obviously derived from of some archaic representative of *Rhytidelasma* which was associated with the ancestor of vasa parrots conquered Madagascar. The derived tribe of the fig-parrots Cyclopsittini is occupied by mites of the genus *Arhytidelasma*, one of two most derived genera within the *Rhytidelasma* group.

On lorries and lorikeets (Loriinae), the group in question is represented only by one genus - *Lorilichus*. However, as it is possible to note, on most examined species of Loriinae this most derived genus of the *Rhytidelasma* group is represented by species of two different species groups, *lobiger* and *discifer*. Such cases were observed on *Lorius domicellus*, *Vini peruviana* and *Trichoglossus haematodus*. Moreover, each of these groups may be represented by two or even three species living on the same host. As was found by ATYEO & GAUD (1991), five different species of the genus *Lorilichus* belonging to two species groups may inhabit the Purple-naped Lory *Lorius domicellus*. There are no any data about the location of different *Lorilichus* species in the plumage of one host, but it is obvious that each of them is restricted to some special area among feathers as in the case of the genus *Neorhytidelasma*.

Thus, preliminary analysis of host-parasite associations between the *Rhytidelasma* group and Psittaciformes shows certain traces of phylogenetic parallelism and supports in general lines a hypothesis of co-evolutionary relationships between this group of mites and psittaciforms.

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