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ABSTRACT

A Generic Revision of the Pterodectinae, a New Subfamily of Feather Mites (Sarcoptiformes: Analgoidea)

Chong K. Park

Warren T. Atyeo

The generic revision of the Pterodectinae, new subfamily of the Proctophyllodidae, is based on 88 named and over 160 new species. Included are morphology, host-parasite relationships, diagnoses of four named and eight new genera, and illustrations of each type species. The named genera are:

Anisodiscus Gaud and Mouchet, 1957; *Montesauria* Oudemans, 1905; *Proterothrix* Gaud, 1968; *Pterodectes* Robin, 1877. The new genera and their type species are: *Dolichodectes*, *Proctophyllodes* (*Pterocolus*) *edwardsi* Trouessart, 1885; *Megalodectes*, *Proctophyllodes* (*Pterodectes*) *major* Trouessart, 1885; *Neodectes*, *Proctophyllodes* (*Pterodectes*) *securiclatus* Trouessart and Neumann, 1888; *Pedanodectes*, *Pterodectes* *hologaster* Gaud, 1953; *Syntomodectes*, *Proctophyllodes* (*Pterodectes*) *selenurus* Trouessart, 1885; *Toxerodectes*, *Pterodectes* *gladiger hastifolia* Trouessart, 1899; *Trochilodectes*, *Proctophyllodes* (*Pterodectes*) *trochilidarum* Trouessart, 1885; *Xynonodectes*, *Proctophyllodes* (*Pterodectes*) *gracillior* Trouessart, 1885.

The subgenus *Pterodectes* (*Proterothrix*) Gaud, 1968, is elevated to genus. Eighty-eight species are assigned to the appropriate genera, six species are unassigned, *Pterodectes rotifer* (Trouessart and Neumann), 1888, is re-assigned to the genus *Trouessartia*, and *Pterodectes armatus* Banks, 1909, is assigned to the genus *Proctophyllodes*. New synonymy: *Montesauria cylindrica* (Robin), 1877 = *Pterodectes corvincola* Oudemans, 1905.

A Generic Revision of the Pterodectinae, a New Subfamily of Feather Mites (Sarcoptiformes: Analgoidea)³

INTRODUCTION

The genus *Pterodectes* Robin, 1877 (Proctophyllodidae) as previously defined (Trouessart, 1885, 1899; Gaud, 1952, 1953; Gaud and Mouchet, 1957) is one of the largest groups of feather mites, but includes a heterogeneous assemblage of species. Numerous species groups are evident for the described species, but only the genera *Anisodiscus* Gaud and Mouchet, 1957, *Montesauria* Oudemans, 1905, and *Proterothrix* Gaud, 1968, have been recognized as supraspecific taxa. The bionomics of these acarines, broadly classified as epizotic scavengers, are virtually unknown. Popp (1967) in conjunction with studies of the morphology of the reproductive systems, conducted mating experiments with two species of *Pterodectes* (s.l.) in which

he demonstrated that tritonymph and adult females laid viable bisexual eggs.

The present study, based on over 250 new and described species, is the first concerted effort to recognize and diagnose supraspecific categories within the genus *Pterodectes* (s.l.). The genera *Pterodectes* (s.s.), *Montesauria*, *Anisodiscus*, *Proterothrix* and eight new genera are defined; the type species for each genus is illustrated, and described species are re-assigned. Descriptions and redescrptions of the more than 250 species will appear in future studies.

The material for this investigation is part of an extensive feather mite collection now housed at the University of Georgia. The collection consists of approximately 16,000 vials and 35,000 slides acquired through examination of 1,900 field collected birds and 20,000 museum study skins, and through loans and exchanges with various persons and museums. In addition, through the cooperation of Drs. Jean Gaud and Max Vachon, types have been made available for most of the described species.

The collection and preparation of the feather mite specimens follow the procedures of Atyeo and Braasch (1966). The optical equipment used in this study included a Wild-Heerbrugg phase-contrast microscope with drawing attachment and an AO Spencer phase-contrast microscope equipped with an ocular micrometer.

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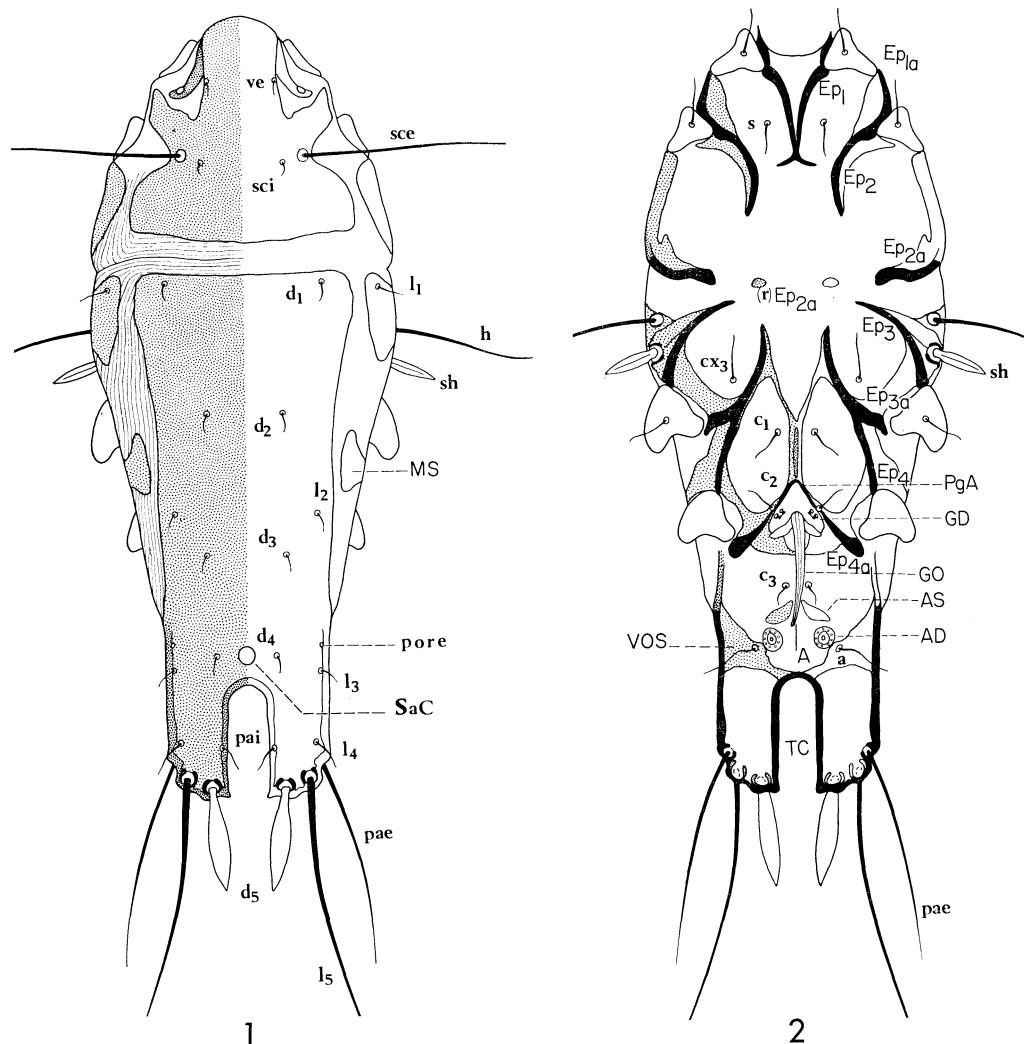
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MORPHOLOGY

The general idiosomal conformation of both the males and females is relatively simple. Modifications of the male genital region, the idiosomal termini of the male and female, and the female spermatheca are some of the more useful characteristics for species differentiation. For illustrative purposes, a hypothetical species has been created to include morphological fea-

tures encountered in studying this group of acarines (Figs. 1-4). An analysis of the gnathosoma is not included; it is similar to that of *Proctophyllodes* species described by Donald E. Johnston (*in* Atyeo and Braasch, 1966). The terminology used for the descriptive morphology follows Atyeo and Braasch (1966) and the chaetotaxal signatures are those of Atyeo and Gaud (1966).



Figs. 1 and 2. Hypothetical pterodectine male. A, anus; AD, adanal discs; AS, anal shields; Ep_{1-4a} , epimerites; GD, genital discs; GO, genital organ; MS, metapodosomal shields; SaC, supranal concavity; TC, terminal cleft; VOS, ventrolateral shields. SETAE: a, anal; c_{1-3} , centrals; cx_3 , coxal III; d_{1-5} , dorsal hysterosomals; h, humeral; l_{1-5} , lateral hysterosomals; pae, pai, external and internal postanal; s, coxal I; sce, sci, external and internal scapulars; sh, subhumeral; ve, external vertical.

Idiosoma

Dorsal idiosoma (Figs. 1 and 3). The propodosomal shield bears two or three pairs of setae; the scapular setae (*sci*, *sce*) are always present and the external vertical setae (*ve*) may be present or absent. The external margins of this shield may be indistinct as the sclerotization gradually diminishes and blends with the surrounding striated integument. Nevertheless, the approximate shape of the shield can be described as approximately rectangular, triangular, or trapezoidal. The shape of the propodosomal shield is generally constant within a genus and as such, has little value for species differentiation.

Two scapular shields, when present, are immediately posterior to legs II and the shields complete the complement of sclerotized regions of the dorsal (and lateral) propodosoma. The scapular shields never bear setae.

The shields of the hysterosoma consist of the large median shield, two lateral humeral shields anterior to legs III, and rarely two small metapodosomal shields between legs III and IV. Except for setae *l*₁, the hysterosomal shield usually bears all of the posterior setae, the openings of the dorsal hysterosomal glands, the supranal concavity, and the various ornamentations associated with the termini (Figs. 1, 3). The humeral shields often bear the lateral pair of the first row of hysterosomal setae (*l*₁), the long humeral setae (*h*), and the short, often bladelike subhumeral setae (*sh*).

With the exception of the new genus *Toxero-dectes*, the male hysterosoma usually tapers gradually from the posterior articulations of legs IV to the terminus. The terminus is weakly to distinctly bilobed, the lobes being separated by a terminal cleft of various configurations which may be unique to certain genera.

The female hysterosoma is primitively divided into a large anterior portion and a smaller terminal region which may bear ensiform appendages. The terminus is bilobed and the dorsal surface is usually separated from the idiosoma proper by a distinct suture. In a few genera this suture is absent or partially developed. As in the male, the terminal cleft may be variously formed. Each of the posterior lobes may bear a

gladiform appendage supported internally by a sclerotized rod. If these appendages are absent, setae *d*₅ are extremely long.

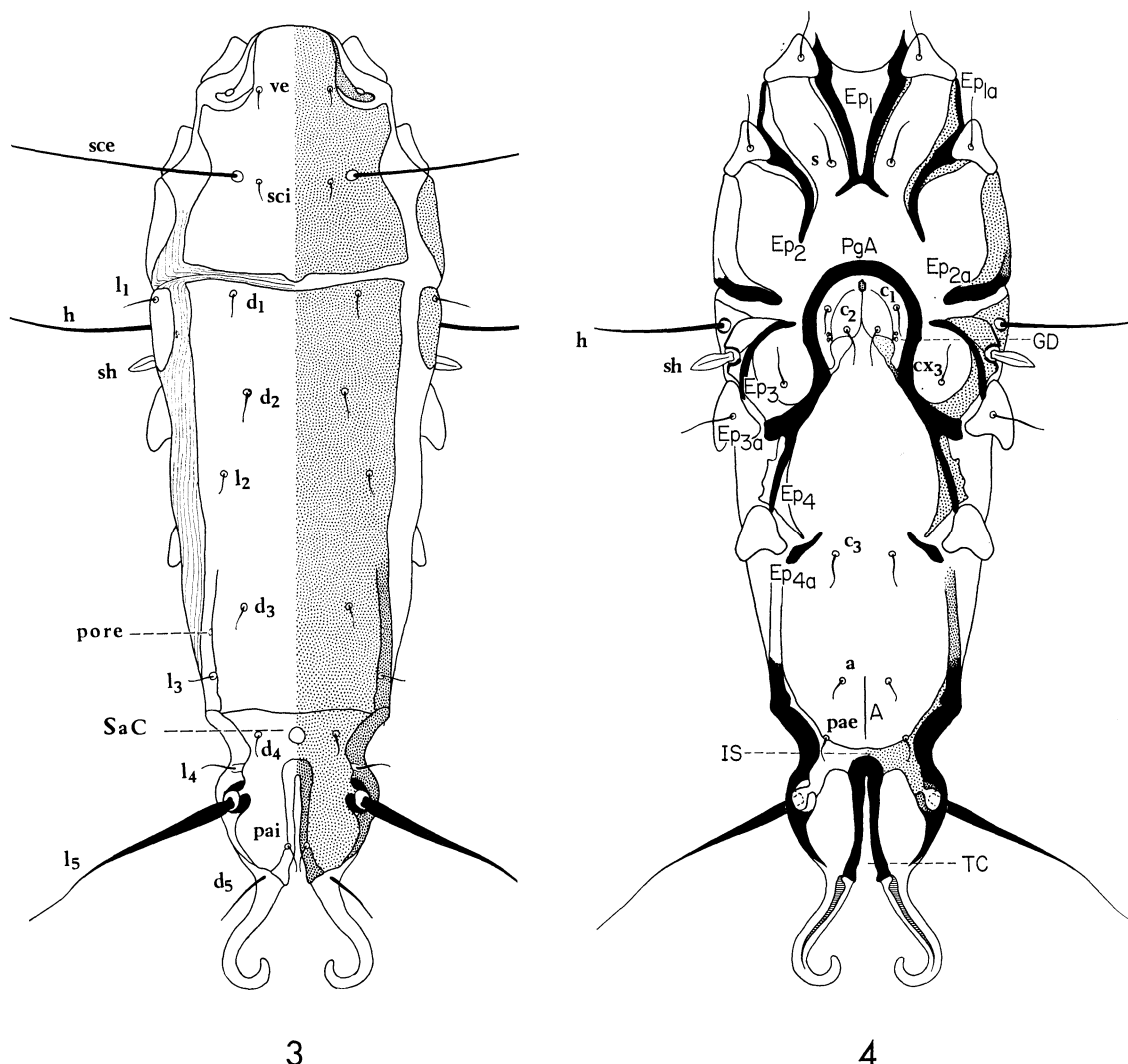
Ventral idiosoma (Figs. 2 and 4). An important diagnostic feature of the ventral idiosoma is the pattern formed by the epimerites, apodemes, and associated sclerites (sternocoxal skeleton). The various conditions of epimerites I-III are usually consistent within a genus; the posterior epimerites (IIIa-IVa) vary between taxa and between sexes. Without exception there are surface sclerotizations (surface shields) closely associated with one or more of the epimerites.

Epimerites I are basically Y-, V-, or λ -shaped with or without posterolateral extensions (compare Figs. 2, 22, 36, and 38). Occasionally, the posterolateral extensions are sufficiently developed to extend to epimerites II thereby enclosing coxal fields I (Fig. 54). Epimerites II usually curve toward the midline and end free, rarely are they connected with epimerites IIa to form closed coxal fields. The latter epimerites of this coxa (IIa) are always associated with the posteroventral edge of the scapular shields and usually terminate as bluntly rounded apodemes before reaching the meson. There may be a pair of small internal structures that are presumably remnants of these epimerites mesal to the major terminations.

Epimerites III are ventrolateral apodemes associated with the humeral shields and the anterior articulations of legs III; those of the male and female are similar (Figs. 2 and 4). In a few genera, extensions of the epimerites form closed coxal fields (Fig. 30).

A complex arrangement of the posterior epimerites, surface shields, and apodemes is illustrated in a hypothetical male (Fig. 2). Epimerites IIIa + IV and IVa are joined on each side through a fusion with a median Y-shaped sclerite. Epimerites IVa of each side connect anteriorly to the genital arch and surface shields of IVa are present posterior to the genital arch. Commonly the median Y-shaped sclerite is absent and epimerites IVa and associated sclerotizations are weakly developed. For additional information, see the section on the male genital region.

In the region between the male genital arch



Figs. 3 and 4. Hypothetical pterodectine female. A, anus; Ep_{1-4a} , epimerites; GD, genital discs; IS, interlobar shield; PgA, pregenital apodeme; SaC, supranal concavity; TC, terminal cleft. SETAE: a, anal; c_{1-8} , centrals; cx_3 , coxal III; d_{1-5} , dorsal hysterosomals; h, humeral; l_{1-5} , lateral hysterosomals; pae, pai, external and internal postanal; s, coxal I; sce, sci, external and internal scapulars; sh, subhumeral; ve, external vertical.

and the adanal discs, there may be one or more sclerites. The more anterior, mentioned above, may connect epimerites IVa across the venter of the mite (Fig. 2) or may appear as two small shields connected with the terminations of the genital arch. These latter are simply expansions of the genital arch. Anterior to the adanal discs and posterior to setae c_3 are the small adanal shields (AS) that may or may not be connected to each other and may or may not bear the anal setae (a). Posterior and/or lateral to the adanal

discs there may be sclerotized areas, termed the ventrolateral shields (VOS); these areas may bridge the lateral margins and the anterior cleft (Fig. 2), may appear as extensive lateral shields (Fig. 30), or be absent. In a few heavily sclerotized species (not figured), the entire ventral surface posterior to the adanal discs may be sclerotized.

In the female (Fig. 4), the pregenital apodeme and epimerites IV are fused into an omega-shaped arch characteristic for the related gen-

era cited in this study. The pregenital apodeme is basically in the shape of an inverted U with rounded or square corners or in the shape of an arc of a circle. The epimerites connected to the pregenital apodeme may be short to long and have variously shaped shields associated with them. Not associated with the epimerites or pregenital apodeme are ventral sclerotized areas joining the idiosomal margins to the top of the interlobar cleft, the interlobar shields (*IS*). These shields may be weakly to well developed and may bear setae *pae*.

Male genital region (Fig. 2). The structures of the male genital region and their relationships to each other and to other components of the ventral hysterosoma provide important criteria for the differentiation of species and genera. The length of the genital organ, the presence or absence of a pregenital apodeme, the development of the shields, and the positioning of the genital discs and ventral setae are examples of these characters.

The obvious structures of the male reproductive system are the genital arch and the stylet-like genital organ. The primary reproductive system, however, consists of paired testes, paired vas deferens uniting into an annulated common duct, a seminal vesicle and an accessory gland each leading to the common duct (internal ejaculatory duct), and a three-chambered sperm pump (Popp, 1967). Our method of slide preparation destroys the testes, vas deferens, seminal receptacle, and accessory gland; the first visible internal structures of the system are the annulated duct and sperm pump. Two variations of Popp's illustration of the pump are noted: the third chamber (*Blase III*) may be wanting and the small internal plate dorsal to the sperm pump (*Innenskeletales Flügelpaar*) may be circular or have the lateral tips directed rostrad. The development of the latter structures varies considerably within the various taxa.

Two pairs of atrophied genital discs are positioned either anterior or posterior to the genital arch. The discs on each side are usually approximate to each other and are often borne on small sclerotizations; they are widely separated in only a few species (Fig. 50). In heavily sclerotized species and especially if the discs are

positioned posterior to the genital arch, the discs may not be evident (Fig. 30).

The various apodemes adjacent to or connected with the genital arch are usually very conspicuous. Although elements of the posterior epimerites of coxae IV may extend in front of the genital apparatus, a pregenital apodeme *per se* occurs only in species of *Anisodiscus*. The apodemal configurations result primarily from modifications of the (antero)mesally directed posterior epimerites of coxae IV (epimerites IVa). These epimerites may be absent, weakly developed, united across the venter of the idiosoma, or united with the supporting structures of the genital organ, *i.e.*, the genital arch.

In the genera *Pterodectes*, *Proterothrix*, *Neodectes*, *Megalodectes*, *Toxerodectes* and *Xynonodectes* and many species of *Montesauria*, the genital arch is positioned between coxae IV and with few exceptions, is independent of the weakly developed epimerites IVa (Figs. 22 and 38). The exceptions are species in which epimerites IVa are well developed and directed anteromesal from trochanters IV to anterior to the genital arch where they end free (not figured). In a few species of *Montesauria* and in *Anisodiscus megadiscus*, the genital arch is positioned between the anterior articulations of trochanters IV and epimerites IVa are weakly joined to the posterolateral terminations of the arch (not figured). The species of *Trochilodectes*, new genus, have epimerites IVa well developed and connected anterior to the genital arch to form a prominent inverted U-shaped apodeme (Fig. 54). This apodeme is independent of the genital arch and bears the insertions of the second pair of central setae (c_2). The heavily sclerotized species of *Dolichodectes*, new genus, have the genital arch surrounded by the many sclerites associated with the epimerites (Fig. 30).

With the exception of the *Montesauria* species and *Anisodiscus megadiscus* previously mentioned, the genital structures and the epimerites have been independent from each other. The species of *Pedanodectes* have epimerites IVa anastomosed with the anterior edge of the genital arch. The mesal ends of these epimerites may end at the level of the apex of the arch (as

in Fig. 34), may curve rostrad and end free before reaching setae c_1 (not figured), or may join the opposite member immediately anterior to the genital organ (as in *Trochilodectes*, Fig. 54).

In *Anisodiscus* (except *megadiscus*), the genital arch is midway between coxae III and IV and the posterolateral terminations of the arch are joined with epimerites IVa. Short, mesally directed apodemes arise from the fused posterior epimerites of legs III (=IIIa) and the anterior epimerites of legs IV to connect a short and distinct pregenital arch (Fig. 38).

Female genital region. There are two external openings to the reproductive system—an inverted V- or Y-shaped oviporus (tostome) immediately posterior to the crescentic pregenital apodeme and a copulatory opening anterior to the terminal cleft which leads into the bursa copulatrix. Combining observations of the visible internal structures (after specimen preparation) with Popp's (1967) study, the female reproductive system is as follows. The copulatory opening is variously positioned along the midline from anterior to the dorsal limits of the terminal cleft (often marked by the supranal concavity) ventral to the posterior limits of the anal slit. Immediately internal to the opening there may be a small expanded bursa copulatrix which is the terminal ending of the primary spermduct (bursa copulatrix of Popp). Before entering the large seminal receptacle (receptaculum seminalis), the sperm duct may be locally expanded and/or surrounded by a thinly granulated sheath. The receptacle, a voluminous, thin-walled sac, is connected to the ovaries by two secondary spermducts (our preparations show only the basal portions of these ducts). Popp illustrates two ovaries, two lateral oviducts, a median oviduct (uterus or vagina of Popp), and the oviporus (tostome of authors). The oviporus is flanked by two lightly sclerotized latigynial plates and the apex is marked by a minute, often hexagonal, sclerite. The latigynial plates are usually connected to the junctions of the pregenital apodeme and epimerites IV. Two pairs of atrophied genital discs and two pairs of setae (c_1 , c_2) are lateral to the oviporus.

Legs

Leg morphology is important in the taxonomy

of feather mites. Subfamilies of the Proctophyllodidae, for example, can be separated by the presence or absence of solenidia σ_1 on genua II, the structure of the pretarsi, and the condition of the articulations between the genua and femora.

Most genera in this study are characterized by five-segmented, subequal legs which have the genua and femora freely articulated. The only obvious hypertrophy occurs in species of *Montesauria*, *Pterodectes*, *Neodectes*, and *Proterothrix* in which legs I may be enlarged. A few groups have males in which legs III-IV or IV are slightly stouter and thicker than legs I-II, and a few groups have the articulation between the genu and femur partially fused.

The pretarsi have rounded ambulacra in which the condylophores are unguiform; apical points may be present. The sizes of the ambulacra vary according to genus or species; they may be subequal (Figs. 17-20) or I-II may be larger (Figs. 9-12) or smaller (Figs. 5-8) than III-IV. It is noted that the larger ambulacra may appear spade-shaped as there is a tendency for the lateral margins to be folded.

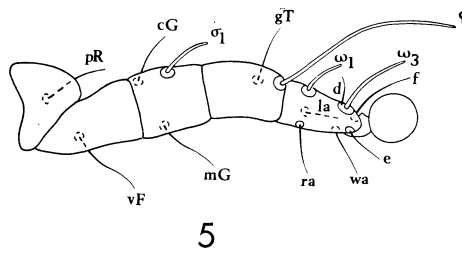
Chaetotaxy

Since Atyeo and Gaud (1966) proposed chaetotaxal signatures for the sarcoptiform feather mites, the system has been successfully used for various mite groups. The system is applied to the genera and species cited in this study.

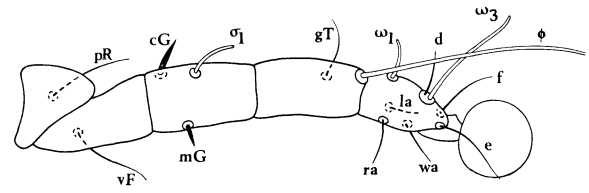
The chaetotaxy of the idiosoma and legs is very similar to that described for the genus *Proctophyllodes* by Atyeo and Braasch (1966). Except for the marked deviations from *Proctophyllodes*, only a résumé and illustrations of the setae and their positions are included (Figs. 1-20).

Dorsal idiosoma. The propodosomal shield bears the short internal and the long external scapular setae (sci , sce) and, if present, the external vertical setae (ve). As in all proctophyllodine mites, the internal vertical setae (vertical setae of authors) are always absent.

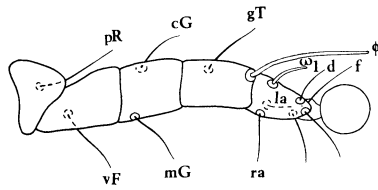
The dorsal hysterosoma theoretically has five transverse rows of four setae per row (d_{1-5} , l_{1-5}); the anterior four rows are microsetae and the fifth row is composed of variously modified macrosetae. In males, setae l_5 are simple and setae



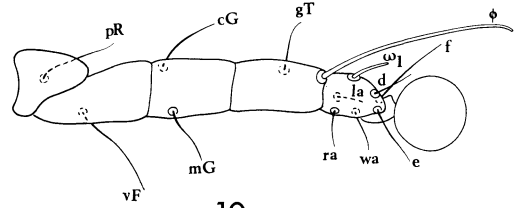
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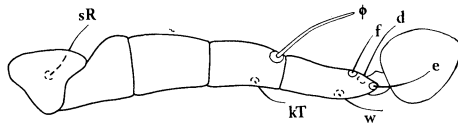
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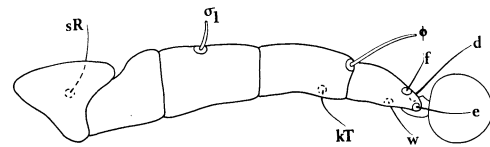
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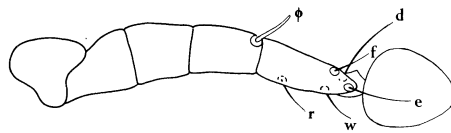
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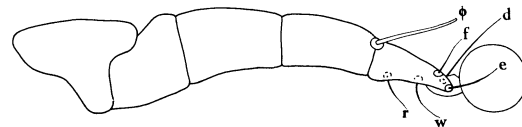
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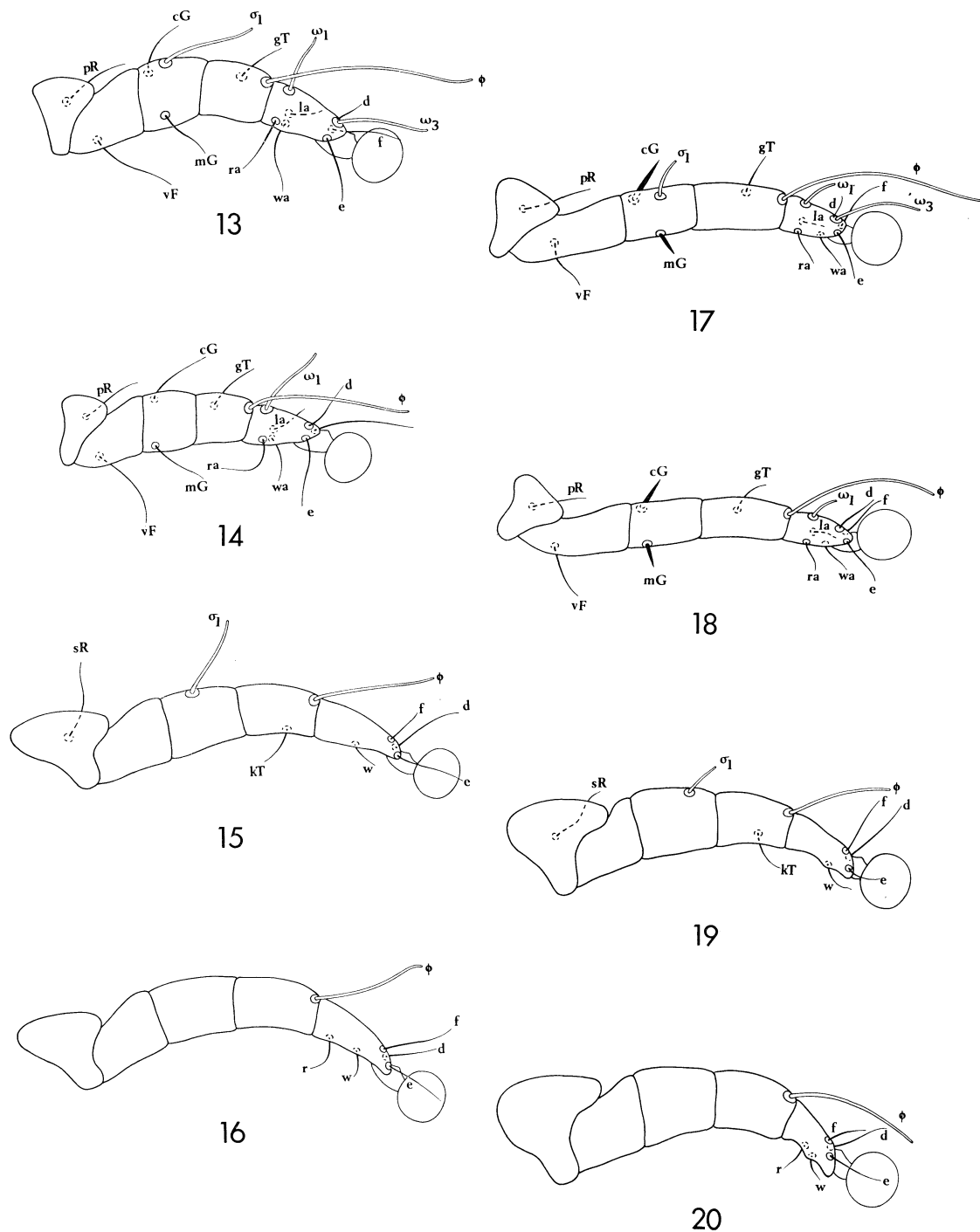


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Figs. 5-12. Legs I-IV of *Anisodiscus megacaulus* (Trouessart) female (5-8) and *Proterothrix phyllura* (Trouessart) male (9-12).



Figs. 13-20. Legs I-IV of *Xynonodectes* species male (13-16) and *Megalodectes major* (Trouessart) male (17-20).

d_5 may be setiform, ovate, lanceolate, or spiculiform. In females, setae l_5 , positioned on the lateral expansions of the terminus are simple or bladelike, with or without a terminal filament; setae d_5 , positioned at the base of the terminal

appendages are small unless the appendages are absent, in which case the lengths of the setae are greatly exaggerated.

Two additional pairs of setae may appear on the dorsal or lateral surfaces of the terminus,

the postanal setae (*pai*, *pae*). In males, the internal postanals are usually on the mesal margins of the hysterosomal lobes and are setiform or spiculiform. The external postanals are conspicuous and ventrolateral to setae I_4 and anteroventral to setae I_5 . In females, setae *pai* are on the cleft margins or middorsal on the lobes; setae *pae* are ventral and inserted between setae I_5 and the anus.

Lateral idiosoma. Anterior to legs III are the long humeral setae (*h*) and the more posteriorly positioned subhumeral setae (*sh*). The humerals are always long and setiform; the subhumeral are short and vary in shape from spiculiform to bladellike.

Ventral idiosoma. The usual six pairs are present: two pairs of coxal setae, three pairs of central setae, and one pair of anal setae; in females, a seventh pair is present, the external postanals (mentioned above). In characterizing males, the relative positions of the posterior pair of central setae (c_3), the anal setae (*a*), and the adanal discs are useful. For example, members of the pair c_3 may be closer to each other than are the members of the pair of anals, and the anal setae may be positioned anterior, anterolateral, lateral, or posterolateral to the adanal discs. The external postanal setae and setae I_4 may be in a ventral position due to the encroachment of the dorsal hysterosomal shield onto the ventral region.

The ventral chaetotaxy of the female is consistent with other proctophyllodine genera. With the coalescence of the pregenital apodeme and the epimerites, the two anterior pairs of central setae are within the top of the *omega*-shaped pregenital apodeme and lateral to the oviporus.

Legs. There are several differences between the leg chaetotaxy of *Proctophyllodes* and certain genera in this study. Setae *ba*, *la*, *wa* on tarsi I-II may be in a whorl as in *Proctophyllodes* (Figs. 13 and 14) or the ventral member (*wa*) may be subapical, that is, distant from the other members of the whorl (Figs. 9, 10, 17, and 18). Setae *sR* on trochanters III and solenidia σ_1 on genua III may be lacking, or only σ_1 may be absent (Fig. 7); in *Proctophyllodes*, both structures are always present. Solenidia σ_1 are usually smaller than ω_3 on legs I, but in certain genera

σ_1 are subequal to or larger than ω_3 in length (Fig. 13). Finally, setae *cG* and *mG* on genua I or I-II may be modified into spinelike setae in some genera (Figs. 9, 17, and 18).

HOST-PARASITE RELATIONSHIPS

Limitations of the Study

The University of Georgia feather mite collection is probably the largest in the world. Although the collection contains at least a few samples from every avian order except the large ratites and penguins, limitations do exist that may introduce bias into observations on host-parasite relationships. In amassing material, large numbers of field collected samples have been acquired from the United States, South Africa, and southeastern Asia. The African and North American collections are general while those from the remaining area are primarily from the Apodiformes, Trogoniformes, Piciformes (Picidae only), and the Passeriformes (Passeres only). Over a nine-year period, we have collected from a wide range of host species at various museums (see Acknowledgements) either by attempting to find mites on every species or many representative species within every family. To date we have had insufficient time to examine study skins from major groups of birds (except hosts for named feather mite species), namely, Falconiformes, Columbiformes, Psittaciformes, Musophagiformes, Cuculiformes, Caprimulgiformes, and numerous families of the Passeriformes. With the exception of the latter order, we do not believe these orders to be important hosts for the Pterodectinae.

Relationships

Based on our collection containing an estimated 250 species of pterodectine mites from over 500 species of birds, it can be stated that the genera and species of the Pterodectinae occur primarily on the Passeriformes and Apodiformes. Additionally, from our collection and from literature records, we know that a limited number of species have adapted to birds from other than two primary host orders.

The common relationship of the birds and mites is a one parasite-one host association; the next most common is one parasite on two

or more closely related host species. As information accumulates, the number of single host-single parasite associations will probably decrease as it is thought that a pterodectine species is able to live on a number of related host species. It should also be emphasized that one mite species often shares the same host species (or genus) with other pterodectine and non-pterodectine species.

The species of the four new genera of the *Trochilodectes* group are restricted to the Trochilidae, but there is no demonstrable host specificity. It appears that any pterodectine species of this group is able to subsist on any species of hummingbird (although two species of *Trochilodectes* have been collected only from species of *Aglaeactis*). The apparent lack of host specificity is peculiar; obviously there has been geographical isolation of the hosts and multiple invasions of the ectoparasitic arthropods, but it is not uncommon to find numerous species of mites on one bird specimen. Additional records may show that certain mites are associated with certain species or groups of species of hummingbirds and/or that some mite species are restricted in their geographical distribution. The only certainty has been stated—the distinct hummingbirds mites are found only on hummingbirds and do not occur even on the other families of the Apodiformes.

The majority of the pterodectine species are associated with birds of the order Passeriformes. The ectoparasites, although known to occur on all of the passeriform suborders are not evenly distributed through these groups. From the suborder Eurylaimi, one species has been described: *Proterothrix xiphiura* (Trouessart), 1885 from *Psarisomus dalhousiae* and another species, mentioned by Trouessart (1885) as a variety of *Pterodectes mainati* from *Eurylaimus ochromelas*, will eventually be described as a species of *Proterothrix*.

Species of the larger genera *Pterodectes* and *Proterothrix* are known to occur on families of the Tyranni, namely, Furnariidae, Cotingidae, Tyrannidae, and Phytotomidae. The mite species are typical of the mentioned genera and either they have not evolved as rapidly or have not been associated with the hosts for a period

sufficient for major adaptations as have species of the Proctophyllodinae. In the latter group the taxa described from the Tyranni are unique to that avian suborder.

Only one species is known to be associated with the suborder Menurae. An extremely large mite, *Megalodectes major* (Trouessart), 1885, occurs on the lyrebird *Menura superba*. Pterodectine mites are not known from the second species of *Menura* or from the two species of the family Atrichornithidae.

For the suborder Passeres (Oscines of authors), sixty percent of the families contain known hosts of pterodectine mites. This percentage is expected to be much higher when all the host families have been adequately studied. As would be expected, records indicate that the larger genera of mites occur on more families of birds than do the smaller genera. However, it should be emphasized that there are within these larger genera loosely defined species groups that may eventually be restricted to certain host groups. The smaller genera have a more restricted host list: *Anisodiscus* from Nectariniidae and Sylviidae; *Pedanodectes* from Dicaeidae, Laniidae, Muscicapidae, Nectariniidae, and Pycnonotidae; and *Dolichodectes* from Muscicapidae, Sylviidae, and Turdidae.

Considering next those mites from birds other than the orders Apodiformes and Passeriformes, there are only limited numbers of samples, some of which are questionable associations. Falling into the suspect categories are the collections from the Strigiformes (Tytonidae and Strigidae); each of the species appear to be conspecific with species known to occur on the Passeriformes. In other orders there are valid associations: one species from Musophagiformes (Musophagidae), one from Trogoniformes (Trogonidae), one from Coraciiformes (Alcedinidae), and one or more species from the Piciformes (Galbulidae, Ramphastidae, Picidae).

Trouessart (1885) described *Pterodectes trulla* from *Tauraco macrorhynchus* (Musophagidae) from Gabon. This species, the only one known from the Musophagiformes, belongs to a *Proterothrix* species group that is found only on the Paradisaeidae of New Guinea. The ranges of

the two families, Musophagidae and Paradisaeidae, do not overlap today, the former being from Africa south of the Sahara (except Madagascar) and the latter being from the Moluccas, New Guinea and adjacent islands, and north and eastern Australia. The obvious implications of past sympatry could be made.

One species of *Pterodectes* occurs on the Trogonidae of the New World. Although many collections have been examined from the Old World genera, especially *Harpactes*, pterodectine species have never been discovered. The possibility that the New and Old World Trogonidae each supports a unique fauna will be explored after all of our information is collated.

In the Piciformes, extensive collections have been obtained from the Bucconidae, Ramphastidae, and Jyngidae but there is a paucity of material from the Galbulidae, Capitonidae, Indicatoridae, and Picidae. A few species of *Pterodectes* occur on the Ramphastidae, Galbulidae and Picidae and one species of *Proterothrix* has been recovered from the latter family. It is doubtful that pterodectine mites will be found on the puffbirds or wrynecks, but it is probable that when sufficient representatives of the 208 species of woodpeckers have been examined, a number of new species will be found. As concerns the remaining families, it may be that a limited number of additional species and/or host records will be forthcoming.

The Alcedinidae is the only family in the Coraciiformes known to harbor pterodectine mites. One species of *Proterothrix* has been found associated with the kingfishers. Other families of this avian order are infested by species of the proctophyllodid subfamily Trouessartinae, but species from neither the Proctophyllodinae nor Alloptinae have been recovered.

In summary, the orders Apodiformes, Trogoniformes, Coraciiformes and Piciformes appear to have been invaded on numerous occasions by members of the Pterodectinae, probably by species normally found on the Passeriformes. Only those mites associated with the Apodiformes (Trochilidae) have had sufficient time to evolve into a distinctive fauna; species from the other orders are related to or conspecific with species from the Passeriformes. The discussion as it

relates to the mite taxa has been general, but after critical evaluation of all species and records has been completed, it is probable that more families and species will be added to the host lists, but that the essential inter- and intragroup relationships will not be significantly changed.

TAXONOMY

Historical Account

The name *Pterodectes* (s.l.) first appeared in a footnote in Robin's "Mémoire sur les Sarcophtides avicoles et sur les métamorphoses des Acariens" in 1868. In this footnote (pp. 786-7) Robin stated that his investigation was based on species of *Dermaleichus* Koch and several new genera—*Pterolichus*, *Pteronyssus*, *Proctophyllodes*, and *Pterodectes*. However, the descriptions of the new genera and species were not published until 1877 when Robin (*in* Robin and Mégnin) described several taxa including the subgenus *Pterodectes*. Each of his new taxa was footnoted by a reference to the 1868 paper—a paper which in essence contained only *nomina nuda*.

Trouessart (1885) and Trouessart and Neumann (1888), in addition to describing many new species of *Pterodectes*, divided the genus *Proctophyllodes* into five subgenera: *Proctophyllodes*, *Trouessartia* (= *Pterocolus*), *Alloptes*, *Pterodectes* and *Pterophagus*. These subgenera were recognized as genera by Canestrini and Kramer (1899) and Trouessart (1915). The only other genera erected for pterodectine species have been *Montesauria* Oudemans, 1905, *Anisodiscus* Gaud and Mouchet, 1957, and *Proterothrix* Gaud, 1968.

Other than the descriptions of *Montesauria* and a few new species, there was little activity on the Pterodectinae from 1900 until Gaud (1952, 1953), Gaud and Mouchet (1957) and Till (1954, 1957), described many new species discovered in studies of the African fauna. Gaud (1962, 1964) has since described species from other regions as have Berla (1958, 1959, 1960), Černý (1963), and Vassilev (1958).

Synonymies

In this and future investigations on the Pterodectinae, we intend to give only the pertinent

synonymies for the genera and species. Many of the works published have been faunal lists or host-parasite lists compiled from various literature sources, and as such have added little new information. Publications of this nature (e.g., Canestrini and Kramer, 1899; Gaud and Till, 1961; Radford, 1953, 1958; Poppe, 1888; Turk, 1953) unless they contain new records or nomenclatural changes are not cited, but are listed in the bibliography.

Deposition of Type Material

In the descriptive sections, the names of institutions and persons receiving primary and secondary types are denoted by the following abbreviations:

BAS	Zoological Institute, Bulgarian Academy of Sciences, Boulevard Ruski 1, Sofia, Bulgaria.
BMNH	British Museum (Natural History), Cromwell Road, London S.W. 7, United Kingdom.
GAUD	Dr. J. Gaud, Laboratoire de Parasitologie, Faculté de Médecine, Rennes (Ille-et-Vilaine), France.
LAS	Zoological Institute, Academy of Sciences of the U.S.S.R., Leningrad B-164, U.S.S.R.
NU	University of Nebraska, Lincoln, Nebraska 68503.
RNH	Rijksmuseum van Natuurlijke Historie, Raamsteeg 2, Leiden, Netherlands.
SAIMR	South African Institute for Medical Research, Hospital Street, Post Office Box 1038, Johannesburg, South Africa.
SEA	Stazione Entomologica Agraria, via Romana 15-17, Florence, Italy.
TC	Trouessart Collection, c/o Dr. Max Vachon, 61 rue de Buffon, 75 Paris, France.
UGA	University of Georgia, Athens, Georgia 30601.
USNM	United States National Museum, Washington, D. C. 20560.
ZSBS	Zoologische Sammlung des Bayerischen Staates, Menzingstrasse 67, Munich 19, Germany.

ZSZM Zoologisches Staatsinstitut und Zoologisches Museum, Von-Melle-Park 10, 2000 Hamburg 13, Germany.

Descriptive Terminology—Genera

In addition to the familial and subfamilial features, each genus is defined by thirty-two characters. To facilitate comparisons, each character is numbered and the same sequence is used in each definition. The few terms that are not in common usage or are not self-explanatory are defined below. The character number is given in parentheses.

Metapodosomal shields (6): A pair of small plates on males situated on the dorsal hysterosoma lateral to the hysterosomal shield between legs III and IV (Fig. 53). These structures are unique to species of *Trochilodectes*, new genus.

Ventrolateral shields, male (7): These sclerotizations, if present, are connected to, or extensions of the dorsal hysterosomal shield and serve as strengthening devices for the ventrolateral opisthosoma. The shields are variously shaped and may be confined to the lateral margins (Figs. 34 and 38), may extend from the margins to the anterior limits of the terminal cleft (Fig. 54), or may connect across the venter posterior to the adanal discs (Fig. 30).

Setal arrangements (14): The positions of two pairs of setae in relation to each other are said to be arranged in a square, a rectangle, or a trapezoid.

Hysterosomal terminus, female (21): The distinct posterior section of the hysterosoma, the *terminus*, usually bears two lobes, various setae, and terminal appendages. The terminus may be freely articulated, or partially or completely fused with the anterior hysterosoma, the degree is reflected by the completeness of the conjunctiva separating the terminus from the remainder of the idiosoma.

Genitocoxal apodemes, female (23): This complex is composed of the pregenital apodeme and the epimerites of the posterior two pairs of legs. The pregenital apodeme has three basic shapes: 1) *omega*-shaped, oval (Fig. 24) or circular (Fig. 35) arc approximating 270°, 2) inverted U-shaped (Fig. 52), and 3) inverted U-shaped with angular corners (Fig. 60). The length of the pregenital apodeme is measured

as the vertical distance between the apex to the level of the posterolateral limits (where the arch joins the posterior epimerites). The length of the coxal apodemes is the vertical distance from the limits of the pregenital apodeme to the level of the posterior limits of epimerites IV. The gentio-coxal apodemes are considered as: *short* if the length of the pregenital apodeme is greater than the length of the coxal apodemes (Fig. 64), *normal* if the two measurements are approximately equal (Figs. 24, 52, and 60), or *elongated* if the coxal apodemes are more than 1½ times longer than the pregenital apodeme (Figs. 36 and 40).

Descriptive Terminology—Species

The format will be the same for each species to be described or redescribed in future papers dealing with the Pterodectinae. Those characters and descriptive methods which for clarity need to be defined are explained below; for additional discussions refer to the Morphology section.

Male

Length of body. Distance between pedipalp apices and the terminus without considering the terminal setae.

Length of hysterosomal shield. Distance between the most anterior point and the terminus.

Length of genital organ. Distance between the top of the genital arch and the apex of the genital organ.

Distance between adanal discs. Measurement between the centers of the discs.

Female

Length of body. Distance between pedipalp apices and the end of the hysterosomal lobes at the level of setae d_5 , excluding the terminal appendages.

Family PROCTOPHYLLODIDAE

Trouessart and Mégnin

The family Proctophyllodidae includes forty-four named genera which have been separated into three subfamilies: the Alloptinae (19 genera), the Proctophyllodinae (16 genera), and the Trouessartiinae (9 genera). The Alloptinae and Trouessartiinae will not be discussed as each is a distinct group and each will eventually be afforded familial rank.

Within the genera of the Proctophyllodinae, the females are more similar in form than the males; often it is difficult to make species determinations based on the females. However, using the two basic arrangements of the pregenital apodeme and epimerites IV, females can be divided into two distinct groups. In one group these structures are independent and in the other, the posterolateral ends of the pregenital apodeme connect with epimerites IV to form a Moresque arch-shaped structure (enlarged Ω). On the bases of these and other modifications in the males and females, the genera can be placed into two major groups which are designated as subfamilies.

Proctophyllodinae

(Apodemes independent)

Allodectes Gaud and Berla, 1963

Anisophyllodes Atyeo, 1967

Bradyphyllodes Atyeo and Gaud, 1970

Diproctophyllodes Atyeo and Gaud, 1968

Favettea Trouessart, 1915

Hemipterodectes Berla, 1959

Monojoubertia Radford, 1950

Nycteridocaulus Atyeo, 1966

Philepittalgus Atyeo, 1966

Proctophyllodes Robin, 1877

Ptyctophyllodes Atyeo, 1967

Tanyphyllodes Atyeo, 1966

Pterodectinae, new subfamily

(Apodemes joined)

Anisodiscus Gaud & Mouchet, 1957

Dolichodectes, new genus

Megalodectes, new genus

Montesauria Oudemans, 1905

Neodectes, new genus

Pedanodectes, new genus

Proterothrix Gaud, 1968

Pterodectes Robin, 1877

Syntomodectes, new genus

Toxerodectes, new genus

Trochilodectes, new genus

Xynonodectes, new genus

The genus *Allodectes* appears to be misplaced; this monotypic genus, erected for *Proctophyllodes* (*Alloptes*) *norneri* Trouessart, 1885, is restricted to the avian family Trochilidae.

Both sexes have the coxal fields heavily sclerotized and all legs have the genua and femora incompletely fused. The males have legs IV enlarged and the hysterosomal terminus entire; they resemble the males of the genera *Alloptes* Canestrini, 1879 (Alloptinae) or *Monojoubertia*. The females resemble the *Pterodectes* group only in the connections of the pregenital apodeme to the posterior epimerites. These connections are very weak and probably are a reflection of the extremely dense sclerotizations of coxal fields III and IV.

A few species occurring on the Tyranni appear to be intermediate between the two subfamilies. The males have small terminal lamellae and a genital organ similar to species of the Proctophyllodinae, but the general impression of the idiosoma, ventral apodemes, anal shields, and positions of the central and anal setae immediately suggest the genus *Proterothrix*. The females of these species are typical of the Proctophyllodinae except the pregenital apodeme extends almost to, or weakly connects the posterior epimerites. The species of this group are: *Pterodectes minor* Berla, 1959, *P. ocelatus* Berla, 1960, both from the Furnariidae; possibly *P. intermedius* (Trouessart), 1885, from the Eurylaimidae; and a new species from the Dendrocolaptidae.

PTERODECTINAE, new subfamily

The new taxon is based on the comparative studies of approximately 250 species, most of which have not been described. It will be noted that a few of the larger genera can be divided into species groups that may be recognized as genera after additional material has been studied from key hosts.

Intergeneric relationships among the pterodectine mites are based on comparative morphology and when possible, host preference, realizing that adaptations to the various hosts may be strongly reflected in the morphological modifications of the ectoparasites. The four new genera from hummingbirds (the *Trochilodectes* group) and the remaining genera (the *Pterodectes* group) are separated by the positions of setae *wa* relative to setae *la* and *ra* on tarsi I-II, the relative development of solenidia σ_1 and ω_3 on legs I, and host preference.

Diagnosis: Proctophyllodid mites; males strongly or weakly bilobed, with ensiform genital organ, without terminal lamellae; females with pregenital apodeme and epimerites IV joined in a broad Ω -shape and usually with distinct terminal region bearing well-developed lobes and ensiform appendages.

Idiosoma with dorsal shields; propodosoma with internal vertical setae (*vi*) absent, external vertical setae (*ve*) present or absent; hysterosoma usually with five pairs of dorsal (d_{1-5}) and five pairs of lateral (l_{1-5}) setae; setae d_{1-3} , l_4 and/or *pai* may be absent; setae d_{1-4} and l_{1-4} are usually microsetae, setae d_5 and l_5 are macrosetae and may be variously modified. Idiosomal venter with or without shields; epimerites I are V-, Y-, or λ -shaped, with or without posterolateral extensions. Legs five segmented, usually subequal, femorogenua articulations free to partially fused; solenidion σ_2 absent on genu I; solenidia σ_{1-2} absent on genu II; solenidion σ_1 and seta *sR* may be absent on legs III; setae *ba*, *s*, *p*, *q*, absent from tarsi I-II; ambulacra usually ovoid with triangular apotele and unguiform condylophores.

Type genus: *Pterodectes* Robin, 1877.

Key to the genera of the Pterodectinae

1. Both sexes with solenidion σ_1 smaller than solenidion ω_3 on legs I and seta *wa* distant from setae *ra* and *la* on legs I-II (Figs. 5 and 9); on non-apodiform birds; the *Pterodectes* group..... 2
- Both sexes with solenidion σ_1 subequal or larger than ω_3 on legs I and setae *wa*, *ra*, and *la* approximate and arranged in a whorl on legs I-II (Fig. 13); only on Trochilidae; the *Trochilodectes* group 9
2. Male with anal setae (*a*) anterior to adanal discs and positioned mesal to disc centers; setae *a* and c_3 in rectangular arrangement 3
- Male with anal setae lateral or posterior to adanal discs and setae *a* and c_3 in trapezoidal arrangement or setae *a* positioned posterior to adanal discs.... 5
3. Male with genital discs anterior to genital arch 4

- Male with genital discs posterior to genital arch, often impossible to discern*Neodectes*, new genus, p. 69
4. Male with genital discs widely separated from each other and from genital arch; on Menuridae.....*Megalodectes*, new genus, p. 71
- Male with genital discs approximate to each other and to genital arch.....*Proterothrix* Gaud, p. 66
5. Male with setae *a* positioned lateral to adanal discs; setae *a* and *c*₃ in trap-ezoidal arrangement..... 6
- Male with setae *a* posterior to adanal discs; setae *a* and *c*₃ in long rectangular arrangement.....*Dolichodectes*, new genus, p. 60
6. Male with genital discs posterior to genital arch or not evident (*i.e.*, invisible) 7
- Male with genital discs anterior to genital arch.....*Pterodectes* Robin, p. 54
7. Both sexes with solenidium σ_1 on legs III and *pai* present; epimerites I variously shaped, with or without posterolateral extensions. Male with genital discs embedded in heavy sclerotizations and often not apparent. Female with ambulacra of legs III-IV equal to or smaller than on legs I-II..... 8
- Both sexes with solenidium σ_1 on legs III and *pai* absent; epimerites I Y-shaped without posterolateral extensions. Male with genital discs independent of sclerotizations and visible. Female with ambulacra of legs III-IV larger than legs I-II; usually on Nectariniidae*Anisodiscus* Gaud and Mouchet, p. 64
8. Both sexes with all dorsal hysterosomal setae present (*i.e.*, *d*₁₋₃ present); setae *l*₁ inserted off hysterosomal shield; legs I may be enlarged. Males with terminus distinctly bilobed.....*Montesauria*, Oudemans, p. 58
- Both sexes with setae *d*₁₋₃ or *d*₂₋₃ absent; setae *l*₁ inserted at anterolateral angles of hysterosomal shield; legs I-II subequal. Male terminus truncated, without distinct lobes.....*Pedanodectes*, new genus, p. 62
9. Male with epimerites IVa not joining anterior to genital arch, with setae *a* lateral to adanal discs, without metapodosomal shields. Female with setae *l*₅ long, either setiform or lanceolate, with terminal filament.....10
- Male with epimerites IVa forming a massive arch in front of genital apparatus, with setae *a* anterior to adanal discs, with metapodosomal shields. Female with setae *l*₅ short and bladelike without terminal filament.....*Trochilodectes*, new genus, p. 73
10. Both sexes with epimerites I either Y- or π -shaped with posterolateral extensions. Male broad, without distinct bilobation and without a pronounced terminal cleft. Female with terminus fused to anterior hysterosoma, with pregenital apodeme U- or Ω -shaped.... 11
- Both sexes with epimerites I Y-shaped without posterolateral extensions. Male narrow, distinctly bilobed with V-shaped cleft. Female with terminus freely articulated to anterior hysterosoma, with pregenital apodeme almost square (Fig. 60).....*Xynonodectes*, new genus, p. 75
11. Male with terminus broadly arched. Female with terminal lobes attenuated....*Toxerodectes*, new genus, p. 75
- Male with terminus weakly bilobed, with small U-shaped cleft. Female with terminal lobes abbreviated.....*Syntomodectes*, new genus, p. 77

The *Pterodectes* Group

Eight of the twelve pterodectine genera have setae *wa* distant from *la* and *ra* on the anterior two pairs of tarsi and have solenidia σ_1 smaller than solenidia ω_3 on legs I; additionally, the eight genera are not known to occur on the hummingbirds (Trochilidae). Subdivisions can be established for these genera either by the positions of the male genital discs in relation to the genital arch or by the positions of setae *a* in relation to setae *c*₃ and the adanal discs. The two systems of division are not compatible and we will discuss only the former as it is the least complicated.

In analgoid protonymphs a pair of genital discs is positioned between coxae IV and in the tritonymphs a second pair of discs is added immediately posterior to the protonymphal pair. Thus, the configuration in the tritonymph is four discs between coxae IV with the discs on each side of the midline closer to each other than to their opposite members. These relative positions are maintained in adult females, but in males, the discs on each side of the idiosoma are arranged side-by-side rather than anterior and posterior; the two discs on each side may be connected by a small sclerotization. Connected or not, the result is four discs arranged across the idiosoma with the left and right members of each pair adjacent to each other and the two left discs distant from the two right discs. In most genera the genital discs are near the apex of the genital arch.

Sporadically in the Analgoidea the normal positions of the discs are shifted, usually by the discs retaining the tritonymphal positions and the male genital structures developing anterior or posterior to them. A second type of juxtapositioning is the shifting from the normal anterior position to immediately posterior to the arch with the discs retaining their side-by-side relationship. Additional modifications do occur, one of which will be demonstrated in the new monotypic genus *Megalodectes*.

The anteriorly positioned discs may become separated from each other and from the genital arch. Within the genus *Proterothrix*, most species have the typical disc-genital arch arrangement, but in a few species one pair of discs is slightly separated from and anterior to the second pair. This tendency culminates in *Megalodectes major* with the discs being widely separated from the genital arch and from each other (Fig. 50).

Eliminating *Megalodectes*, which is the only pterodectine group occurring on the passeriform suborder Menurae, the remaining genera can be divided into two subgroups based on the positions of the discs relative to the genital arch.

<i>Pterodectes</i> subgroup	<i>Montesauria</i> subgroup
<i>Pterodectes</i> Robin, 1877	<i>Anisodiscus</i> Gaud & Mouchet, 1957
<i>Proterothrix</i> Gaud, 1968	<i>Dolichodectes</i> , new genus

Montesauria Oudemans,
1905
Neodectes, new genus
Pedanodectes, new genus

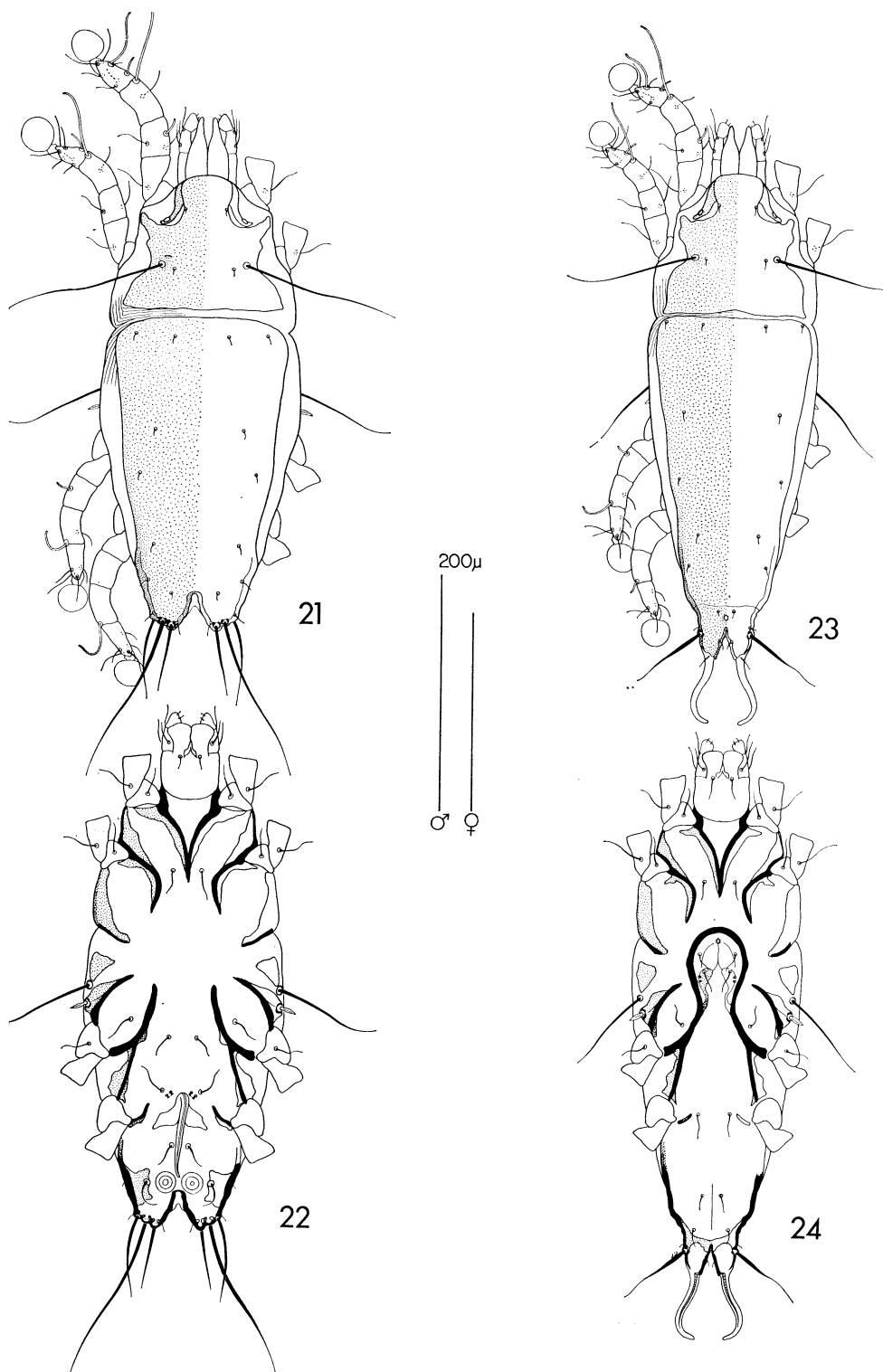
The *Pterodectes* subgroup is characterized by the genital discs anterior to the genital arch and in the *Montesauria* subgroup these positions are reversed. Within the latter complex, the genera *Anisodiscus* and *Pedanodectes* are closely related as evidenced by the mutual loss and/or modifications of specific setae, the overall dimensions of the females, and host preferences. The genus *Dolichodectes* is unique, having a high degree of development of the ventral shields in the male although the female is not spectacular. The genus *Neodectes*, although the discs are posterior to the genital arch, generally resembles *Proterothrix*; if the positions of the discs are basic, then this apparent relationship is an excellent example of parallel evolution. The remaining genera are large and have been studied only enough to suggest that there may be distinct species groups which may be elevated to generic rank after additional material from critical host groups is obtained.

Genus *Pterodectes* Robin

Pterodectes Robin, 1868, Compt. rend. Acad. Sci. Paris, 66(16): 786 (*nomen nudum*);—*Proctophyllodes* (*Pterodectes*) Robin, in Robin and Mégnin, 1877, J. Anat. Physiol., 13: 392; Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 78;—*Pterodectes*: Oudemans, 1905, Entomol. Ber., 1(24): 240; Trouessart, 1916, Bull. Soc. zool. France, 40: 221; Till, 1954, Moçambique doc. trim., (79): 85-6; Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37(2): 108.

Type species: Proctophyllodes (Pterodectes) rutilus Robin, 1877 (by subsequent designation).

The definition of the genus *Pterodectes* is based on nine described and about ninety new species. Within the taxon, the type species is an anomaly in respect to certain characters, so much so that it is best to consider the genus as being composed of two species groups. The first, the *rutilus* group, has females with setae I_3 , almost setiform with a long terminal filament (Fig. 23), males with a broadly expanded genital arch (Fig. 22), both sexes with setae I_1 inserted on the hysterosomal shield, and the hosts are in the family Hirundinidae. Only *P. rutilus* is known in the group, but we believe that this species is in actuality a species complex.



Figs. 21-24. *Pterodectes rutilus* (Robin): dorsal and ventral aspects of male (21, 22) and female (23, 24).

The second, the *gracilis* group, has I_5 lanceolate without a terminal filament (as in Fig. 27), has a narrower genital arch (as in Figs. 42 and 62), has setae I_1 inserted off the hysterosomal shield, and the hosts are not in the Hirundinidae. The following definition of the genus includes the above conditions of the characters.

Male

1. Epimerites I V-, U-, or λ -shaped with or without posterolateral extensions.
2. Coxal fields I-IV open.
3. Legs I-IV subequal.
4. Hysterosomal lobes distinct forming V-shaped cleft.
5. Supranal concavity distinct or indistinct.
6. Metapodosomal shields absent.
7. Ventrolateral shields may be present.
8. Pregenital apodeme absent.
9. Genital arch broad, massive (*rutilus*) or moderately developed (as in Figs. 42 and 62) and situated between coxae IV independent of epimerites IVa.
10. Genital discs approximate and anterolateral to genital arch.
11. Anal shields absent.
12. Adanal discs dentate or edentate.
13. Setae a lateral or posterolateral to adanal discs.
14. Setae a and c_3 in trapezoidal arrangement.
15. Setae d_5 setiform.
16. Setae pai minute and setiform.
17. Solendia \emptyset on legs III-IV subequal.

Female

18. Epimerites I V- or Y-shaped without posterolateral extensions.
19. Legs I-IV subequal.
20. Ambulacra I-IV subequal.
21. Hysterosomal terminus articulated with anterior idiosoma, with or without terminal appendages.
22. Supranal concavity distinct.
23. Genitocoxal apodemes normal with pregenital apodeme Ω -shaped.
24. Setae I_5 almost setiform with terminal filament (*rutilus*) or bladeliike without terminal filament.
25. Solenidia \emptyset on legs III longer than on legs IV.

Male and Female

26. Hysterosomal setae absent: none.
27. Setae I_1 on hysterosomal shields (*rutilus*) or off.
28. Solenidia σ_1 smaller than ω_3 on legs I.
29. Setae wa distant from la and ra on legs I-II.
30. Setae cG and mG on legs I-II setiform or bladeliike.
31. Solenidia σ_1 and setae sR present on legs III.
32. Found on birds of the passeriform suborders Tyranni and Passeres.

The following described species are retained in the genus *Pterodectes*; species re-assigned to the genus are denoted by an asterisk:

Pterodectes bilineatus Berla

Pterodectes bilineatus Berla, 1958. Bolm. Mus. Nac. Rio de J., N.S., Zool. (186): 1-3.

Pterodectes crassus Trouessart

Proctophyllodes (*Pterodectes*) *crassus* Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 79; *Pterodectes c.*: Canestrini and Kramer, 1899, Tierreich, 7: 125.

Pterodectes gracilis Trouessart

Proctophyllodes (*Pterodectes*) *gracilis* Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 79; *Pterodectes g.*: Canestrini and Kramer, 1899, Tierreich, 7: 125.

Pterodectes interifolia Trouessart

Pterodectes interifolia Trouessart, 1899, Bull. Soc. Etud. sci. Angers, 28: 61.

Pterodectes muticus Banks

Pterodectes muticus Banks, 1909, Proc. Entomol. Soc. Washington, 11(3): 141.

Pterodectes nordestensis Berla

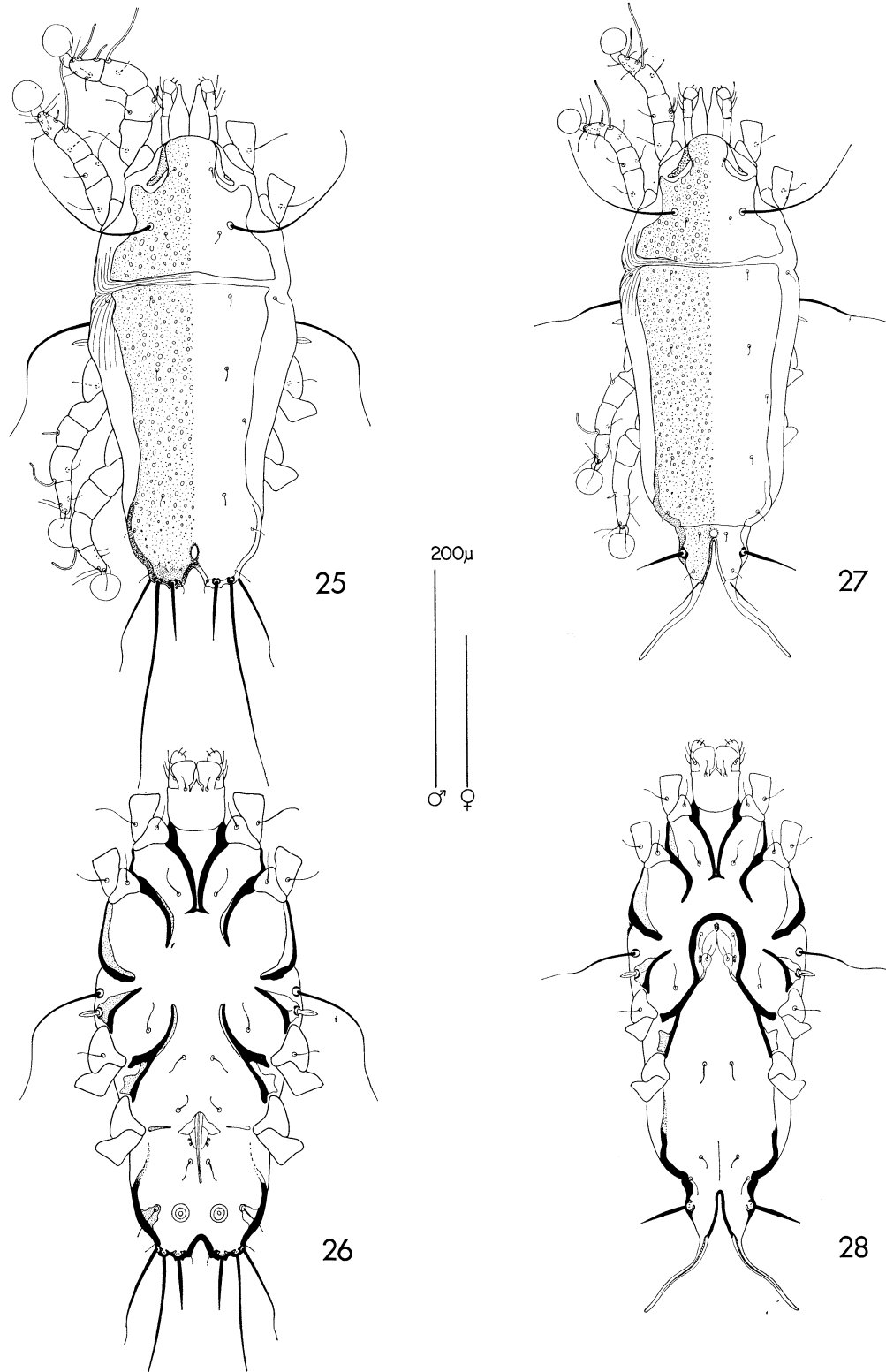
Pterodectes nordestensis Berla, 1958. Bolm. Mus. Nac. Rio de J., N.S., Zool. (186): 4-6.

Pterodectes rutilus Robin

Pterodectes rutilus Robin, 1868, Comp. rend. Acad. Sci. Paris, 66(16): 786 (*nomun nudum*); *Proctophyllodes* (*Pterodectes*) *rutilus* Robin, 1877, in Robin and Mégnin, 1877, J. Anat. Physiol., 13: 644; *Dermaleichus hirundinis* Canestrini, 1878, Atti 1st. veneto Sci., Ser. 5, 5:66; *Pterodectes r.*: Canestrini, 1886, Prosp. Acarof., 2: 305-6; *Pterodectes rhodesiensis* Till, 1954, Moçambique doc. trim., (79): 90.

Pterodectes sialiarum (Stoll)

Proctophyllodes sialiarum Stoll, 1893, Biol. Cent.-Amer., 3: 42; *Pterodectes s.*: Atyeo and Braasch, 1966, Bull. Univ. Nebraska St. Mus., 5: 317.



Figs. 25-28. *Montesauria cylindrica* (Robin): dorsal and ventral aspects of male (25, 26) and female (27, 28).

Pterodectes turdinus Berla

Pterodectes turdinus Berla, 1959, Bolm. Mus. Nac. Rio de J., N.S., Zool. (209): 11.

Genus Montesauria Oudemans

Montesauria Oudemans, 1905, Entomol. Ber., 1(24): 240; Trouessart, 1916, Bull. Soc. zool. France, 40: 221; —*Pterodectes*: Till, 1954, Moçambique doc. trim., (79): 86; Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37(2): 108; —*Montesauria*: Vassilev, 1959, Bulg. Acad. Sci., Proc. Zool. Inst., 8: 49, 50.

Type species: Proctophyllodes (Pterodectes) cylindricus Robin, 1877 (by original designation).

The lack of investigations of feather mites during the first half of the twentieth century is well demonstrated with the history of this genus. Oudemans erected *Montesauria* in 1905, Till synonymized the genus with *Pterodectes* in 1954 and Vassilev re-established the genus in 1959. However, between 1899 when Trouessart described *Pterodectes navicula* and 1942 when Sugimoto described *P. lanceolatus*, there were forty-two years during which systematic research on mites even resembling the *Montesauria* was not done. Yet as we define the genus, it includes forty-one described and about twenty undescribed species.

As in the genus *Pterodectes*, there are recognizable species groups within *Montesauria*—at least five major complexes plus many species that can not be placed with these groups. Only the *bilobatus* group will be mentioned as these species, which occur primarily on the Alaudidae and Hirundinidae, confuse the generic definition. The males of the *bilobatus* group have small genital arches with thickened genital organs and the females have setae l_5 setiform and long. Males of the remaining species have broadened genital arches and the females have setae l_5 lanceolate and without terminal filaments.

Male

1. Epimerites I V-, Y-, or λ -shaped, with or without posterolateral extensions.
2. Coxal fields I open or closed, coxal fields II-IV open.
3. Legs I-IV subequal or legs I enlarged.
4. Hysterosomal lobes distinct forming linear, V-, or U-shaped cleft.
5. Supranal concavity distinct and round or indistinct.
6. Metapodosomal shields absent.
7. Ventrolateral shields present or absent.
8. Pregenital apodeme absent.
9. Genital arch expanded, massive, often irregular in outline (small in *bilobatus* group); epimerites IVa may be independent or incorporated along anterior margin of arch.
10. Genital discs approximate and posterior to genital arch, often not visible as they are incorporated in the expanded arch.
11. Anal shields independent or absent.
12. Adanal discs dentate or edentate.
13. Setae *a* posterolateral, lateral, or anterolateral to adanal discs.
14. Setae *a* and c_3 in trapezoidal arrangement.
15. Setae d_5 setiform to lanceolate.
16. Setae *pai* setiform (spiculiform in *amblycercus*).
17. Solenidia ϕ on legs III-IV subequal, or ϕ on legs III slightly longer than on IV.

Female

18. Epimerites I as in male—variously formed.
19. Legs I-IV subequal or legs I enlarged.
20. Ambulacra I-IV subequal or ambulacra III-IV slightly larger than I-II.
21. Hysterosomal terminus articulated or fused with anterior idiosoma, with terminal appendages (2 species lack appendages).
22. Supranal concavity present or absent.
23. Genitocoxal apodemes normal with pregenital apodeme Ω -shaped.
24. Setae l_5 lanceolate without terminal filament (setiform with filament in *bilobatus* group).
25. Solenidia ϕ on legs III longer than on legs IV.

Male and Female

26. Hysterosomal setae absent: l_4 or none (d_4 , l_4 lacking in *centropus*).
27. Setae l_1 inserted off humeral shields.
28. Solenidia σ_1 shorter than ω_3 on legs I.
29. Setae *wa* distant from *ra* and *la* on legs I-II.
30. Setae *cG* and *mG* on legs I-II setiform or spiculiform.
31. Solenidia σ_1 present on legs III; setae *sR* present or absent on legs III.
32. Found on birds of the Passeriformes and Piciformes (Capitonidae).

The following described species are assigned to the genus *Montesauria*; species re-assigned to the genus are denoted by an asterisk:

Montesauria acotylura* (Gaud and Mouchet)

Pterodectes acotylurus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 514.

Montesauria agriocerca* (Gaud and Mouchet)

Pterodectes agriocercus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 516.

Montesauria amblycerca* (Gaud and Mouchet)

Pterodectes amblycercus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 517-8.

Montesauria bacillus* (Trouessart)

Proctophyllodes (Pterodectes) bacillus Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 15: 81; *Pterodectes b.*: Gaud, 1952, Mém. Inst. sci. Madagascar, Sér. A, 7: 88.

***Montesauria bilobata* (Robin)**

Pterodectes bilobatus Robin, 1868, Compt. rend., Acad. Sci. Paris, 66(16): 787 (*nomen nudum*); *Proctophyllodes (Pterodectes) b.*: Robin, 1877 in Robin and Mégnin, 1877, J. Anat. Physiol., 13: 392; *Dermaleichus anthi* Canestrini, 1878, Atti R. Ist. Veneto Sci. Let. Arti, Ser. 5, 5: 10; *Proctophyllodes alaudae* Haller, 1882, Z. wiss. Zool., 36: 385, 388 (*nomen nudum*); *Pterodectes b.*: Berlese, 1886, A.M.S., fasc. 27, no. 10; *Pterocolus b.*: Canestrini, 1886, Prosp. Acarof. ital., 2: 296-7; *Pterodectes b.*: Canestrini, 1886, op. cit., 2: 304-5; *Proctophyllodes bureschi* Vassilev, 1958, Acad. Sci., Proc. Second Biol. Med. Sci., 4: 25-30; *Pterodectes bureschi*: Vassilev, 1959, Compt. rend. Acad. bulg. Sci., 12(3): 244-5.

Montesauria brachycaulus* (Gaud and Mouchet)

Pterodectes brachycaulus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 518.

Montesauria buphagi* (Till)

Pterodectes buphagi Till, 1957, J. Entomol. Soc. S. Africa, 20: 452.

Montesauria buttikeri* (Till)

Pterodectes büttikeri Till, 1954, Moçambique doc. trim., (79): 89.

Montesauria centropa* (Gaud and Mouchet)

Pterodectes centropus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 519.

***Montesauria cylindrica* (Robin)**

Pterodectes cylindricus Robin, 1868, Compt. rend. Acad. Sci. Paris, 66(16): 787 (*nomen nudum*); *Proctophyllodes (Pterodectes) cylindricus* Robin in Robin and Mégnin,

1877, J. Anat. Physiol., 13: 647; *Pterodectes c.*: Berlese, 1886, A.M.S., fasc. 27, no. 9; *Pterodectes corvincola* Oudemans, 1905, Entomol. Ber., 1(23): 225 (new synonymy); *Montesauria cylindricus*: Oudemans, 1905, op. cit., 1(24): 240; *M. corvincola*: Oudemans, 1905, op. cit., (2)25: 12; *P. cylindricus*: Bonnet and Timon-David, 1932, Bull. Soc. Linn. Provinces, 5-6: 27; *M. cylindricus*: Vassilev, 1959, Bulg. Acad. Sci., Proc. Zool. Inst., 8: 49.

Montesauria delicatula* (Till)

Pterodectes delicatulus Till, 1957, J. Entomol. Soc. S. Africa, 20: 450.

Montesauria dicruri* (Gaud and Mouchet)

Pterodectes dicruri Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 520.

Montesauria diplotrema* (Gaud and Mouchet)

Pterodectes diplotrema Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 523.

Montesauria dispar* (Gaud)

Pterodectes dispar Gaud, 1953, Ann. Parasitol. hum. comp., 28(3): 202.

Montesauria eucyrta* (Gaud)

Pterodectes papillo eucyrtus Gaud, 1953, Ann. Parasitol. hum. comp., 28(3): 206; *P. eucyrtus*: Gaud, 1964, Ann. Mus. roy. Afr. cent., Zool., 80(132): 121.

Montesauria eulabis* (Buchholz)

Dermaleichus eulabis Buchholz, 1869, Bemerk. Gattung *Dermaleichus*, p. 21; *Pterocolus e.*: Haller, 1878, Zeit. f. Wiss. Zool., 20: 539; *Trouessartia e.*: Canestrini and Kramer, 1899, Tierreich, 7: 121.

Montesauria eurycalyx* (Gaud)

Pterodectes eurycalyx Gaud, 1964, Ann. Mus. roy. Afr. cent., Zool., 80(132): 121.

Montesauria gigas* (Gaud and Mouchet)

Pterodectes gigas Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 523.

Montesauria heterocaula* (Gaud and Mouchet)

Pterodectes heterocaulus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 526.

Montesauria holosticta* (Gaud and Mouchet)

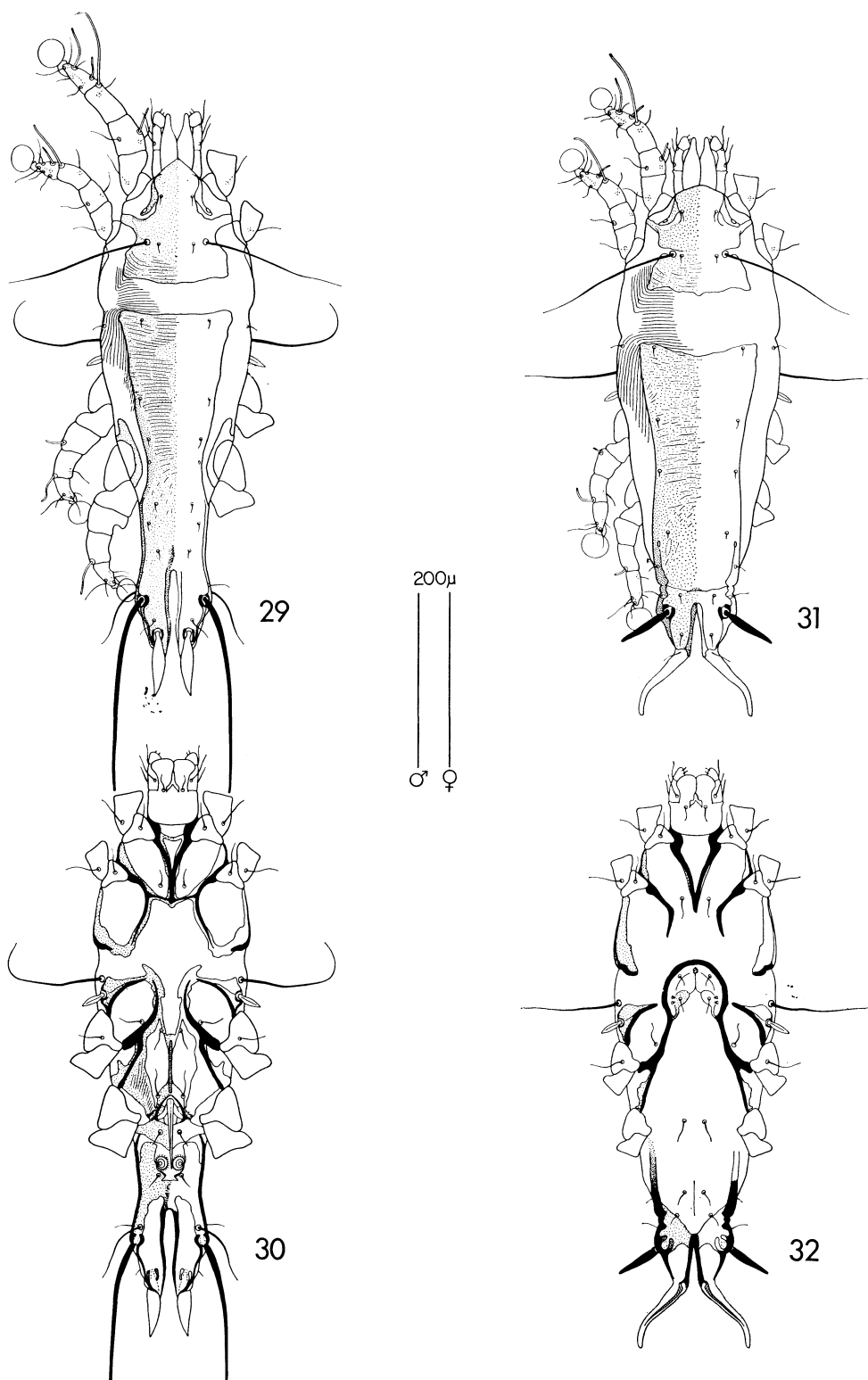
Pterodectes holostictus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 527.

Montesauria holothyra* (Gaud)

Pterodectes holothyra Gaud, 1952, Mém. Inst. sci. Madagascar, Sér. A, 7(1): 89-90.

Montesauria hypersticta (Gaud and Mouchet)*,
new status*Pterodectes holostictus hyperstictus* Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 527.**Montesauria lanceolata** (Sugimoto)**Pterolichus lanceolatus* Sugimoto, 1942, Bull. Sch. Agric. Forest., Taihoku Imp. Univ., 3:135-6, 147; *Pterodectes l.*: Gaud and Petitot, 1948, Ann. Parasitol. hum. comp., 23(5-6): 341-2, 343, 346.**Montesauria leioplax** (Gaud and Mouchet)**Pterodectes leioplax* Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 527.**Montesauria listroprocta** (Gaud and Mouchet)**Pterodectes listroproctus* Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 528.**Montesauria mainati** (Trouessart)**Proctophyllodes (Pterodectes) mainati* Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 81; *Pterodectes m.*: Canestrini and Kramer, 1899, Tierreich, 7: 126.**Montesauria merulae** (Gaud)**Pterodectes merulae* Gaud, 1957, Bull. Soc. Sci. nat. Maroc, 37: 126, *P. (P.) m.*: Gaud, 1968, Nat. Hist. Rennell Is., Brit. Solomon Isls. 5: 134.**Montesauria navicula** (Trouessart)**Pterodectes navicula* Trouessart, 1899, Bull. Soc. Etud. sci. Angers, 28: 36.**Montesauria oligosticta** (Gaud and Mouchet)**Pterodectes oligostictus* Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 531.**Montesauria oxyphylla** (Gaud and Petitot)*,
new status*Pterodectes phyllurus oxyphyllus* Gaud and Petitot, 1948, Ann. Parasitol. hum. comp., 23(5-6): 342.**Montesauria pachypa** (Gaud)**Pterodectes (P.) pachypus* Gaud, 1968, Nat. Hist. Rennell Is., Brit. Solomon Isls. 5: 134-138.**Montesauria papillo** (Gaud and Petitot)**Pterodectes papillo* Gaud and Petitot, 1948, Ann. Parasitol. hum. comp., 23(5-6): 342.**Montesauria pardalis** (Gaud and Mouchet)**Pterodectes pardalis* Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 532.**Montesauria reticulifera** (Trouessart and Neuman)*, provisional inclusion*Pterodectes reticulifer* Trouessart and Neumann, 1888, Bull. sci. France Belg., 19: 371.**Montesauria rosickyi** (Černý)**Pterodectes rosickyi* Černý, 1963, Acarologia, 5(4): 649.**Montesauria sabiensis** (Till)**Pterodectes sabiensis* Till, 1954, Moçambique doc. trim., (79): 94.**Montesauria stephanocaula** (Gaud)**Pterodectes stephanocaulus* Gaud, 1953, Ann. Parasitol. hum. comp., 28(5-6): 207.**Montesauria stictothyra** (Gaud)**Pterodectes papillo* var. *stictothyra* Gaud, 1953, Ann. Parasitol. hum. comp., 28(5-6): 206; *P. s.*: Gaud and Till, 1961, Publ. S. African Inst. Med. Res., 11(L): 256.**Montesauria synosterna** (Gaud and Mouchet)**Pterodectes synosternus* Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 535.**Montesauria trulla** (Trouessart)**Proctophyllodes (Pterodectes) trulla* Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 81; *Pterodectes t.*: Gaud, 1966, Rev. Zool. Bot. Afr., 73(3-4): 337.**Montesauria zumpti** (Till)**Pterodectes zumpti* Till, 1954, Moçambique doc. trim., (79): 96.**Dolichodectes**, new genus*Type species: Proctophyllodes (Pterocolus) edwardsi* Trouessart, 1885.*Derivation:* Contraction of *dolichos*, long and *Pterodectes*.

The elongated males of this new genus are unique in having the anal setae (a) positioned posterior to the adanal discs and in having the hysterosomal lobes extended beyond the insertions of setae d_5 resulting in the dorsal positioning of these latter setae. The males also have considerable portions of the ventral hysterostoma heavily sclerotized, closed coxal fields I-IV, well-developed ventrolateral shields, and the formation of an apparent pregenital arch and subgenital shield(s). The latter two structures, the arch and the subgenital shields, are interpreted as being respectively, thickenings and expansions of the surface shields associated with the pos-



Figs. 29-32. *Dolichodectes edwardsi* (Trouessart): dorsal and ventral aspects of male (29, 30) and female (31, 32).

terior epimerites. The coxal fields of the hysterosoma are enclosed by a Y-shaped sclerite or apodeme extending from the genital arch to the epimerites of coxae III. Conversely, the females of this genus are without notable ventral sclerotizations; all coxal fields are open and even epimerites I lack posterolateral extensions.

The following definition is based on five named and two new species:

Male

1. Epimerites I Y-shaped with posterolateral extensions.
2. Coxal fields I-IV closed.
3. Legs I-IV subequal or legs I and/or IV slightly enlarged.
4. Hysterosomal lobes elongated forming a deep linear cleft.
5. Supranal concavity usually indistinct.
6. Metapodosomal shields absent.
7. Ventrolateral shields well developed, often uniting across the venter posterior to adanal discs, often uniting with surface shields of epimerites IVa.
8. Pregenital apodeme absent.
9. Genital arch with posterolateral extremities connected to some portion of surrounding sclerotizations.
10. Genital discs posterior to genital arch and often invisible.
11. Anal shields absent.
12. Adanal discs edentate.
13. Setae *a* posterior or posterolateral to centers of adanal discs.
14. Setae *a* and *c*₃ in long, almost rectangular arrangement.
15. Setae *d*₅ lanceolate and inserted on dorsal surfaces of lobes.
16. Setae *pai* small and setiform.
17. Solenidia ϕ of legs III-IV subequal.

Female

18. Epimerites I V-shaped without posterolateral extensions.
19. Legs I-IV subequal.
20. Ambulacra I-IV subequal.
21. Hysterosomal terminus articulated with anterior idiosoma and bearing appendages.
22. Supranal concavity indistinct.

23. Genitocoxal apodemes normal with pregenital apodeme Ω -shaped.
24. Setae *I*₅ lanceolate without terminal filament.
25. Solenidia ϕ on legs III much longer than ϕ on legs IV.

Male and Female

26. Hysterosomal setae absent: none.
27. Setae *I*₁ inserted on or off humeral shields.
28. Solenidia σ ₁ smaller than ω ₃ on legs I.
29. Setae *wa* distant from *ra* and *la* on legs I-II.
30. Setae *cG* and *mG* on legs I-II setiform.
31. Solenidia σ ₁ and setae *sR* present on legs III.
32. Found on birds of the families Muscicapidae, Turdidae and Sylviidae (Passeres).

The following named species are assigned to the new genus *Dolichodectes*; the new combinations are denoted by an asterisk:

Dolichodectes allocaulus* (Gaud and Mouchet)

Pterodectes allocaulus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 517.

Dolichodectes diplocercus* (Gaud and Mouchet)

Pterodectes diplocercus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 522-3.

Dolichodectes edwardsi* (Trouessart)

Proctophyllodes (Pterocolus) edwardsii Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 72-3; *Pterodectes e.*: Canestrini and Kramer, 1899, Tierreich, 7: 123.

Dolichodectes glyphonotus

(Gaud and Mouchet)*

Pterodectes glyphonotus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 533.

Dolichodectes platynocercus

(Gaud and Mouchet)*

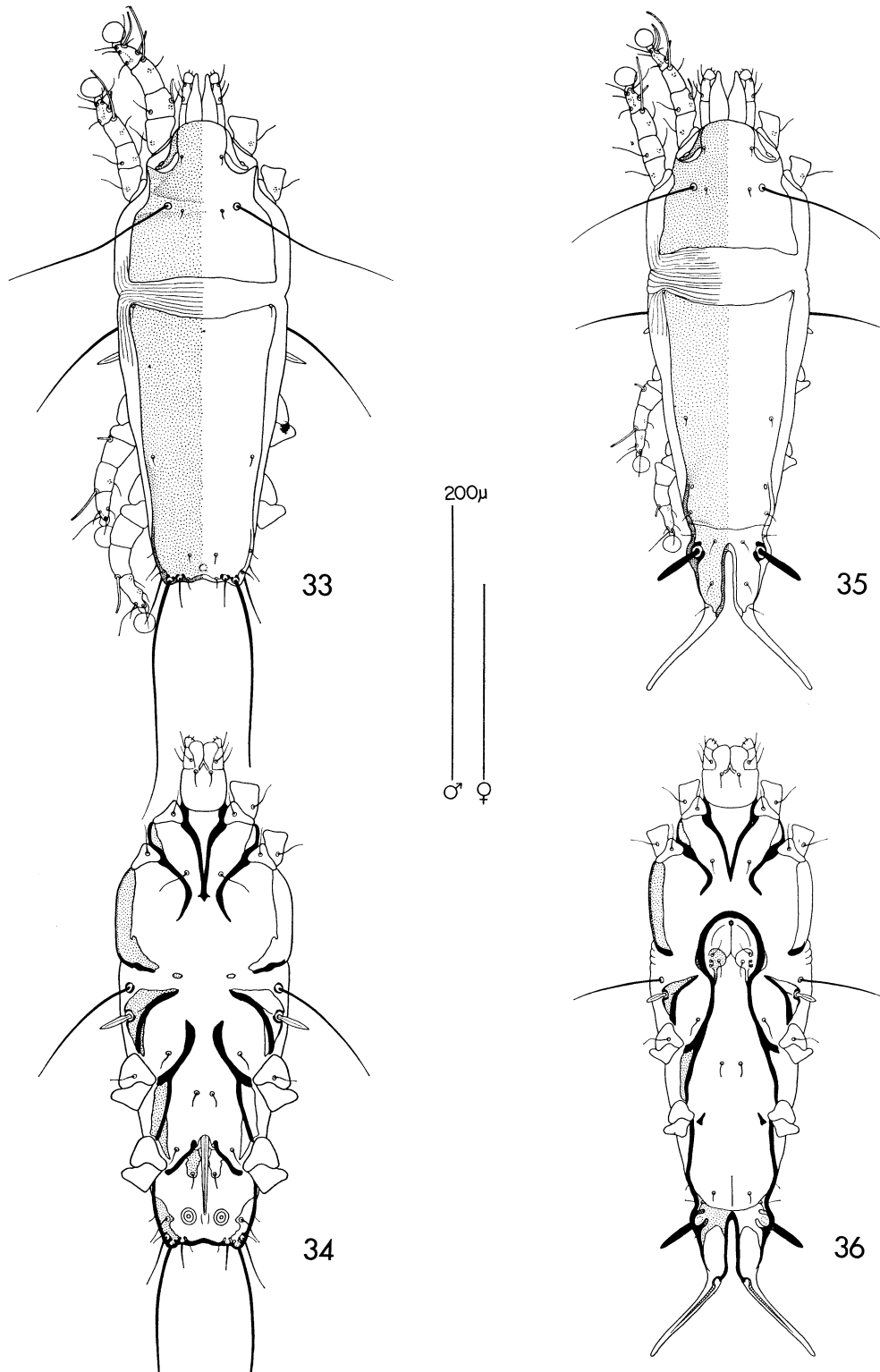
Pterodectes platynocercus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 523.

***Pedanodectes*, new genus**

Type species: Pterodectes hologaster Gaud, 1953.

Derivation: Contraction of *pedanos*, short and *Pterodectes*.

The new genus shows affinities to the genus *Anisodiscus* not only in morphological features,



Figs. 33-36. *Pedanodectes hologaster* (Gaud): dorsal and ventral aspects of male (33, 34) and female (35, 36).

but both groups share a number of hosts. The morphological similarities are illustrated by the lack of setae d_2 in both sexes, indistinct hysterosomal lobes in the males, and lanceolate setae l_5 and elongated genitocoxal apodemes in the females. Species of both genera occur on the families Nectariniidae and Sylviidae.

The following definition is based on three named and five new species:

Male

1. Epimerites I Y- or V-shaped with posterolateral extensions.
2. Coxal fields I-IV open, rarely I is closed.
3. Legs I-IV subequal.
4. Hysterosomal lobes weakly developed or absent forming truncated or entire terminus without distinct cleft.
5. Supranal concavity indistinct.
6. Metapodosomal shields absent.
7. Ventrolateral shields weakly developed.
8. Pregenital apodeme absent.
9. Genital arch with anterior margins fused to epimerites IVa; epimerites IVa from each side may or may not connect anterior to arch.
10. Genital discs posterior to genital arch and indistinct.
11. Anal shields absent.
12. Adanal discs edentate.
13. Setae a posterolateral, lateral, or anterolateral to adanal discs.
14. Setae a and c_3 in trapezoidal arrangement.
15. Setae d_5 setiform or spiculiform.
16. Setae pai small and setiform.
17. Solenidia ϕ on legs III-IV subequal.

Female

18. Epimerites I V- or Y-shaped with or without posterolateral extensions.
19. Legs I-IV subequal.
20. Ambulacra I-IV subequal.
21. Hysterosomal terminus articulated with anterior idiosoma and bearing appendages.
22. Supranal concavity indistinct.
23. Genitocoxal apodemes slightly longer than normal with pregenital apodeme Ω -shaped.
24. Setae l_5 bladelike without terminal filament.
25. Solenidia ϕ on legs III much longer than ϕ on legs IV.

Male and Female

26. Hysterosomal setae absent: d_{1-2} or d_{1-3} .
27. Setae l_1 inserted on anterolateral angles of hysterosomal shield.
28. Solenidia σ_1 smaller than ω_3 on legs I.
29. Setae wa distant from la and ra on legs I-II.
30. Setae cG and mG on legs I-II setiform.
31. Solenidia σ_1 and setae sR present on legs III.
32. Found on birds of the families Nectariniidae, Pycnonotidae, Dicaeidae, Laniidae and Sylviidae (Passeres).

The following named species are assigned to the new genus *Pedanodectes*; the new combinations are denoted by an asterisk:

Pedanodectes andrei* (Till)

Pterodectes andrei Till, 1954, Moçambique doc. trim. (79): 86.

Pedanodectes hologaster* (Gaud)

Pterodectes hologaster Gaud, 1953, Ann. Parasitol. hum. comp., 28(3): 204.

Pedanodectes mesocaulus* (Gaud and Mouchet)

Pterodectes mesocaulus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 529-31.

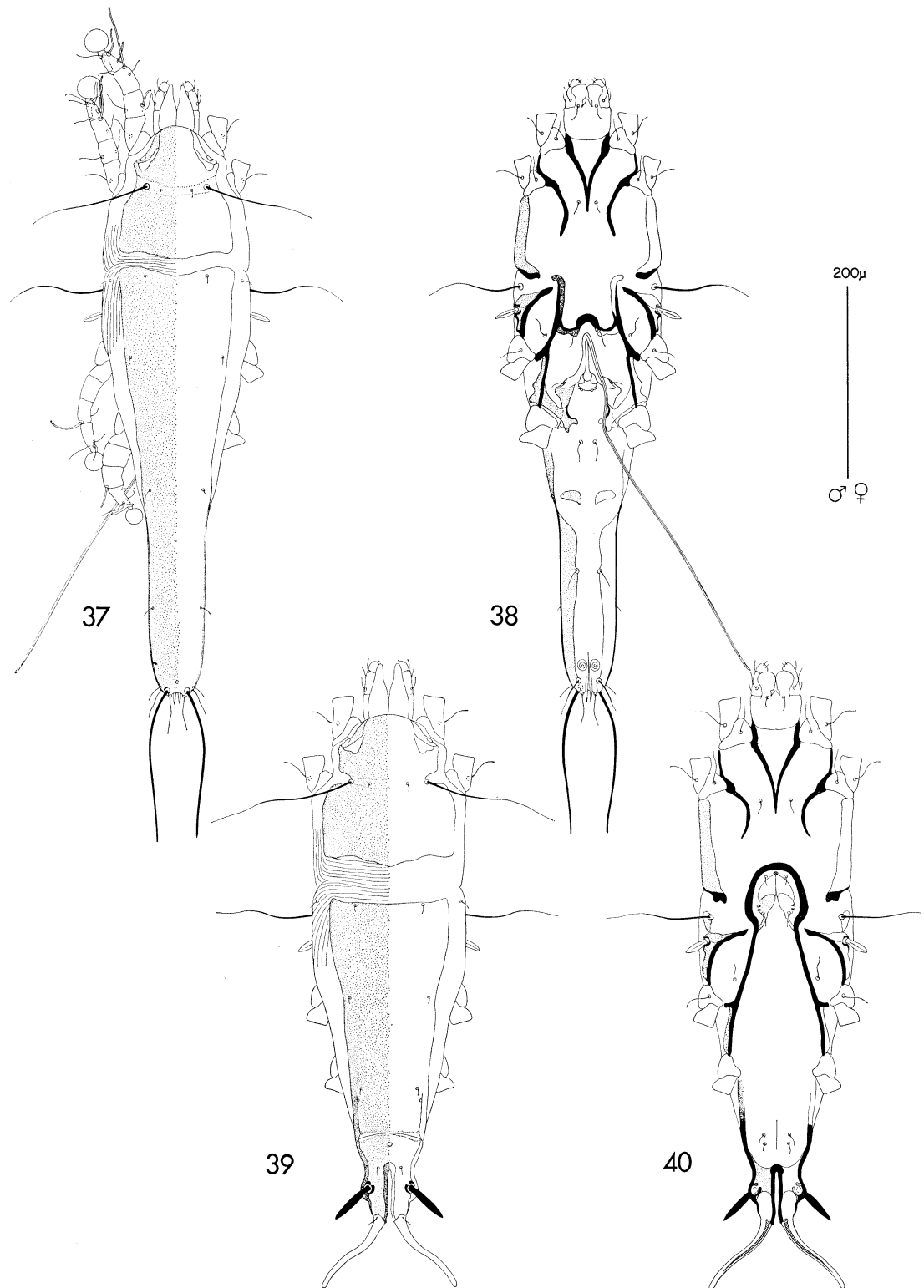
Genus *Anisodiscus* Gaud and Mouchet

Anisodiscus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 502-4; Gaud and Till, 1961, Publ. S. Afr. Inst. Med. Res., 11(L): 246-7.

Type species: Pterodectes dolichogaster Gaud, 1953 (by original designation).

The genus *Anisodiscus* was erected for a distinctive species characterized by the extremely long male and the large posterior ambulacra of the female (Figs. 37-40). Species added to the genus have been shorter and less spectacular in appearance, although most males are elongated and have setae a positioned far anterior to the adanal discs.

With the exception of *A. megadiscus* in which the male genital organ is between coxae IV, the males have well-developed genital arch positioned midway between coxae III and IV. The genital arch is surmounted by a small, distinct pregenital apodeme which is connected to the posterior epimerites to form an H-shaped genitocoxal apodeme.



Figs. 37-40. *Anisodiscus dolichogaster* (Gaud): dorsal and ventral aspects of male (37, 38) and female (39, 40).

The new definition of the genus is based on five named and one new species.

Male

1. Epimerites I V- or Y-shaped without posterolateral extensions.
2. Coxal fields I-II open, III open or closed, IV closed.
3. Legs I-III subequal, legs IV slightly thickened.
4. Hysterosomal lobes absent or weakly developed forming shallow U-shaped cleft.
5. Supranal concavity distinct.
6. Metapodosomal shields absent.
7. Ventrolateral shields present.
8. Pregenital apodeme present and connected to posterior epimerites (absent in *megadiscus*).
9. Genital arch well developed and positioned between coxae III-IV (small in *megadiscus* and positioned between coxae IV).
10. Genital discs approximate, visible and positioned posterior to the genital arch.
11. Anal shields independent and positioned approximately midway between genital arch and adanal discs.
12. Adanal discs edentate.
13. Setae *a* distant and anterolateral to adanal discs.
14. Setae *a* and *c*₃ in trapezoidal arrangement.
15. Setae *d*₅ setiform.
16. Setae *pai* absent.
17. Solenidia ϕ on legs III larger than ϕ on legs IV.

Female

18. Epimerites I Y-shaped without posterolateral extensions.
19. Legs I-IV subequal.
20. Ambulacra III-IV larger than I-II.
21. Hysterosomal terminus articulated with anterior idiosoma and bearing appendages.
22. Supranal concavity distinct.
23. Genitocoxal apodemes elongated with pregenital apodeme Ω -shaped.
24. Setae *I*₅ lanceolate without terminal filament.
25. Solenidia ϕ on legs III longer than on legs IV.

Male and Female

26. Hysterosomal setae absent: *pai*, *d*₂, and *I*₄.
27. Setae *I*₁ inserted off humeral shields.
28. Solenidia σ ₁ smaller than ω ₃ on legs I.
29. Setae *wa* distant from *Ia* and *ra* on legs I-II.
30. Setae *cG* and *mG* on legs I-II setiform.
31. Solenidia σ ₁ absent and setae *sR* present on legs III.
32. Found on birds of the families Nectariniidae and Sylviidae (Passeres).

The following named species are assigned to the genus *Anisodiscus*; new combinations are denoted by an asterisk:

Anisodiscus dolichogaster (Gaud)

Pterodectes dolichogaster Gaud, 1953, Ann. Parasitol. hum. comp., 28(5-6): 202-3; *Anisodiscus d.*: Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 502; *A. d.*: Gaud and Till, 1961, Publ. S. Afr. Inst. Med. Res., 11(L): 246.

Anisodiscus eupariphus Gaud and Mouchet

Anisodiscus eupariphus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32 (5-6): 503.

Anisodiscus megacaulus (Trouessart)

Proctophyllodes (*Pterodectes*) *megacaulus* Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 80; *Pterodectes m.*: Canestrini and Kramer, 1899, Tierreich, 7: 125; *Anisodiscus m.*: Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 504.

Anisodiscus megadiscus Gaud and Mouchet

Anisodiscus megadiscus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32 (5-6): 504.

Anisodiscus megalurus (Trouessart)*

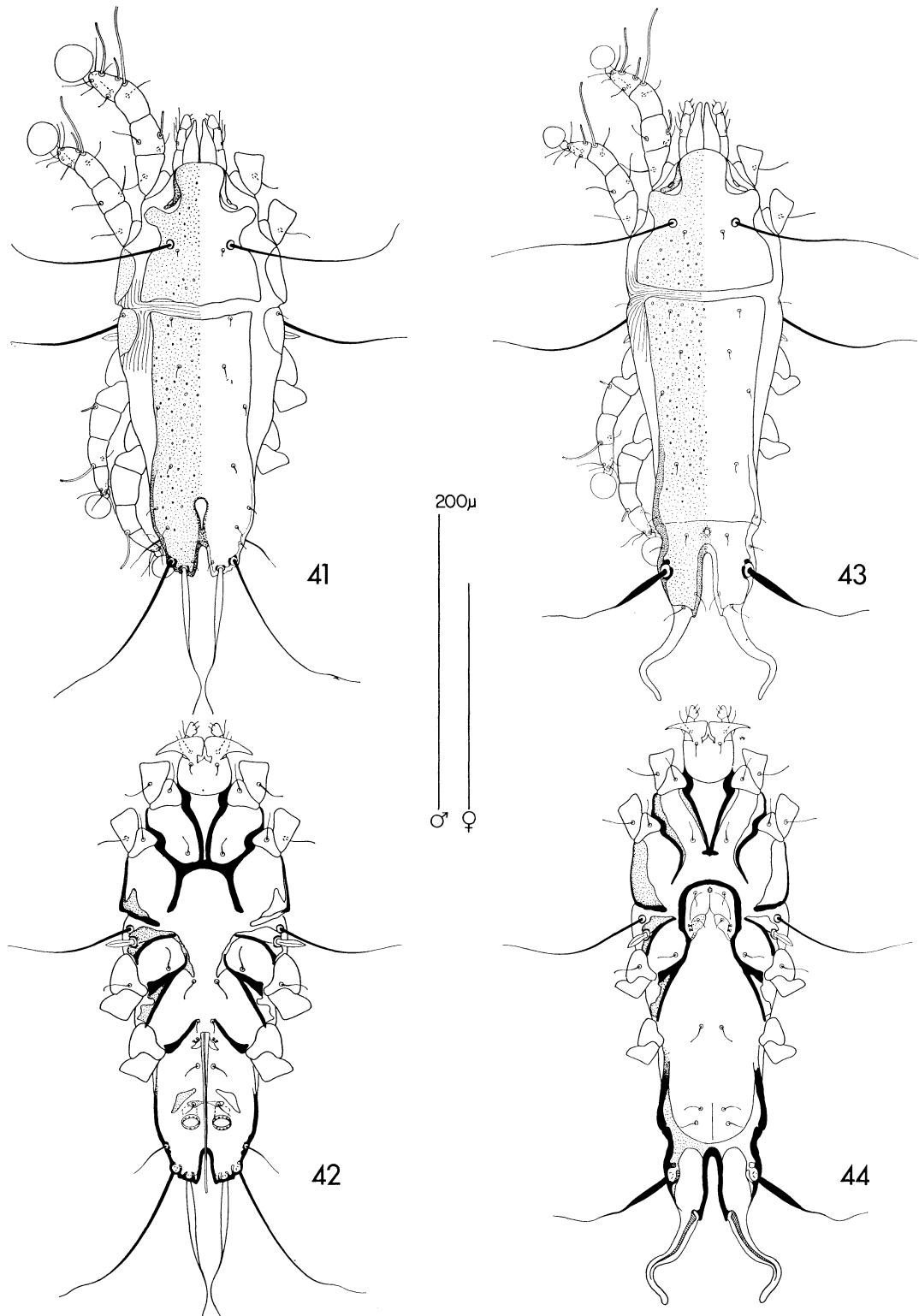
Pterodectes megalurus Trouessart, 1899, Bull. Soc. Etud. sci. Angers, 28: 37.

Genus *Proterothrix* Gaud, new status

Pterodectes (*Proterothrix*) Gaud, 1968, Nat. Hist. Rennell Is., Brit. Solomon Isls., 5: 126.

Type species: Pterodectes wolffi Gaud, 1962 (by original designation).

Gaud (1962) first suggested the possibility of dividing the genus *Pterodectes* (s.l.) into two divisions based in part on the positions of setae *a* in relation to the adanal discs in the males; then he said the females would have setae *I*₅ lanceolate with terminal filaments (*in litt.*). Later, Gaud (1968) created the taxon *Proterothrix* as a subgenus of *Pterodectes* and in addition to char-



Figs. 41-44. *Proterothrix wolffi* (Gaud): dorsal and ventral aspects of male (41, 42) and female (43, 44).

acters mentioned, stated that both sexes had legs I dilated.

Our studies which include the fifteen named species of *Proterothrix* and approximately twenty new species show that legs I *may be* dilated and that setae I_5 in the females *may be* setiform with terminal filaments. Additional variations are seen in the positions of the genital discs in the males; in most species they are approximate to each other and to the genital arch, but in a few species from Paradisaedidae one pair of discs may be removed a short distance anterior to the arch (a condition approaching that of *Megalodectes* species).

Male

1. Epimerites I V-, Y-, or π -shaped with posterolateral extensions.
2. Coxal fields I or I and III closed.
3. Legs I-IV subequal or I dilated.
4. Hysterosomal lobes distinct forming V-shaped cleft.
5. Supranal concavity distinct, oval or bell-shaped.
6. Metapodosomal shields absent.
7. Ventrolateral shields absent.
8. Pregenital apodeme absent.
9. Genital arch small, between coxae IV and independent of epimerites IVa.
10. Genital discs approximate and anterolateral to apex of genital arch (rarely one pair of discs positioned slightly anterior).
11. Anal shields independent or fused.
12. Adanal discs dentate, often similar to *Proctophyllodes*.
13. Setae *a* anteromesal to adanal disc centers.
14. Setae *a* and c_3 in rectangular arrangement.
15. Setae d_5 setiform or leaflike.
16. Setae *pai* setiform and small.
17. Solenidia \emptyset on legs III equal to or smaller than those of legs IV.

Female

18. Epimerites I V- or π -shaped with posterolateral extensions.
19. Legs I-IV subequal or I dilated.
20. Ambulacra III-IV subequal or slightly larger than ambulacra I-II.
21. Hysterosomal terminus articulated to anterior idiosoma bearing appendages.

22. Supranal concavity distinct, round or oval in shape.
23. Genitocoxal apodemes normal with pregenital apodeme Ω -shaped.
24. Setae I_5 setiform or lanceolate with terminal filament.
25. Solenidia \emptyset on legs III larger than on IV.

Male and Female

26. Hysterosomal setae absent: none.
27. Setae I_1 inserted off or rarely on humeral shields.
28. Solenidia σ_1 smaller than ω_3 on legs I.
29. Setae *wa* distant from *la* and *ra* on legs I-II.
30. Setae *cG* and *mG* setiform on legs I-II.
31. Solenidia σ_1 and setae *sR* present on legs III.
32. Found on birds of the Coraciiformes, Pici-formes, Musophagiformes and Passeri-formes.

The following named species are assigned to the genus *Proterothrix*; new combinations are denoted by asterisks:

***Proterothrix aculeata* (Canestrini)*,** new status, provisional inclusion

Proctophyllodes (*Pterodectes*) *mainati* var. Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 81; *Pterodectes mainati aculeata* Canestrini, in Canestrini and Kramer, 1899, Tierreich, 7: 126.

***Proterothrix coscinonota* Gaud**

Pterodectes (*Proterothrix*) *coscinonotus* Gaud, 1968, Nat. Hist. Rennell Is., Brit. Solomon Isls., 5: 126-8.

***Proterothrix dicranochaeta* Gaud**

Pterodectes (*Proterothrix*) *dicranochaetus* Gaud, 1968, Nat. Hist. Rennell Is., Brit. Solomon Isls., 5: 129-30.

Proterothrix diminuta* (Trouessart)

Pterodectes diminutus Trouessart, 1899, Bull. Soc. Etud. sci. Angers, 28: 38; *P. phyllurus* var. *d.*: Canestrini and Kramer, 1899, Tierreich, 7: 126.

***Proterothrix emarginata* (Trouessart)*,** new status

Pterodectes phyllurus emarginatus Trouessart, 1899, Bull. Soc. Etud. sci. Angers, 28: 38.

***Proterothrix hymenostoma* Gaud**

Pterodectes (*Proterothrix*) *hymenostomus* Gaud, 1968, Nat. Hist. Rennell Is., Brit. Solomon Isls., 5: 130-1.

Proterothrix modesta (Trouessart)*,
new status

Pterodectes diminutus modestus Trouessart, 1899, Bull. Soc. Etud. sci. Angers, 28: 38-9.

Proterothrix paradisiaca (Trouessart)*

Proctophyllodes (*Pterodectes*) *paradisiacus* Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 80; *Pterodectes p.*: Canestrini and Kramer, 1899, Tierreich, 7: 125.

Proterothrix phyllura (Trouessart)*

Pterodectes phyllurus Trouessart, 1899, Bull. Soc. Etud. sci. Angers, 28: 37-8.

Proterothrix ranci (Gaud)*

Pterodectes Ranci Gaud, 1952, Mém. Inst. sci. Madagascar, Sér. A, 7(1): 90-1.

Proterothrix sakatai (Sugimoto)*

Proctophyllodes sakatai Sugimoto, 1940, Bull. Sch. Agric. Forest., Taihoku Imp., Univ., 1: 53; *Pterodectes s.*: Radford, 1953, Parasitol., 43(3,4): 215.

Proterothrix schizothyra (Gaud)*

Pterodectes schizothyrus Gaud, 1952, Mém. Inst. sci. Madagascar, Sér. A, 7(1): 91-2.

Proterothrix stenochaeta Gaud

Pterodectes (*Proterothrix*) *stenochaetus* Gaud, 1968, Nat. Hist. Rennell Is., Brit. Solomon Is., 5: 132-4.

Proterothrix wolffi (Gaud)

Pterodectes wolffi Gaud, 1962, Nat. Hist. Rennell Is., Brit. Solomon Is., 4: 42-4; *P. (Proterothrix) w.*: Gaud, 1968, *op. cit.*, 5: 134.

Proterothrix xiphiura (Trouessart)*

Proctophyllodes (*Pterodectes*) *xiphiurus* Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 82; *Pterodectes x.*: Canestrini and Kramer, 1899, Tierreich, 7: 127.

Neodectes, new genus

Type species: Proctophyllodes (*Pterodectes*) *securiclatus* Trouessart and Neumann, 1888.
Derivation: Contraction of *neos*, new and *Pterodectes*.

The new genus *Neodectes* is extremely close to the genus *Proterothrix* and is distinguished by the genital discs posterior to the genital arch and by host preference, occurring primarily on the Meliphagidae.

The definition of the genus is based on two named and at least five new species.

Male

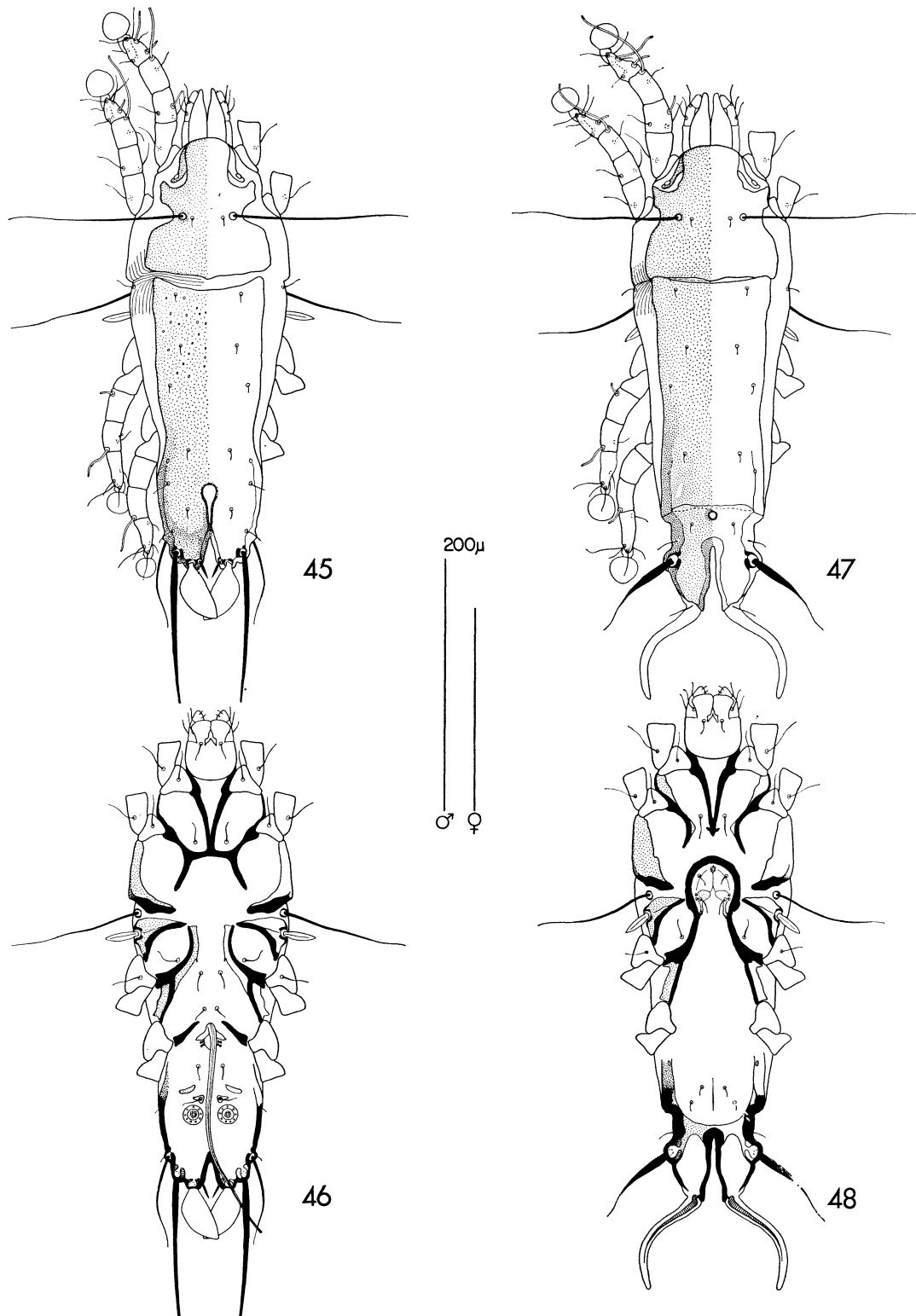
1. Epimerites I Y- or λ -shaped with postero-lateral extensions.
2. Coxal fields I and III closed or open; coxal fields II, IV open.
3. Legs I-IV subequal.
4. Hysterosomal lobes distinct forming V-shaped cleft (except *manicatus*).
5. Supranal concavity distinct, oval or bell-shaped.
6. Metapodosomal shields absent.
7. Ventrolateral shields absent.
8. Pregenital apodeme absent.
9. Genital arch between coxae IV and independent of epimerites IVa.
10. Genital discs approximate and posterior to genital arch.
11. Anal shields independent or absent.
12. Adanal discs dentate.
13. Setae *a* anteromesal to adanal disc centers.
14. Setae *a* and *c*₃ in rectangular arrangement.
15. Setae *d*₅ setiform to spiculiform (leaflike in *securiclatus*).
16. Setae *pai* small and setiform (spiculiform in *securiclatus*).
17. Solenidia \emptyset on legs III-IV subequal.

Female

18. Epimerites I V- or Y-shaped with or without posterolateral extensions.
19. Legs I-IV subequal.
20. Ambulacra I-IV subequal or III-IV slightly larger than I-II.
21. Hysterosomal terminus articulated with anterior idiosoma and bearing appendages.
22. Supranal concavity distinct, round or oval in shape.
23. Genitocoxal apodemes elongated with pre-genital apodeme Ω -shaped.
24. Setae *l*₅ lanceolate with terminal filament.
25. Solenidia \emptyset on legs III longer than \emptyset on legs IV.

Male and Female

26. Hysterosomal setae absent: none.
27. Setae *l*₁ inserted on or off humeral shields.
28. Solenidia σ ₁ shorter than ω ₃ on legs I.
29. Setae *wa* distant from *ra* and *la* on legs I-II.
30. Setae *cG* and *mG* setiform on legs I-II.



Figs. 45-48. *Neodectes securiclatus* (Trouessart and Neumann): dorsal and ventral aspects of male (45, 46) and female (47, 48).

31. Solenidia σ_1 and setae *sR* present on legs III.
32. Found on birds of the families Campephagidae, Ptilonorhynchidae, Pycnonotidae, Sylviidae, and Meliphagidae (Passeres).

The following species are assigned to the genus *Neodectes*; new combinations are denoted by asterisks:

Neodectes manicatus* (Trouessart)

Proctophyllodes (Pterodectes) manicatus Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 81; *Pterodectes m.*: Canestrini and Kramer, 1899, Tierreich, 7: 127.

***Neodectes securiclatus*
(Trouessart and Neumann)***

Proctophyllodes (Pterodectes) securiclatus Trouessart and Neumann, 1888, Bull. Sci. France Belg., 19: 370-1; *Pterodectes s.*: Vitzthum, 1922, Arch. Naturgesch., A, 88(5): 61-2.

***Megalodectes*, new genus**

Type species: Proctophyllodes (Pterodectes) major Trouessart, 1885.

Derivation: Contraction of *megale*, large + *Pterodectes*.

The new monotypic genus contains the largest mites of the Pterodectinae. Close affinities between *Megalodectes* and the *Proterothrix* species from Paradisaeidae are indicated by setae *pai* being spiculiform and setae *a* anterior to the adanal discs in the males and by setae *cG* on legs I modified as spines in both sexes. Unique features include the widely spaced genital discs and the large posterolateral lamellae in the males (Figs. 49, 50).

The definition of the genus is based on the single species.

Male

1. Epimerites I Y-shaped without posterolateral extensions.
2. Coxal fields I-IV open.
3. Legs III-IV thickened.
4. Hysterosomal lobes distinct forming small, U-shaped cleft.
5. Supranal concavity distinct, oval in shape.
6. Metapodosomal shields absent.
7. Ventrolateral shields well developed.
8. Pregenital apodeme absent.

9. Genital arch weakly developed, positioned behind coxae IV; epimerites IVa small.
10. Genital discs distant from each other and from genital arch.
11. Anal shields independent.
12. Adanal discs dentate.
13. Setae *a* anteromesal to adanal disc centers.
14. Setae *a* and *c₃* in rectangular arrangement.
15. Setae *d₅* setiform.
16. Setae *pai* spiculiform and conspicuous.
17. Solenidia ϕ of legs III-IV subequal.

Female

18. Epimerites I Y-shaped without posterolateral extensions.
19. Legs I-IV subequal.
20. Ambulacra I-IV subequal.
21. Hysterosomal terminus fused with anterior idiosoma and bearing appendages.
22. Supranal concavity distinct, round in shape.
23. Genitocoxal apodemes normal with pregenital apodeme U-shaped.
24. Setae *I₅* lanceolate with terminal filament.
25. Solenidia ϕ on legs III-IV subequal.

Male and Female

26. Hysterosomal setae absent: none.
27. Setae *I₁* not inserted on humeral shields.
28. Solenidia σ_1 smaller than ω_3 on legs I.
29. Setae *wa* distant from *la* and *ra* on legs I-II.
30. Setae *cG* and *mG* on legs I-II spiculiform.
31. Solenidia σ_1 and setae *sR* present on legs III.
32. Found only on birds of the family Menuridae (Passeriformes: Menurae).

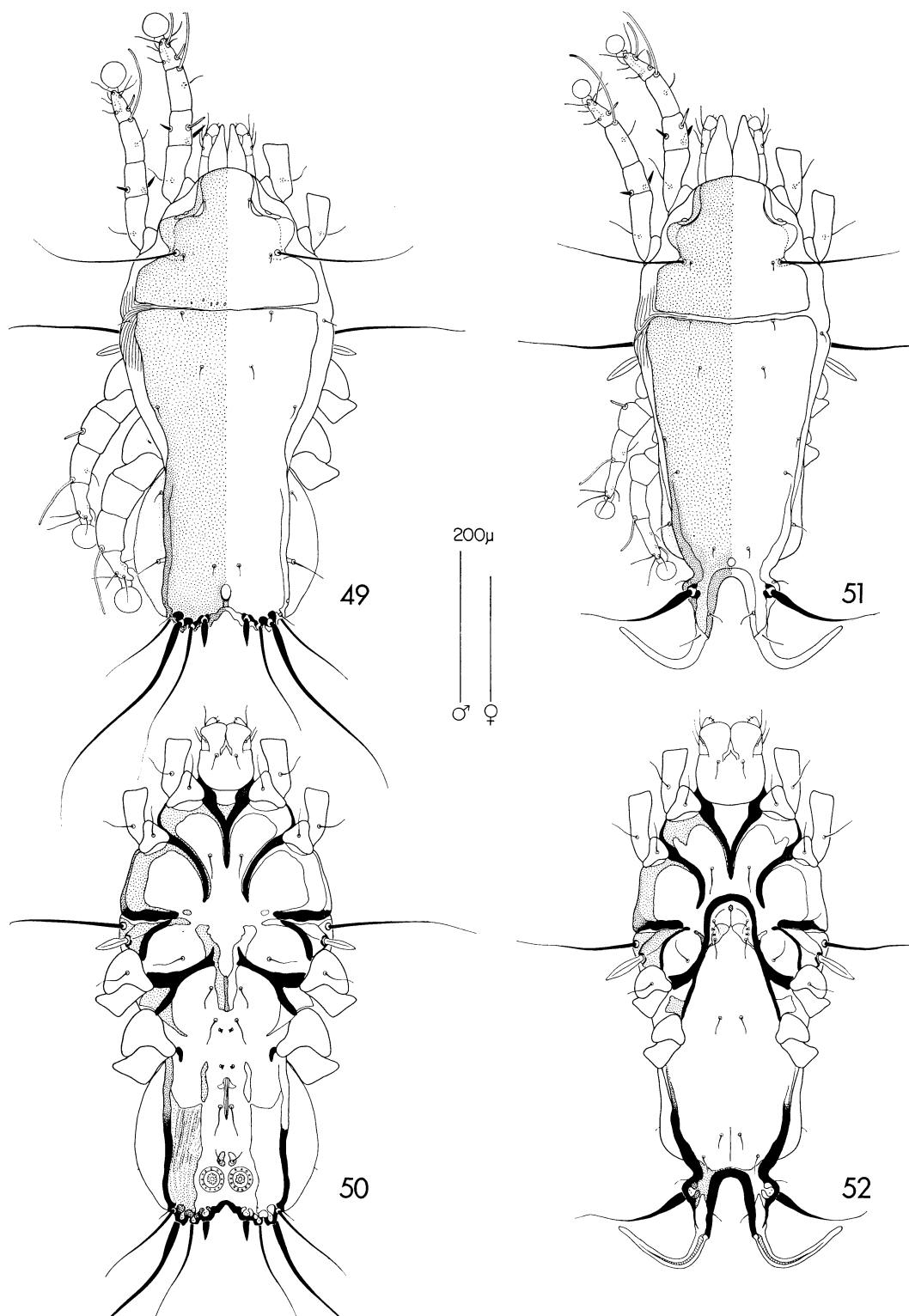
Only the type species is included in this monotypic genus.

Megalodectes major* (Trouessart)

Proctophyllodes (Pterodectes) major Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 78-9; *Alloptes m.*: Canestrini and Kramer, 1899, Tierreich, 7: 115.

The *Trochilodectes* Group

This group, characterized by setae *wa*, *ra*, and *la* approximate on tarsi I-II and solenidia σ_1 equal to or longer than ω_3 on legs I, occurs exclusively on the hummingbirds (Trochilidae). Within the group, which has apparently been associated with these birds for a long period of



Figs. 49-52. *Megalodectes major* (Trouessart): dorsal and ventral aspects of male (49, 50) and female (51, 52).

time, little can be said about the intergeneric relationships. It is obvious that the genera *Trochilodectes* and *Xynonodectes* are closely related and that the genera *Toxerodectes* and *Syntomodectes* are unique and probably represent separate invasions of feather mites onto the hummingbirds.

***Trochilodectes*, new genus**

Type species: Proctophyllodes (Pterodectes) trochilidarum Trouessart, 1885.

Derivation: Contraction of *Trochilus* and *Pterodectes*.

The males of *Trochilodectes* are distinguished by having small metapodosomal shields lateral to the dorsal hysterosomal shield, epimerites IVa connecting anterior to the genital arch, well-developed ventrolateral shields, and coxal fields I closed. The males of *Xynonodectes* lack metapodosomal shields, well-developed epimerites IVa, ventrolateral shields, and have coxal fields I open. Females of the two genera are also easily distinguished by the π -shaped epimerites I, Ω -shaped pregenital apodeme, and setae I_5 without terminal filaments in *Trochilodectes* and the Y-shaped epimerites I, angular U-shaped pregenital apodeme, and setae I_5 with terminal filaments in *Xynonodectes*.

The definition of the genus is based on two named and five new species.

Male

1. Epimerites I π -shaped with posterolateral extensions.
2. Coxal fields I closed, II-III open, and IV closed or open.
3. Legs I-IV subequal.
4. Hysterosomal lobes distinct forming U- or V-shaped cleft.
5. Supranal concavity distinct, round or oval in shape.
6. Metapodosomal shields present.
7. Ventrolateral shields extending to apex of terminal cleft.
8. Pregenital apodeme absent.
9. Genital arch well developed, between anterior articulations of legs IV or between coxae III-IV; epimerites IVa connecting anterior to arch.

10. Genital discs approximate and anterolateral to genital arch apex.
11. Anal shields absent, or present.
12. Adanal discs edentate.
13. Setae a lateral or anterolateral to adanal discs.
14. Setae a and c_3 in trapezoidal arrangement.
15. Setae d_5 lanceolate, leaflike, or setiform.
16. Setae pai minute and setiform.
17. Solenidia ϕ on legs III-IV subequal or III slightly shorter than IV.

Female

18. Epimerites I π -shaped with posterolateral extensions.
19. Legs I-IV subequal.
20. Ambulacra I-IV subequal.
21. Hysterosomal terminus articulated with anterior idiosoma and bearing appendages.
22. Supranal concavity distinct and round in shape.
23. Genitocoxal apodemes short with pregenital apodeme Ω -shaped.
24. Setae I_5 lanceolate without terminal filament.
25. Solenidia ϕ on legs III-IV subequal.

Male and Female

26. Hysterosomal setae absent: none.
27. Setae I_1 inserted on humeral shields.
28. Solenidia σ_1 subequal to ω_3 on legs I.
29. Setae wa , la , and ra approximate on legs I-II.
30. Setae cG and mG on legs I-II setiform.
31. Solenidia σ_1 and setae sR on legs III present.
32. Found exclusively on birds of the family Trochilidae (Apodiformes).

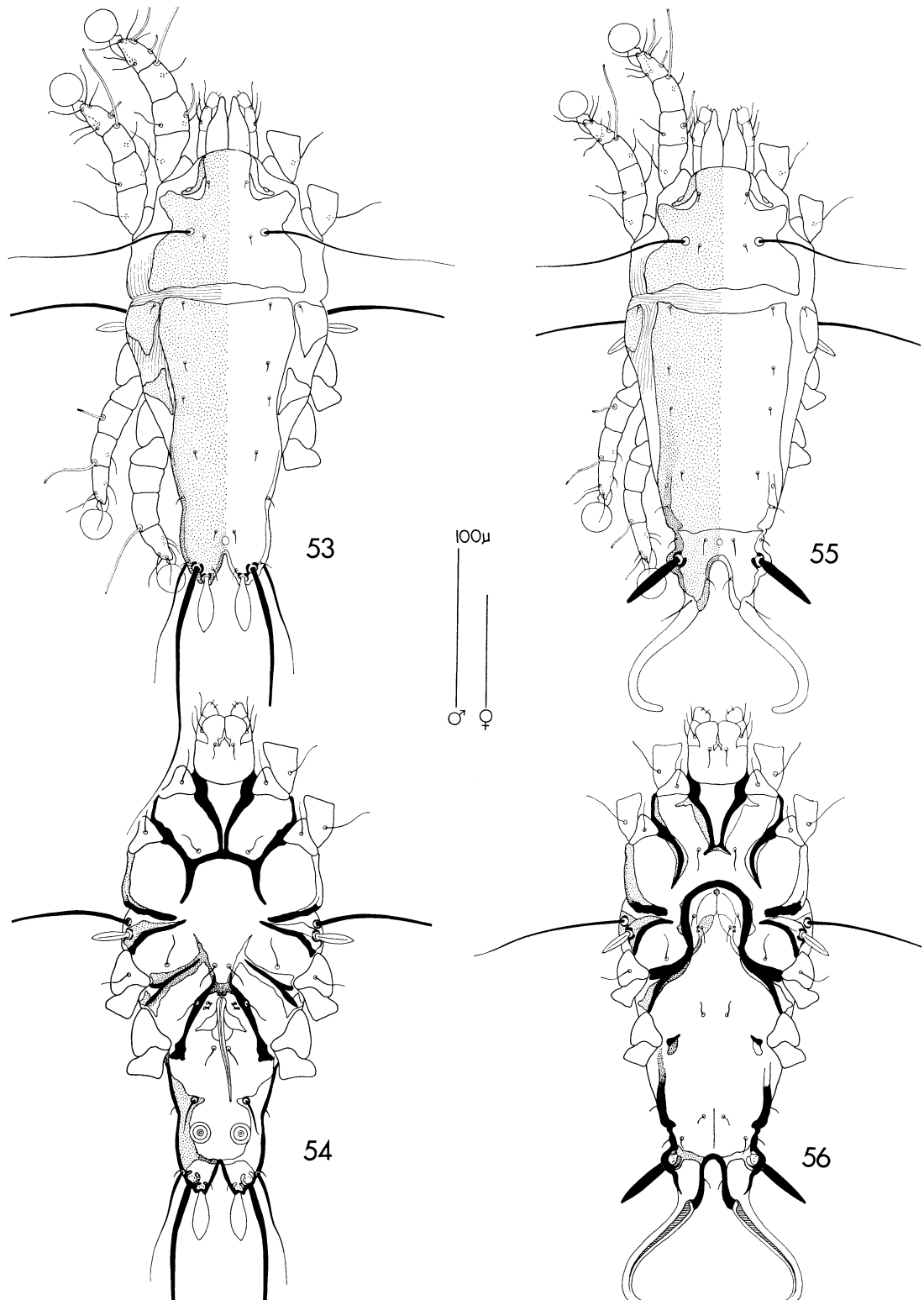
Two species are assigned to *Trochilodectes*; the asterisks denote new combinations.

Trochilodectes alloptinus* (Trouessart)

Proctophyllodes (Pterodectes) alloptinus Trouessart, 1886, Bull. Soc. Etud. sci. Angers, 16: 149-50; *Alloptes a.*: Canestrini and Kramer, 1899, Tierreich, 7: 110.

Trochilodectes trochilidarum* (Trouessart)

Proctophyllodes (Pterodectes) trochilidarum Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 82; *Pterodectes t.*: Canestrini and Kramer, 1899, Tierreich, 7: 127.



Figs. 53-56. *Trochilodectes trochilidarum* (Trouessart): dorsal and ventral aspects of male (53, 54) and female (55, 56).

Xynonodectes, new genus

Type species: Proctophyllodes (Pterodectes) gracilior Trouessart, 1885.

Derivation: Contraction of *Xynonos*, companion and *Pterodectes*.

The differentiating characters between *Xynonodectes* and the closely related *Trochilodectes* have been stated in the description of the latter taxon. The only unique modification of a structure is the unusual shape of the pregenital apodeme of the female. This structure, rather than being Ω - or U-shaped, is almost square (Fig. 60).

The definition is based on one named and one new species.

Male

1. Epimerites I Y-shaped without posterolateral extensions.
2. Coxal fields I-IV open.
3. Legs I-IV subequal.
4. Hysterosomal lobes distinct forming V-shaped cleft.
5. Supranal concavity distinct, round or oval in shape.
6. Metapodosomal shields absent.
7. Ventrolateral shields absent.
8. Pregenital apodeme absent.
9. Genital arch weakly developed and positioned between weakly developed epimerites IVa.
10. Genital discs approximate and anterolateral to genital arch.
11. Anal shields weak, divided.
12. Adanal discs edentate.
13. Setae *a* posterolateral to adanal discs.
14. Setae *a* and *c*₃ in trapezoidal arrangement.
15. Setae *d*₅ setiform.
16. Setae *pai* setiform.
17. Solenidia \emptyset on legs III-IV subequal.

Female

18. Epimerites I Y-shaped without posterolateral extensions.
19. Legs I-IV subequal.
20. Ambulacra I-IV subequal.
21. Hysterosomal terminus articulated with anterior idiosoma and bearing appendages.
22. Supranal concavity distinct, round or oval in shape.

23. Genitocoxal apodemes short with pregenital apodeme U-shaped with angular corners.
24. Setae *l*₅ narrowly lanceolate with terminal filament.
25. Solenidia \emptyset on legs III equal to or slightly longer than those on legs IV.

Male and Female

26. Hysterosomal setae absent: *l*₄.
27. Setae *l*₁ inserted on or near humeral shields.
28. Solenidia σ ₁ equal to or larger than ω ₃ on legs I.
29. Setae *wa*, *ra*, and *la* approximate on legs I-II.
30. Setae *cG* and *mG* on legs I-II setiform.
31. Solenidia σ ₁ and setae *sR* present on legs III.
32. Found exclusively on birds of the family Trochilidae (Apodiformes).

Only one named species is included in this new genus; the asterisk indicates a new combination.

Xynonodectes gracilior (Trouessart)*

Proctophyllodes (Pterodectes) gracilior Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 80-1; *Pterodectes g.*: Canestrini and Kramer, 1899, Tiererich, 7: 125.

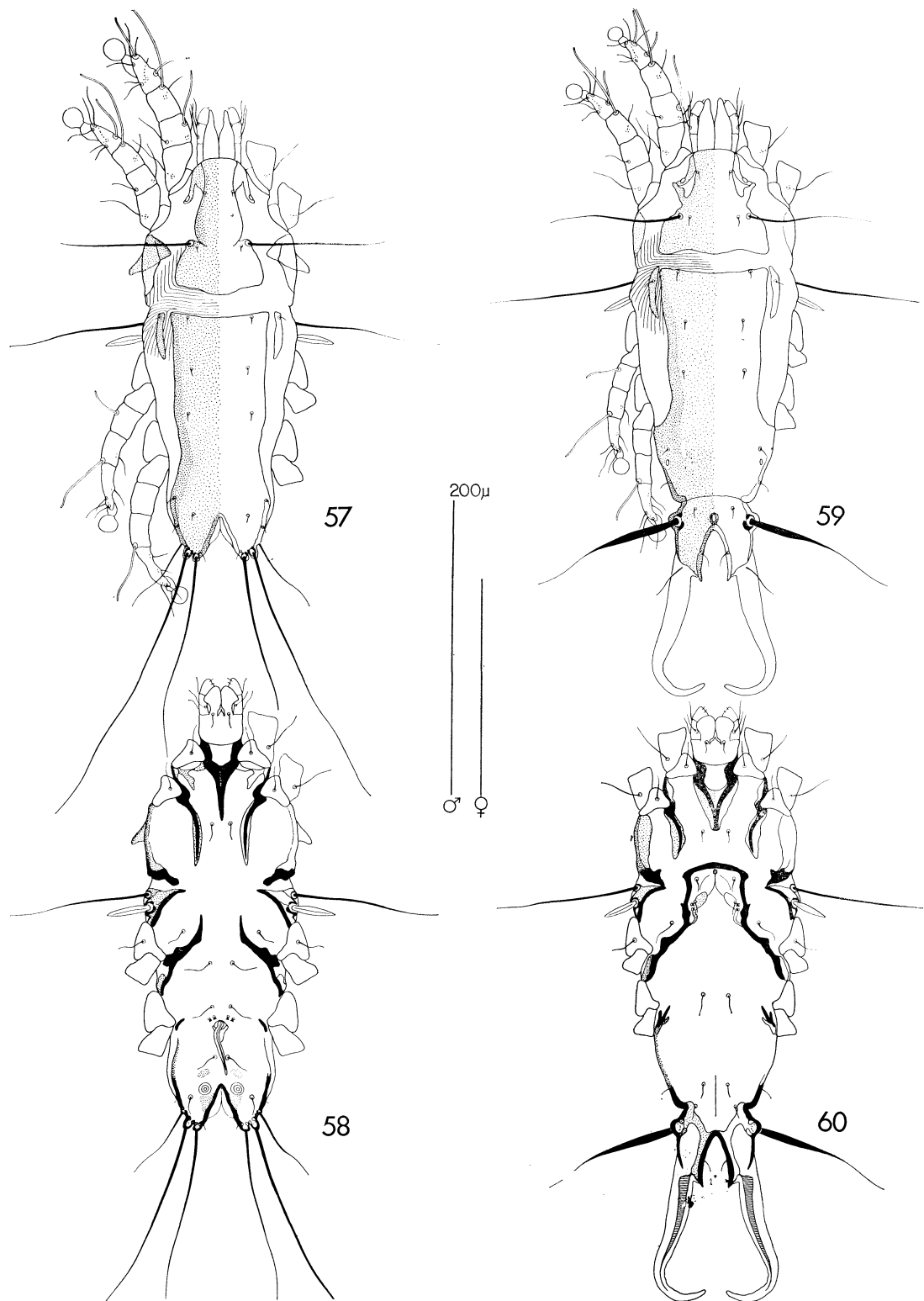
Toxerodectes, new genus

Type species: Pterodectes gladiger hastifolia Trouessart, 1899.

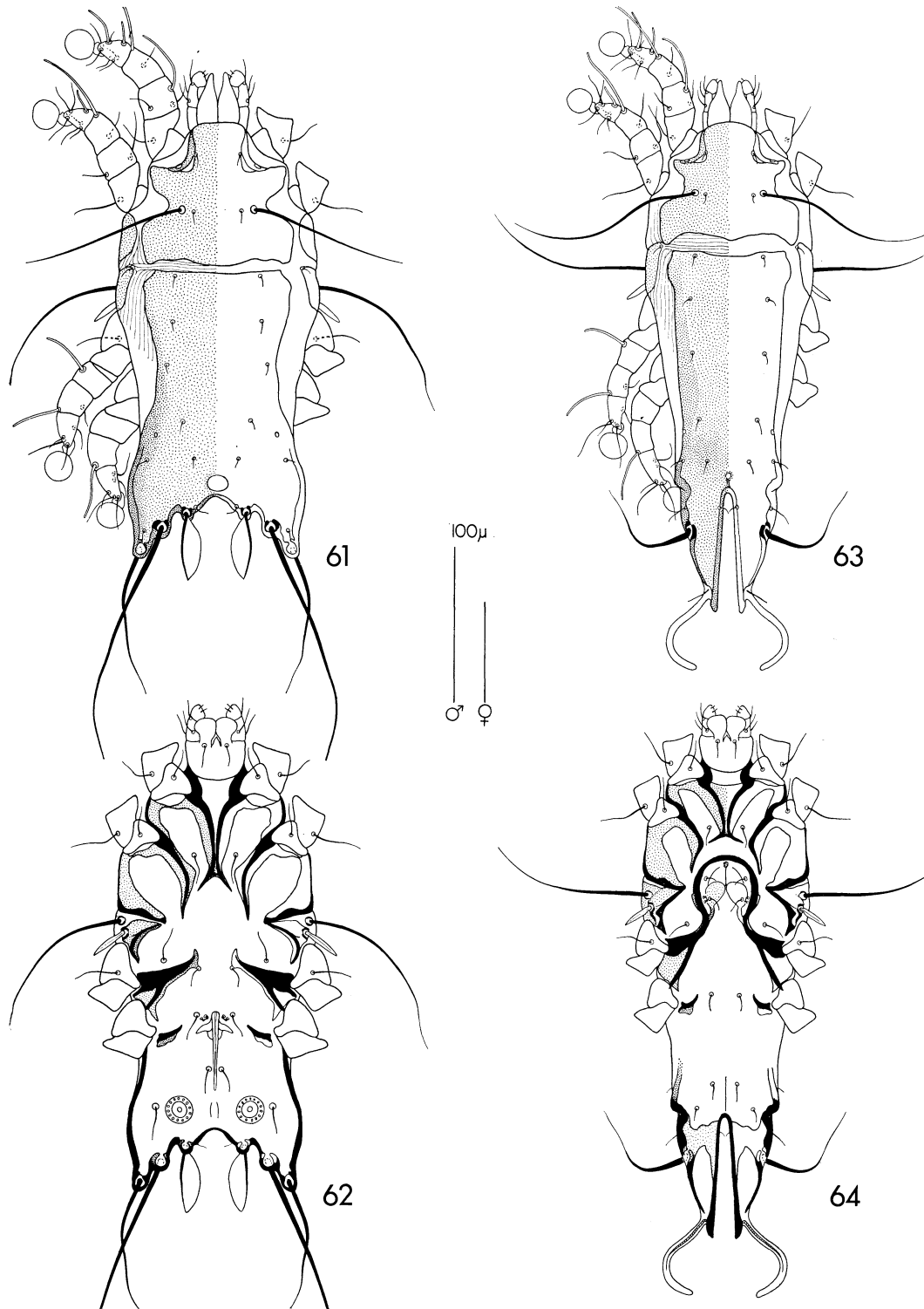
Derivation: Contraction of *toxeres*, with a bow and *Pterodectes*.

The males of this mite group are unique to the Pterodectinae—all have the opisthosomata broad with sides parallel or divergent behind legs IV. The wide terminus of each has a shallowly curved terminal "cleft" into which are directed setae *d*₅, *l*₅, *pai*, and *pae*. The females have two types of termini. One, as illustrated in figure 64 has a deep, narrow V-shaped cleft and has the origins of the terminal appendages on the lateral margins of the lobes. The second type, in which the cleft is a broad U, has the terminal appendages arising from the terminal portions of the lobes as is normally observed in the Pterodectinae and Proctophyllodinae.

The definition of the new taxon is based on three named and five new species.



Figs. 57-60. *Xynonodectes gracilior* (Trouessart): dorsal and ventral aspects of male (57, 58) and female (59, 60).



Figs. 61-64. *Toxerodectes hastifolia* (Trouessart): dorsal and ventral aspects of male (61, 62) and female (63, 64).

Male

1. Epimerites I π - or Y-shaped with postero-lateral extensions.
2. Coxal fields I-IV open, rarely fields I closed.
3. Legs I-IV subequal.
4. Hysterosomal lobes indistinct forming a broad and shallow cleft.
5. Supranal concavity distinct, round or oval in shape.
6. Metapodosomal shields absent.
7. Ventrolateral shields absent.
8. Pregenital apodeme absent.
9. Genital arch moderately developed and positioned between small epimerites IVa; one species with large pregenital arch situated posterior to large anteromesally directed epimerites IVa.
10. Genital discs approximate and positioned anterolateral to genital arch.
11. Anal shields usually absent.
12. Adanal discs dentate.
13. Setae *a* lateral to adanal discs.
14. Setae *a* and *c*₃ in trapezoidal arrangement.
15. Setae *d*₅ setiform, spiculiform, or leaflike.
16. Setae *pai* minute and setiform.
17. Solenidia ϕ of legs III-IV subequal.

Female

18. Epimerites I π - or Y-shaped with postero-lateral extensions.
19. Legs I-IV subequal.
20. Ambulacra I-IV subequal.
21. Hysterosomal terminus fused with anterior idiosoma and bearing appendages which may arise at or lateral to the apices.
22. Supranal concavity distinct, round in shape.
23. Genitocoxal apodemes short with pregenital apodeme Ω -shaped.
24. Setae *l*₅ lanceolate with terminal filament, or setiform.
25. Solenidia ϕ on legs III larger than on legs IV.

Male and Female

26. Hysterosomal setae absent: none.
27. Setae *l*₁ inserted on humeral shields.
28. Solenidia σ ₁ subequal or larger than ω ₃ on legs I.
29. Setae *wa*, *la*, and *ra* approximate on legs I-II.

30. Setae *cG* and *mG* on legs I-II setiform.
31. Solenidia σ ₁ and setae *sR* present on legs III.
32. Found exclusively on birds of the family Trochilidae (Apodiformes).

The following species are assigned to this new taxon; the asterisks denote the new combinations:

Toxerodectes gladiger (Trouessart) *

Proctophyllodes (*Pterodectes*) *gladiger* Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 82-3; *Pterodectes g.*: Canestrini and Kramer, 1899, Tierreich, 7: 127.

Toxerodectes gracillimus (Trouessart) *

Proctophyllodes (*Pterodectes*) *gracillimus* Trouessart, 1886, Bull. Soc. Etud. sci. Angers, 16: 151; *Pterodectes g.*: Canestrini and Kramer, 1899, Tierreich, 7: 128.

Toxerodectes hastifolia (Trouessart) *,
new status

Pterodectes gladiger hastifolia Trouessart, 1899, Bull. Soc. Etud. sci. Angers, 28: 37.

Syntomodectes, new genus

Type species: Proctophyllodes (*Pterodectes*) *selenurus* Trouessart, 1885.

Derivation: Contraction of *syntomos*, shortened and *Pterodectes*.

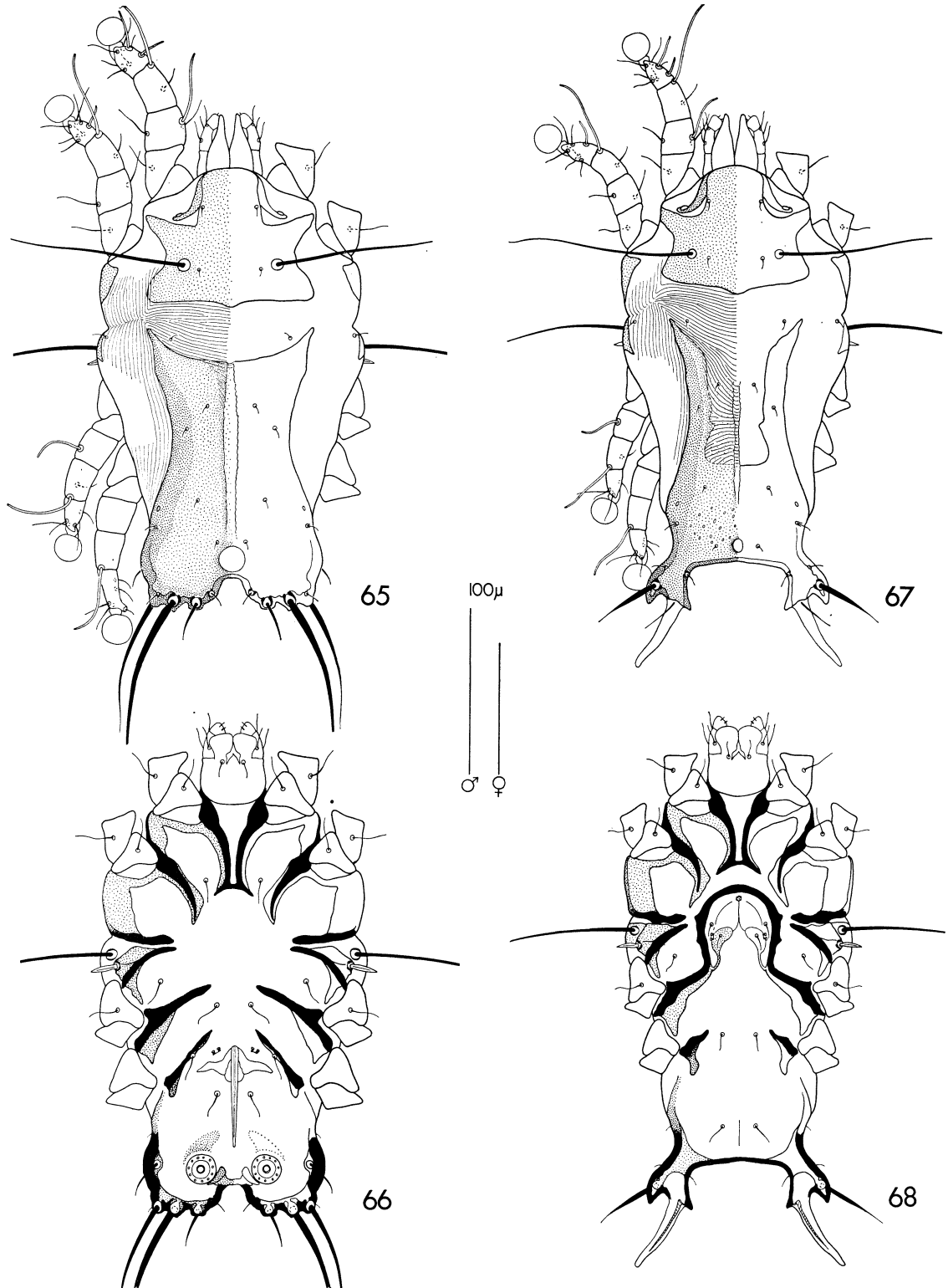
The last genus is considered to contain one new and one named species. Both contain extremely broad mites with reduced lobes in the males and females. The males have wide, weakly developed terminal lobes, small, often poorly defined terminal clefts, and anal setae so distant from the adanal discs that they are sub-lateral in position.

The female termini of both species are shortened by fusion with the anterior idiosoma and reduction of the terminal lobes. The female of the type species has uniquely modified hysterosomal lobes and a reduced hysterosomal shield; both are considered as species characters.

The definition of the genus is based on one named and one new species.

Male

1. Epimerites I π -shaped with small postero-lateral extensions.
2. Coxal fields I-IV open.
3. Legs I-IV subequal.



Figs. 65-68. *Syntomodectes selenurus* (Trouessart): dorsal and ventral aspects of male (65, 66) and female (67, 68).

4. Hysterosomal lobes indistinct and forming weakly developed U-shaped cleft.
5. Supranal concavity distinct, round or oval in shape.
6. Metapodosomal shields absent.
7. Ventrolateral shields slightly developed.
8. Pregenital apodeme absent.
9. Genital arch well developed and positioned between coxae IV; epimerites IVa well developed and directed anterior to genital arch.
10. Genital discs approximate and anterolateral to genital arch apex.
11. Anal shields independent.
12. Adanal discs dentate.
13. Setae *a* lateral to and removed from adanal discs; positioned sublaterally on venter.
14. Setae *a* and *c*₃ in trapezoidal arrangement.
15. Setae *d*₅ setiform.
16. Setae *pai* small and setiform.
17. Solenidia ϕ on legs III-IV subequal.

Female

18. Epimerites I λ -shaped with small posterolateral extensions.
19. Legs I-IV subequal.
20. Ambulacra I-IV subequal.
21. Hysterosomal terminus fused with anterior idiosoma; terminal lobes reduced and bearing appendages.
22. Supranal concavity present, oval or round in shape.
23. Genitocoxal apodeme short with pregenital apodeme Ω -shaped.
24. Setae *l*₅ lanceolate with or without a short filament.
25. Solenidia ϕ on legs III-IV subequal.

Male and Female

26. Hysterosomal setae absent: none.
27. Setae *l*₁ inserted on or off humeral shields.
28. Solenidia σ ₁ longer than ω ₃ on legs I.
29. Setae *wa*, *ra*, *la* approximate on legs I-II.
30. Setae *cG* and *mG* on legs I-II setiform.
31. Solenidia σ ₁ and setae *sR* present on legs III.
32. Found on birds of the family Trochilidae (Apodiformes).

At this time, only the type species is assigned to this new genus.

Syntomodectes selenurus (Trouessart)*

Proctophyllodes (*Pterodectes*) *selenurus* Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 84; *Pterodectes* s.: Canestrini and Kramer, 1899, Tierreich, 7: 127.

SPECIES INCORRECTLY ASSIGNED TO PTERODECTES***Proctophyllodes armatus* (Banks),
new combination**

Pterodectes armatus Banks, 1909, Proc. Entomol. Soc. Washington, 11(3): 141; *P. a.*: Banks, 1915, U.S. Dept. Agric., Office Secy., Rept. (108): 125.

***Trouessartia rotifer* (Trouessart and Neumann),
new combination**

Proctophyllodes (*Pterocolus*) *rotifer* Trouessart and Neumann, 1888, Bull. sci. France Belg., 19: 366; *Pterodectes* r.: Canestrini and Kramer, 1899, Tierreich, 7: 123.

Although Oudemans (1905d) and Radford (1953) have followed Canestrini and Kramer (1899), the species was described in the correct taxon, i.e., *Trouessartia* (= *Pterocolus*).

UNASSIGNED SPECIES OF PTERODECTES***Pterodectes bilaniatus* (Trouessart)**

Proctophyllodes (*Pterocolus*) *bilaniatus* Trouessart, 1885, Bull. Soc. Etud. sci. Angers, 14: 73; *Pterodectes* b.: Canestrini and Kramer, 1899, Tierreich, 7: 124.

This species was described from two males taken from study skins of *Protonotaria* (= *Mniotilta*) *citrea* (Boddaert), 1783 (Parulidae) from the Antilles. The mites are bizarre and without females, it is impossible to assign the species to known taxa. The situation is complicated by the other mites contained on the type slide, namely *Allodectes norneri*, a species specific to the Trochilidae. Until we have been able to re-collect Trouessart's species from either the Parulidae or Trochilidae, it is preferable to maintain it in an unassigned status.

***Pterodectes intermedius* (Trouessart)**

Proctophyllodes (*P.*) *intermedius* Trouessart, 1855, Bull. Soc. Etud. sci. Angers, 14: 78 (*non Proctophyllodes intermedius* Trouessart, 1888 in Poppe, *nom. nud.*; *non Pterodectes intermedius* Trouessart and Neumann, 1888); *Pterodectes i.* (in part): Vitzthum, 1922, Arch. Naturgesch., A, 88(5): 53-5; *P.i.*: Atyeo and Braasch, 1966, Bull. Univ. Nebraska St. Mus., 5: 316.

***Pterodectes minor* (Berla)**

Proctophyllodes minor Berla, 1959, Revta. brasil. Biol., 19(2): 203-4; *Pterodectes m.*: Atyeo and Braasch, 1966, Bull. Univ. Nebraska St. Mus., 5: 316.

Pterodectes ocelatus Berla

Pterodectes ocelatus Berla, 1960, An. Acad. Brasil. Ciências, 32(1): 102.

As explained previously (p. 80), the three species *intermedius*, *minor*, and *ocelatus* are intermediate between the two subfamilies. At a future time, their positions will be critically evaluated.

Pterodectes phylloproctus Trouessart

Proctophyllodes (Pterodectes) phylloproctus Trouessart, 1886, Bull. Soc. Etud. sci. Angers, 16: 150-1; *Pterodectes p.*: Canestrini and Kramer, 1899, Tierreich, 7: 127-8.

This species, described from Podargidae, has never been recollected, but from Trouessart's description there is little doubt that the species would be assigned to the Pterodectinae.

Pterodectes trouessarti Berlese

Pterodectes trouessarti Berlese, 1898, A. M. S., fasc. 88, no. 8.

The figure of this species has epimerites I free and divergent, however by adding a transverse connection between the ends of these structures, a typical *Trochilodectes* species would result. The drawings and descriptions are based on slides sent to Berlese by Trouessart and the host is listed as *Lanius excubitor* (Laniidae) rather than Trochilidae. However, Trouessart did considerable collecting from museum study skins and it is assumed that the host data is incorrect. To date we have been unable to collect this species from either host group.

NOMINA NUDA**Pterodectes rufus** Robin

Pterodectes rufus Robin, 1877, in Robin and Mégnin, 1877, J. Anat. Physiol., 13: 651.

Pterodectes variolosus Mégnin and Trouessart

Pterodectes variolosus Mégnin and Trouessart, 1884, Bull. Soc. Etud. sci. Angers, 12: 132.

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