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The Feather Mite Genus *Proctophyllodes* (*Sarcoptiformes: Proctophyllodidae*)

Warren T. Atyeo

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MAY 1966

Warren T. Atyeo
and
Norman L. Braasch

The Feather Mite Genus Proctophyllodes
(Sarcoptiformes: Proctophyllodidae)





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ABSTRACT

The Feather Mite Genus Proctophyllodes
(Sarcoptiformes: Proctophyllodidae)

WARREN T. ATYEO NORMAN L. BRAASCH

A systematic revision is presented for the genus *Proctophyllodes*. Data on the bionomics, morphology, and host-parasite relationships are included.

Fifty-three named and seventy new species are recognized and described. The new species and the type hosts are: *Proctophyllodes anaxiphus*, from *Dicrurus adsimilis* (Dicruridae), Union of South Africa; *P. batis*, from *Batis capensis* (Muscicapidae), Union of South Africa; *P. breviquadratus*, from *Vireo solitarius* (Vireonidae), United States; *P. calamospizae*, from *Calamospiza melanocorys* (Fringillidae), United States; *P. canadensis*, from *Sitta canadensis* (Sittidae), United States; *P. capensis*, from *Motacilla capensis* (Motacillidae), Union of South Africa; *P. capitatus*, from *Anthreptes malacensis* (Nectariniidae), Malaya; *P. cathari*, from *Catharus aurantiirostris* (Turdidae), México; *P. ceratophyllus*, from *Zosterops conspicillata* (Zosteropidae), Marianas Islands; *P. chlorurae*, from *Chlorura chlorura* (Fringillidae), United States; *P. coerebae*, from *Coereba flaveola* (Parulidae), West Indies; *P. corvinellae*, from *Corvinella melanoleuca* (Laniidae), Union of South Africa; *P. curtiglandarinus*, from *Passer melanurus* (Ploceidae), Union of South Africa; *P. curtiphyllus*, from *Malacopteron cinereum* (Timaliidae), Malaya; *P. cyanerpes*, from *Cyanerpes cyaneus* (Thraupidae), México; *P. cyclarhis*, from *Cyclarhis gujanensis* (Cyclarhidae), México; *P. dasyxiphus*, from *Oriolus larvatus* (Oriolidae), Union of South Africa; *P. dendroicae*, from *Dendroica castanea* (Parulidae), United States; *P. dicruri*, from *Dicrurus ludwigii* (Dicruridae), Mozambique; *P. diglossae*, from *Diglossa baritula* (Thraupidae), México; *P. elegans*, from *Muscicapa sundara* (Muscicapidae), Malaya; *P. empidonicis*, from *Empidonax hammondi*, (Tyrannidae), México; *P. euryurus*, from *Alauda arvensis* (Alaudidae), Netherlands; *P. gularis*, from *Icterus gularis* (Icteridae), México; *P. gymnomytaxis*, from *Gymnomystax mexicanus* (Icteridae), Venezuela; *P. habiae*, from *Habia rubica* (Thraupidae), West Indies; *P. huitzilopochtlii*, from *Lampornis clemenciae* (Trochilidae), United States; *P. hylocichlae*, from *Hylocichla guttata* (Turdidae), United States; *P. icteri*, from *Cacicus cela* (Icteridae), Brazil; *P. longiphyllus*, from *Icterus galbula* (Icteridae), United States; *P. longiquadratus*, from *Dendroica striata* (Parulidae), Newfoundland; *P. lordocaulus*, from *Caryothraustes poliogaster* (Fringillidae), México; *P. ludovicianus*, from *Lanius ludovicianus* (Laniidae), United States; *P. mcclurei*, from *Garrulax erythrocephalus* (Timalii-

dae), Malaya; *P. megathraupis*, from *Poecilothraupis lunulatus* (Thraupidae), Equator; *P. melopyrrhae*, from *Melopyrrha nigra* (Fringillidae), West Indies; *P. mexicanus*, from *Cassidix mexicanus* (Icteridae), United States; *P. minlae*, from *Minla cyanouroptera* (Timaliidae), Malaya; *P. myadestis*, from *Myadestes obscurus* (Turdidae), México; *P. neopinnatus*, from *Loxia curvirostra* (Fringillidae), México; *P. occidentalis*, from *Aphelocoma coerulescens* (Corvidae), México; *P. ornatus*, from *Euplectes axillaris* (Ploceidae), Rhodesia; *P. paramegaphyllus*, from *Junco phaeonotus* (Fringillidae), México; *P. pari*, from *Parus bicolor* (Paridae), United States; *P. parisomae*, from *Parisoma plumbeum* (Muscicapidae), French Cameroons; *P. petroniae*, from *Petronia superciliaris* (Ploceidae), Mozambique; *P. pheuctici*, from *Pheucticus melanocephalus* (Fringillidae), United States; *P. pittae*, from *Pitta brachyura* (Pittidae), Malaya; *P. polyxenus*, from *Passerella iliaca* (Fringillidae), United States; *P. psomocolacis*, from *Psomocolax oryzivorus* (Icteridae), West Indies; *P. pullizonatus*, from *Dolichonyx oryzivorus* (Icteridae), United States; *P. quadratus*, from *Vermivora peregrina* (Parulidae), United States; *P. quadrisetosus*, from *Dendroica coronata* (Parulidae), United States; *P. saltatoris*, from *Saltator coerulescens* (Fringillidae), West Indies; *P. schoenicii*, from *Emberiza schoenicii* (Fringillidae), England; *P. serini*, from *Serinus canicollis* (Fringillidae), Union of South Africa; *P. sialiae*, from *Sialia mexicana* (Turdidae), México; *P. spini*, from *Spinus tristis* (Fringillidae), United States; *P. sporophila*, from *Sporophila americana corvina* (Fringillidae), México; *P. stachyris*, from *Stachyris poliocephala* (Timaliidae), Malaya; *P. stoddardi*, from *Vireo olivaceus* (Vireonidae), United States; *P. tanagrae*, from *Tanagra musica* (Thraupidae), México; *P. tchagrae*, from *Tchagra senegala* (Laniidae), Mozambique; *P. thraupis*, from *Thraupis abbas* (Thraupidae), México; *P. tiaris*, from *Tiaris olivacea* (Fringillidae), West Indies; *P. tricetrata*, from *Spiza americana* (Fringillidae), United States; *P. troglodytis*, from *Thryomanes bewickii* (Troglodytidae), United States; *P. vassilevi*, from *Acrocephalus palustris* (Sylviidae), Bulgaria; *P. vesca*, from *Sialia currucoides* (Turdidae), United States; and *P. xenopsis*, from *Xenops minutus* (Furnariidae), México.

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*Atyeo*¹
and
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The Feather Mite Genus Proctophyllodes
(Sarcoptiformes: Proctophyllodidae)³

INTRODUCTION

The genus *Proctophyllodes* is one of numerous genera of feather mites found as parasites on the feathers of birds. To date, these genera have been virtually ignored by acarologists in North America. The purpose of this study has been to provide a foundation for the initiation and continuance of feather mite studies in North America.

The species of *Proctophyllodes* cited in this study represent parasitic associations involving 350 species of birds, primarily members of Passeriformes. The recognized mite species have been derived from over 8,000 individual samples, representing the examination of at least 40,000 birds or bird skins. The immediately apparent disparity between bird species represented and total individual representations reflects the limited infestation which marks certain bird species. Infestations by all sarcoptiform feather mites approach

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³ The North American species are included in the Doctor of Philosophy dissertation of the junior author.

only about 20%, consequently representation by *Proctophyllodes* alone is minimal.

The majority of the species included herein seemingly have distributions primarily centered in Africa, Malaya, or North America. These areas currently represent the regions from which the major collections of feather mites have been available for study, consequently cited distributions, at best, are incomplete. Subsequent collections involving samples taken from the presently included species and new host species should indicate that many species of *Proctophyllodes* are cosmopolitan.

COLLECTION AND PREPARATION OF MATERIAL

The specimens obtained for study were acquired by field collections, loans, and examination of bird study skins in museums. The latter source has proven to be a particularly satisfactory resource.

Initially a small pilot study, concentrating on the acquisition of diverse bird species, was conducted during the summer of 1959 encompassing the area of eastern and south-central Nebraska. Early results of this study confirmed the feasibility of further study, consequently field collections were continued and expanded to include the southeastern portion of the United States during the summer of 1960; additional collecting was maintained also in Nebraska and adjoining states from 1961–1964.

Collected birds were examined with a dissecting microscope. Areas particularly susceptible to mite infestation and readily discernible included the tail feathers, wing feathers, and dissected nasal passages. The birds were washed in water with a mild detergent; decanted washings were further examined for parasitic mites. All samples were preserved in 70% ethyl alcohol.

A more efficient method of collecting was the examination of bird study skins in museum collections. In spite of the handling associated with the preparation of bird skins, feather mites, particularly those of the family Proctophyllodidae, remain relatively intact. Whereas Mallophaga and blood-feeding mites are subject to considerable movement on both the living and dead birds, feather mites remain comparatively inactive and normally may be observed in compact clusters. This inactivity considerably reduces potential contamination when prepared skins are stored in museum trays. With the aid of a dissecting microscope, the mites could be seen ranked along the rachis or on the remiges; they were removed on

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the points of jewelers forceps or dissecting needles and transferred to vials containing 70% ethyl alcohol.

Prior to mounting on glass microscope slides, specimens were rehydrated and cleared in lactophenol. Heating specimens in lactophenol at 200° F. to 250° F. for approximately five to ten minutes quickly reduces the normal opacity of the mites and enhances the orientation of appendages during the mounting process.

All specimens were mounted in Hoyer's mounting medium. Although this solution possesses clearing properties, the well-developed integument of the mites precludes excessive clearing, even when the mites are initially treated with a mild caustic. Freshly mounted specimens were placed in a drying oven (50° C.) for five to ten days and then the cover slips were ringed with a commercial ringing compound. This procedure provided excellent slides with a minimum of deterioration.

Phase-contrast microscopes were used for the study. Measurements were made with the aid of an ocular micrometer, and drawings were made with a microprojector or a Wild microscope with drawing attachment.

MORPHOLOGY

In contrast to the bizarre forms extant in the feather mite genera, the body conformation of *Proctophyllodes* is relatively simple. Males (figs. 1, 2) tend to have an oval conformation with the total aspect occasionally modified by the size and shape of terminal lamellae. Comparatively, the female configuration (figs. 3, 4) is more elongate with the longitudinal aspect enhanced by the presence of hysterosomal lobes which usually bear ensiform appendages. Rarely, the adult female may have the hysterosomal lobes and/or ensiform appendages reduced or absent (see figs. 145-148, 248).

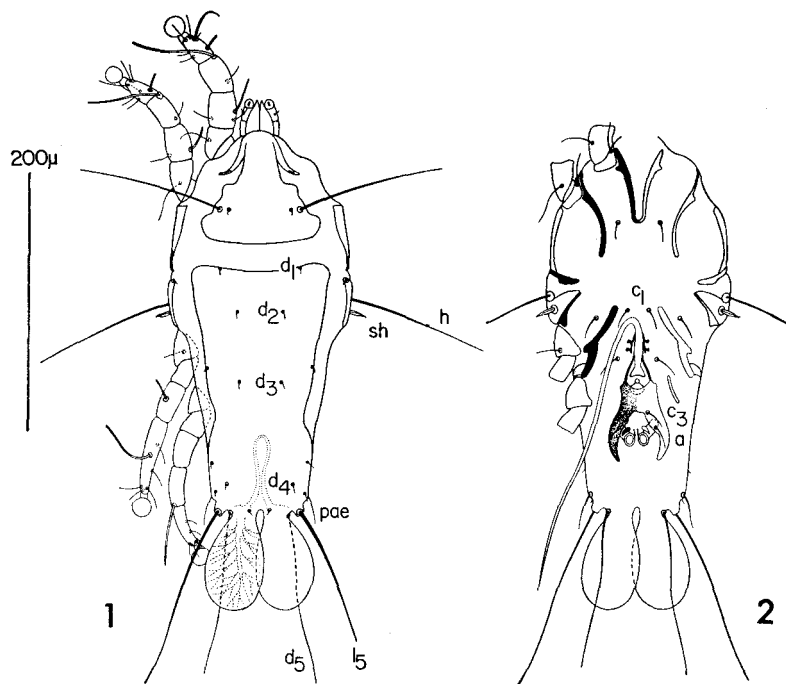
GNATHOSOMA¹

The gnathosoma (figs. 5-7) consists of the subcapitulum chelicerae, and palpi. Oriented to the longitudinal axis of the body, each chelicera is laterally compressed and consists of a shaft and two digits. The fixed digit (*fid.*), distinct from the cheliceral shaft, is short and fitted with a subterminal bifurcate tooth; the strongly

¹The morphology and illustrations of the gnathosoma have been developed by Donald E. Johnston (Institute of Acarology, Wooster, Ohio) from specimens of *Proctophyllodes quadrisetosus*, new species.

curved, movable digit (*m.d.*), operating in a vertical plane by levator (*l. ptr.*) and depressor (*d. ptr.*) muscles, forms a pincer with the fixed digit and bears a single, simple tooth. A paraxial cheliceral hood (*chhd*) extends anteriorly to the level of the cheliceral teeth. An elongate paraxial seta (*chx*) and a paraxial spur (*spur*) arise posterior to the base of the fixed digit. Ventrally, a distinct apophysis (*apo*) is present.

The subcapitulum is short, broad, and bears a pattern of transverse ridges on the ventral surface. A conspicuous feature is the presence of elaborately developed pseudorutella (*psr*) and pseudorutellar processes (*psr p*). Each of the latter processes are fan-shaped with transverse ridges on the ventral surface and a multi-digitate hyaline process on the dorsal surface. Ventrally positioned, the hypostome (*hyp*) is reduced to a simple, triangular lobe. The spade-shaped labrum (*lr*) is smooth. Associated with the subcapitulum are the supracoxal setae (*elo p*) and the subcapitular setae

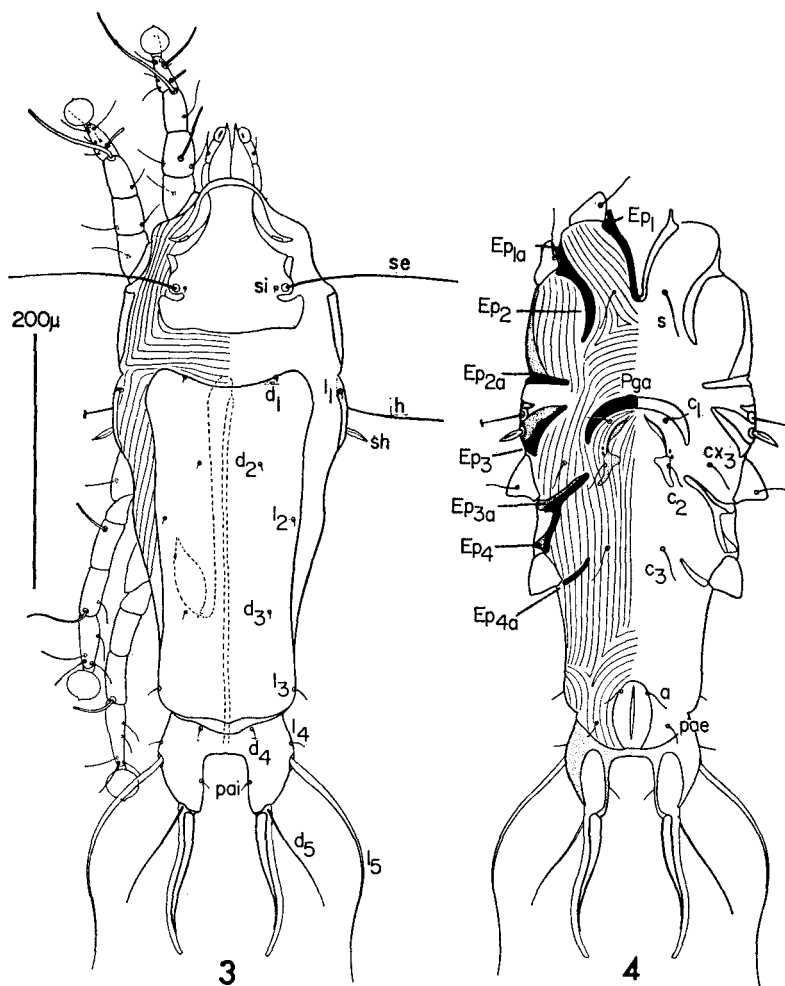


FIGS. 1-2. *Proctophyllodes glandarinus*, dorsal and ventral aspects of the male. *a*, anal setae; *d1-5*, dorsal setae; *h*, humeral setae; *l1-5*, lateral setae; *pae*, external postanal setae; *sh*, subhumeral setae; *c1-3*, central setae.

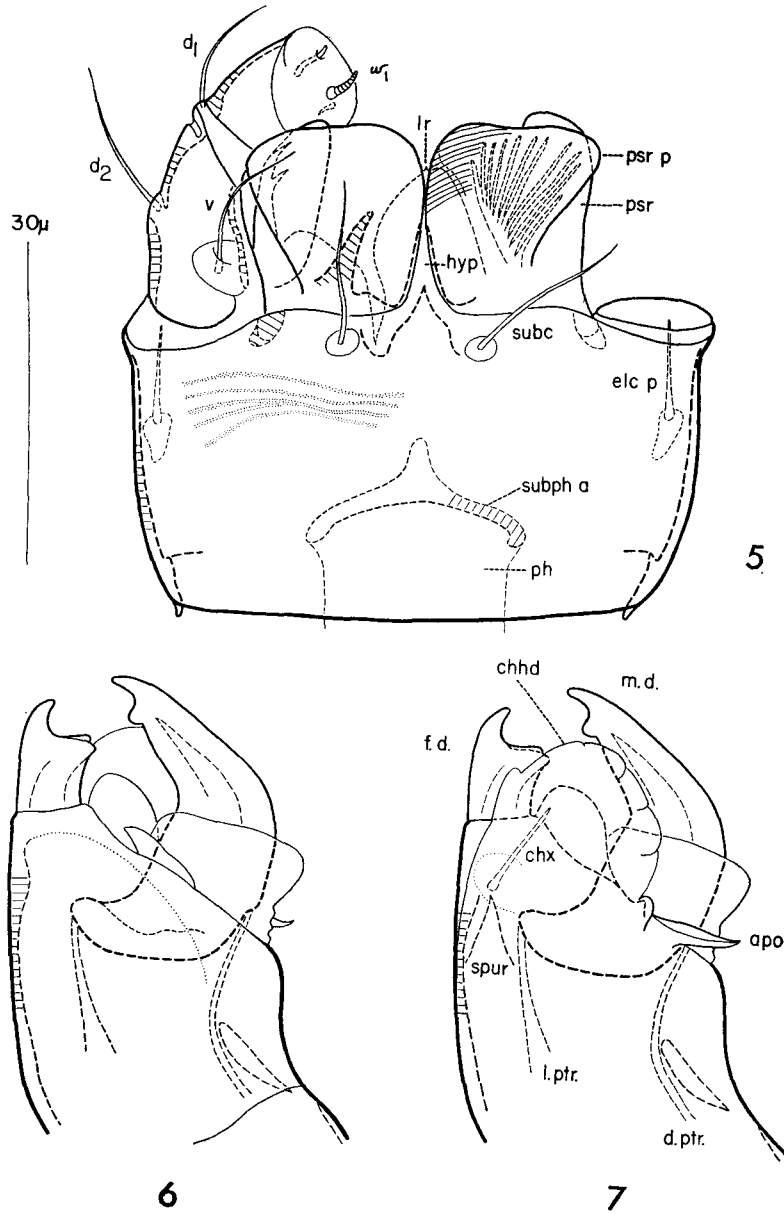
The Feather Mite Genus *Proctophyllodes*

(*subc*). The subpharyngeal apodeme (*subph a*) and pharynx (*ph*) are basal.

Each palpus consists of two podomeres bearing three setae and one solenidion. The setae—*d*₁, *d*₂, and *v*—are simple; the solenidion ω_1 is short and blunt.



FIGS. 3-4. *Proctophyllodes glandarinus*, dorsal and ventral aspects of the female. *a*, anal setae; *s*, *cx*₃, coxal setae; *d*₁₋₅, dorsal setae; *Ep*_{1-4a}, epimerites; *h*, humeral setae; *l*₁₋₅, lateral setae; *pae*, *pai*, external and internal postanal setae; *Pga*, pregenital apodeme; *se*, *si*, external and internal scapular setae; *sh*, subhumeral setae; *Sp*, spermatheca; *c*₁₋₃, central setae.



FIGS. 5-7. Gnathosoma of *Proctophyllodes quadrisetosus*, n. sp., subcapitulum (5), antiaxial aspect of chelicera (6), paraxial aspect of chelicera (7). See text, p. 3, for explanation of figures.

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IDIOSOMA

Dorsal Propodosoma. Constituting the anterior portion of the idiosoma and supporting legs I and II, the propodosoma has portions of the cuticle hardened to form three distinct shields, which constitute the dorsal propodosomal and lateral scapular shields. The propodosomal shield (figs. 8–12) is large and trapezoidal with varying minor configurations. Interspecific variations in shape tend to be maintained by both the male and female within a given species.

Projecting posterolaterally from each anterolateral margin of the propodosomal shield, a thin sclerotized portion supports between itself and the shield a small, clear area which positionally arises immediately posterior to trochanter I. Although devoid of both Grandjean's organ and the supracoxal seta, this area is the opening of the coxal gland.

Modifications of the propodosomal shield appear as variations in the lateral and posterior margins. In the majority of species, the lateral margins lack marked indentations (termed *entire*, fig. 12), however deviations occur as progressive indentations at the level of the scapular setae (*se*, *si*). The incised margin may successively underscore the scapular setae (fig. 11), include the external scapular setae (*se*) but exclude the internal scapular setae (*si*) (fig. 10), bear the internal scapular setae on the incision border (fig. 9), or include both pairs of scapular setae (fig. 8). The posterior margin of the propodosomal shield varies considerably within a species, consequently little diagnostic value is effected.

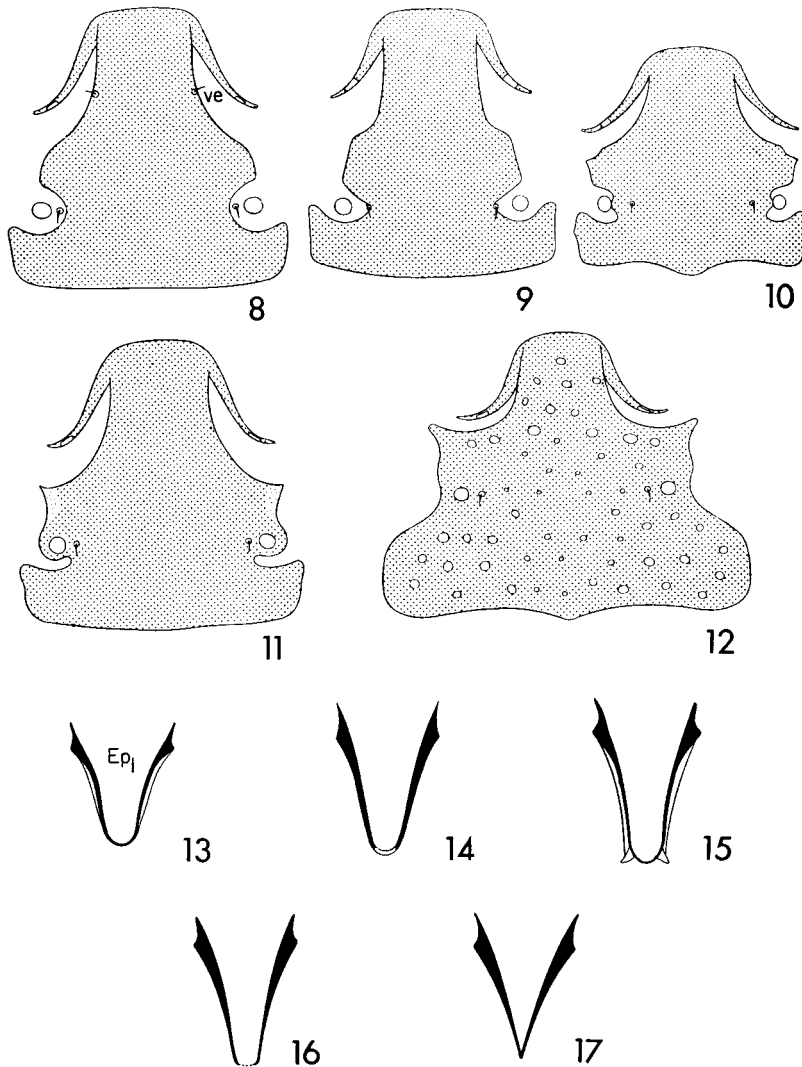
The propodosomal shield may have lacunae varying in size and shape from minute pits to large circles or ovals (fig. 12). A species may exhibit conditions ranging from profuse lacunae to one devoid of lacunae. Finally, the shield may be expanded laterally behind legs II to almost touch the scapular shields (compare figs. 8–11 with fig. 12).

Immediately posterior to legs II, the lateral propodosoma supports well-developed scapular shields (figs. 2, 4). Each shield extends ventrally to curve around the propodosomal margin, connecting with the posterior remnant of epimerite IIa.

Dorsal Hysterosoma. Although the posterior morphologies of the hysterosoma vary considerably between the male and female, the anterior aspects are uniform (figs. 1–4). The anterolateral margin of the hysterosoma bears humeral shields with the associated humeral setae (*h*) and subhumeral setae (*sh*).

The dorsal hysterosomal shield constitutes the most prominent

shield in either males or females, but it terminally varies depending upon the sex. Shields of males are oblong, taper slightly, and exhibit truncated posterior margins. Located on the midline and projecting anteriorly from the posterior margin, a shallow depression



FIGS. 8-12. Propodosomal shields: hypothetical with external vertical setae (8), *Proctophyllodes huitzilopochtlii*, n. sp. (9), *P. parisomae*, n. sp. (10), *P. glandarinus*, male (11), *P. thraupis*, n. sp. (12).

FIGS. 13-17. Connections of epimerites I: strong (13), broad, weak (14), weak, also illustrates surface fields and lateral extensions (15), barely discernible (16), V-shaped (17).

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is designated the *supranal concavity*; this concavity characteristically bears well-defined margins and is rounded anteriorly. In the males of several related species of *Proctophyllodes* (figs. 101, 103, 105, 107, 109), small, triangular apodemes are located posterolaterally; these are internal extensions of the hysterosomal shield and are termed *ventrolateral extensions*. Lacunae may or may not be present on the hysterosomal shield.

Additional dissimilarity of the posterior hysterosoma in males and females is demonstrated respectively by the lamellae and a distinctive lobar region. Confluent with the dorsal hysterosomal shield, the often foliaceous lamellae confer a bilobed appearance. Considering the numerous variations in the shape of the lamellae, the application of distinct lamellar types is arbitrary, however the lamellae may be considered as oval, oblong, spatulate, triangular, linear, and flagelliform. Oval lamellae (figs. 87, 97) are essentially egg-shaped with the longitudinal diameter approximating the transverse diameter. When the longitudinal diameter distinctly exceeds the transverse diameter, lamellae are designated as oblong (figs. 34, 180). Several species bear spatulate lamellae (fig. 63) consisting of round, broad apices and narrowed bases. Short, broad lamellae with the apex modified to form a point are considered as triangular lamellae (fig. 221). The converse condition of distinctively long, narrow lamellae is represented by the types designated as linear (fig. 196) and flagelliform (fig. 46); the latter form differs from the linear by virtue of excessive length and gradual tapering to a blunted point.

An additional lamellar feature is a distinct patterning comparable to the veins within a leaf. Venation involves three patterns: pinnate, palmate, and radial. Pinnately veined lamellae (figs. 32, 97) possess a single, strong median vein, with lateral veins like the barbs of a feather. The rarer palmately veined lamellae (figs. 55, 128) possess several strong veins which arise at the lamellar base and spread through the lamellae like fingers from the palm of the hand. Occurring in only one species, the radial venation pattern (fig. 260) consists of numerous veins arising from a common base much like the spokes of a wheel.

The female hysterosoma, with minor exceptions, consists of a large anterior shield and a terminus exhibiting a cleft which confers a bilobate appearance; *Proctophyllodes glandarinus* (Koch) (figs. 3, 4) serves as an adequate model for the typical lobar morphology. The lobar region is heavily sclerotized dorsally and laterally; this sclerotization continues ventrally as a transverse band.

The ventral band may extend anteriorly to articulate or fuse with the anterior hysterosoma. Dorsally the lobar region usually appears as a distinct separation from the remainder of the hysterosoma; the line of separation is marked by a transverse conjunctiva. In a few species, the conjunctiva is absent in which case a sclerotized continuum is formed (fig. 43). Ordinarily when a continuum is present, a round or oval supranal concavity is also present (fig. 43).

Each hysterosomal lobe typically bears a terminal ensiform appendage which intensifies the bilobate appearance. Each appendage is supported by an internal sclerotized rod extending approximately two-thirds of the length. Species such as *Proctophyllodes microcaulus* Gaud and *P. truncatus* (Robin) characteristically have polymorphic females which have reduced hysterosomal lobes with or without terminal appendages (see fig. 248 and accompanying discussion).

Epimera. Structurally comparable in males and females, a series of sclerotized epimera, which indicate the incorporation of the coxae into the ventral surface, are particularly conspicuous on the idiosomal venter. Collectively the combined epimeral components form the coxosternal skeleton which serves for the attachment of muscles.

Hypothetically, each epimeron consists of four parts (epimerites): dorsal arch, anterior epimerite (Ep), posterior epimerite (Epa), and a mesal juncture of the latter two elements. The dorsal arch connects the anterior and posterior epimerites laterally at the trochanteral articulations; the anterior and posterior epimerites extend mesad from the trochanteral articulations and are joined near the meson by the fourth or mesal element. The area delimited by the hypothetical epimeron constitutes a closed coxal field.

In most mite groups the coxae do not remain independent, but tend to form anterior and posterior groups with the coalescence of the adjacent epimerites between coxae I-II and III-IV. For example, the posterior epimerites of coxae I (Ep1a) coalesce with the anterior epimerites of coxae II (Ep2) forming a common structure within the anterior coxal group, except for small lateral portions which articulate with their respective trochanters. Concomitantly, the coxal fields of epimera II enlarge posteriorly to include the remainder of the ventral propodosoma, and coxae III and IV form a rigid coxosternal framework in the paragenital region.

In *Proctophyllodes*, the tendency is towards a reduction in the epimeral elements. The anterior epimerites of legs I (Ep1), curve mesad from the anterior articulations of trochanters I and join on

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the midline to form a U-shaped unit. The anastomosis between the epimerites varies in thickness, thus this connection may appear to be broad (figs. 13, 14) or barely discernible (figs. 15, 16). Variations of the predominant U-shape consist of appended lateral extensions (fig. 15) and, rarely, a V-shaped, rather than a U-shaped, connection between epimerites I. This latter feature is unusual in the genus *Proctophyllodes*, but common in other feather mite genera.

Epimerites II (= Ep1a + Ep2) curve mesad and end freely; the posterior elements, Ep2a, fuse with the scapular shields. The anterior epimerites of legs III (Ep3) are associated with the humeral shields, while the posterior elements of epimera III and epimera IV form structures with an anteromedial axis. Depending upon the species, the various epimerites may support small surface fields which consist of lightly sclerotized cuticular expansions of varying configurations.

Male Genital Region. The male genitalia and their relationships to various components of the ventral hysterosoma supply important criteria for species differentiation. The most obvious portions are the heavily sclerotized genital arch, the genital organ, and the associated shield(s).

The crescentic genital arch is confluent with the base of the genital sheath. Species in which the genital organ is directed anteriorly before reflexing posteriorly may have a membranous hood formed by the base of the sheath (e.g., *Proctophyllodes glandarinus* and *P. anthi* Vitzthum). In the *P. pinnatus* complex, the base of the sheath is sclerotized and appears as a ringlike apodeme superimposed over the apex of the genital arch. Lateral to the arch are two pairs of atrophied genital discs borne on small sclerotizations. These sclerotizations may be joined or separated.

The seminal vesicle, positioned between the arms of the genital arch, connects with the penis via a short vas deferens. The tubular penis is positioned in or on the genital sheath, and the combined structure, the genital organ, varies considerably in length and shape. The terminus of the sheath may appear entire (fig. 1), bifid (fig. 73) or trifid (fig. 71). A pregenital apodeme may be present either as a small sclerotized bar or maximally as a horseshoe-shaped structure connecting the genital discs.

The region between the genital arch and the anus, topographically the opisthogastric region, has two pairs of setae inserted on or near the variously formed shields. These setae, the third pair of central setae (c_3) and the adanal setae (a), for convenience are termed respectively, the anterior and posterior opisthogastric setae;

the shields are referred to as the opisthogastric shields. Since there is considerable diversity in the conformation of the shields, basic shield shapes are not defined. Reference is made only to divided (fig. 67), fragmented (fig. 61), and joined (fig. 32) opisthogastric shields.

Specialized copulatory structures, the adanal discs, arise lateral to the anus. The disc proper is the distal aspect of a tubular structure of which the longitudinal axis ordinarily is greater than the transverse axis. The distal periphery is involuted thus forming a distinct, sclerotized lip (corona of authors) which may possess numerous coglike teeth. Well provided with muscles, the adanal discs function as adhesive organs for holding the tritonymph female. The adanal discs fit over a pair of fleshy protuberances which are dorsoposterior on the hysterosoma (fig. 28) of the tritonymph; detailed musculature of the discs is presented by Dubinin (1951). Occasionally observed in freshly prepared material, an expanded membrane surrounds the adanal discs (see Fritsch, 1961); presumably the membrane, in conjunction with the discs, acts as an adhesive organ when the male attaches to the adult female.

In a few species there are a pair of structures associated with the adanal discs which may be glandular in function. Termed the adanal accessory glands, they are either heavily sclerotized and reniform in shape (fig. 32) or weakly sclerotized, reticulate, and triangular in shape (fig. 115). A distinct connection has been observed only between the reniform type and the adanal discs.

Female Genital Region. Arising approximately at the level of the subhumeral setae, the anterior limit of the genital area is circumscribed by a well-developed crescentic sclerite—the pregenital apodeme (*PgA*). Posterior to the pregenital apodeme, the genital aperture, shaped like an inverted V, is covered by a pair of integumental folds partially supported by narrow sclerites which expand posteriorly to form the latigynial apodemes. The anterior limit of the genital opening is marked by a small apodeme. Two pairs of atrophied genital discs are positioned on each side of the genital opening.

The spermathecae and associated ducts of *Proctophyllodes* females lack the intricate modifications so often found in other genera of feather mites. The terminal, external opening arises at the center of the terminal cleft, leads into a bursa copulatrix, which is continuous with the longest duct, the primary spermathecal duct. Anteriorly the primary duct connects a small, rigid vulva which merges with a voluminous and membranous suspensory follicle.

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Two small secondary ducts connect the vulva or the base of the suspensory follicle with the paired ovaries. Because of preparatory technique, the visible portions of the secondary spermathecal ducts are limited to the sections connected to the vulva; connections to the ovaries are necessarily obliterated. In other genera, a small seminal receptacle is continuous with the vulva and is surrounded by the suspensory follicle; occasionally, small structures, presumably functioning as accessory glands, flank the seminal receptacle. It is assumed that a seminal receptacle and possibly the accessory glands are present in *Proctophyllodes*, but that they, as well as the distal portions of the secondary ducts, are destroyed during preparation.

There are two basic forms of spermathecae within the genus *Proctophyllodes*. One, occurring in *P. scolopacinus* (Koch) and *P. corvorum* Vitzthum, has the primary duct short, broad and thick-walled in its entirety. The visible portions of the secondary ducts are longer than in other species (fig. 229). The second and most common form is illustrated in *P. pinnatus* (Nitzsch) and *P. glandarinus*. In both species, the vulva, secondary ducts, and suspensory follicle are the same, but the primary duct length serves to correlate males and females of a species. In *P. pinnatus* (fig. 166), the primary duct is short; in *P. glandarinus* (fig. 3), the duct is long, extends to legs III and curves caudad for about $\frac{2}{3}$ its length; the anteriorly directed canal is wide and thin-walled; the posteriorly directed portion has a small diameter and a thicker wall. The males of *P. pinnatus* and *P. glandarinus* have respectively short and long genital organs, the length of each correlates with the length of the primary spermathecal ducts. The same is true for other species—the length of the primary spermathecal duct is positively correlated with the length of the male genital organ.

Two specialized forms of spermathecae are found in *Proctophyllodes weigoldi* Vitzthum, and *P. pittae*, new species. In the former species the primary duct forms a voluminous, membranous tube, the surface of which is marked by small, irregularly positioned, black markings (dots, granulations). The latter species (see p. 221) is the only species in which the male genital organ is not received internally by the female. The caudal portion of the primary spermathecal duct is prolonged externally (as in *Trouessartia*) and the male genital organ is modified as a small clasping organ.

IDIOSOMAL CHAETOTAXY IN *Proctophyllodes*

Dorsal Idiosoma. The majority of the dorsal idiosomal setae are microsetae and are thus often difficult to observe. On the propod-

osoma, the external scapular setae (*se*) are long and conspicuous, the internal scapular setae are small and approximate to the external setae. The internal vertical setae (*vi*) are absent, but the external vertical setae (*ve*) may be present in a species or in one sex of a species. These setae are minute and are inserted at the extreme edge of the propodosomal shield or immediately off this edge. In the latter case, which is most common, the setae lie parallel to the integumental striae and are impossible to observe. Therefore, in the taxonomic section of this study, many species descriptions contain the statement; "external vertical setae present (?)."

The subhumeral setae (*sh*), inserted posteroventral to the long humeral setae (*h*), are classified as lanceolate, spiculiform, and setiform. The latter two setal forms are well defined structurally, but the lanceolate seta displays numerous modifications depending upon the length, width, and condition of the terminus. Widely distributed throughout *Proctophyllodes*, as well as other genera within Proctophyllodidae, the lanceolate form, with its subtle variations in the basic dagger or spear shape, necessarily serves as a composite form. Spiculiform setae assume the form of a slender, needlelike process, while the setiform shape is long and threadlike.

The five rows of dorsohysterosomal setae are characteristically positioned in the males and in the females. In both sexes, the three anterior rows are similar: d_1 occurs at the anterior edge of the anterior hysterosomal shield, l_1 occurs on the anteromesal edge of the humeral shield (or immediately off the shield), and d_2-l_2 and d_3-l_3 form two strongly curved rows. In the male, setae d_4-l_4 form a shallowly curved row of setae near the posterior margin of the idiosoma and setae d_5-l_5 constitute the two large terminal setae positioned lateral to the origins of the lamellae.

In the female, setae d_4 are usually inserted in the conjunctiva connecting the anterior hysterosomal shield to the lobar region; rarely are they inserted on the posterior margin of the large hysterosomal shield or on the anterior margin of the lobar shield. Setae l_4 are microsetae inserted anterior to the large posterolateral setae (l_5) and can be observed as small setae on the extreme lateral margins of the lobar region. Setae d_5 are inserted at the base of the ensiform terminal appendages (if present) and setae l_5 are usually expanded, bladelike setae inserted on the posterolateral margin of the terminal lobes. In species in which the lobar region is reduced or absent, there is a tendency for setae d_5 and l_5 to be long and setiform. In species in which the lobar region may be variable in development, there is a negative correlation between the develop-

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ment of the lobes and the length of the last pair of dorsal setae.

The postanal setae are differently positioned in the two sexes. In the male, the internal postanal setae are inserted at the mesal origins of the terminal lamellae and the external postanal setae are inserted immediately ventral to setae l_4 . It should be noted that within this genus, setae l_4 are microsetae while the postanal external setae are well developed. In the female, the internal postanal setae are positioned on the internal margins of the terminal cleft formed by the lobes, or if the lobes are absent, mesal to setae d_5 . The postanal external setae are inserted ventrally on a line connecting the terminal portion of the anal orifice and the expanded setae, l_5 .

Ventral Idiosoma. Two pairs of setae are constant in position in both the males and females: the coxal setae, s and cx_3 . In the males, the four remaining pairs of setae form two irregular vertical rows. Seta c_1 is positioned near the mesal termination of the common apodeme between legs III and IV. Seta c_2 is positioned anteromesal to the posterior apodeme of leg IV or near the genital discs. The third and fourth pairs of setae, c_3 and a , are posterior to the genitalia and are usually associated with the sclerotized shield(s) of this region. Topographically the area between the genital structures and the anus is the opisthogastric region; the setae of this area are termed the anterior and posterior opisthogastric setae which are respectively, c_3 and a . The anterior opisthogastric setae (c_3) are usually more approximate than the posterior setae (a), thus a trapezoidal arrangement of setae is formed. In a few groups, the setae of both rows are separated by approximately the same distance, thus a square or a rectangular arrangement results. Rarely the setae are arranged in a shallowly curving row.

In females, the anterior two pairs of central setae (c_1 and c_2) are near the genital opening immediately posterior to the pre-genital apodeme. The third pair (c_3) are mesal at approximately the level of legs IV, and the adanal setae (a) flank the anus anteriorly.

LEGS

Each leg is comprised of seven segments: coxa, trochanter, femur, genu, tibia, tarsus, and pretarsus. The coxae are incorporated into the ventral surface of the body forming partially sclerotized epimera; at the distal end of the leg, the pretarsus is expanded to form an ovoid ambulacrum.

The chaetotaxy of the legs is remarkably uniform throughout

the genus *Proctophyllodes*, but intergeneric variations suggest that leg chaetotaxy will be a taxonomic criterion in defining other groups of the Proctophyllodidae. The nomenclature for setal designations follow Atyeo and Gaud (1966) which is a modification of Grandjean (1939). Figures 18–21 position and name the setae of the adult; additional explanation is unnecessary for this life stage.

The larva and protonymph lack the complete complement of setae present in the tritonymph and adult. The following table indicates the setae and solenidia present on each leg segment. Each set of numbers, separated by periods, represents from left to right: tarsus, tibia, genu, femur, and trochanter. The numbers in parentheses on legs IV indicate that seta *r* is absent in a few species, thus the typical setal number is reduced by one.

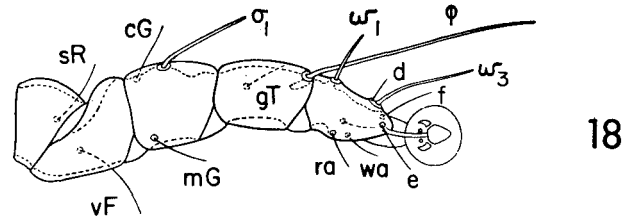
<i>Tactile Setae</i>				
	Leg I	Leg II	Leg III	Leg IV
Larva	6.1.2.1.0	6.1.2.1.0	4.1.0.0.0	
Protonymph	6.1.2.1.0	6.1.2.1.0	4.1.0.0.0	3(2).0.0.0.0
Tritonymph	6.1.2.1.1	6.1.2.1.1	4.1.0.0.1	5(4).0.0.0.0
Adult	6.1.2.1.1	6.1.2.1.1	4.1.0.0.1	5(4).0.0.0.0

<i>Solenidia</i>				
	Leg I	Leg II	Leg III	Leg IV
Larva	1.1.1.0.0	1.1.0.0.0	0.1.1.0.0	
Protonymph	1.1.1.0.0	1.1.0.0.0	0.1.1.0.0	0.0.0.0.0
Tritonymph	2.1.1.0.0	1.1.0.0.0	0.1.1.0.0	0.1.0.0.0
Adult	2.1.1.0.0	1.1.0.0.0	0.1.1.0.0	0.1.0.0.0

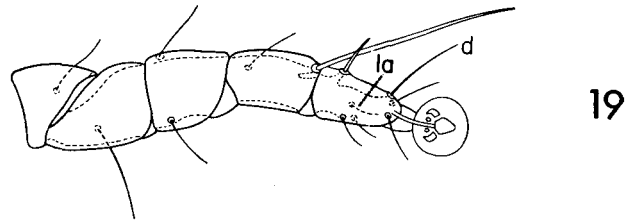
As indicated, the adult and tritonymph bear the same complement of setae and solenidia; legs I-III of the larva and protonymph correspondingly lack the same structures, specifically: seta *sR* on all trochanters and ω_3 on tarsus I. In the larva and protonymph, tarsi I and II are similar inasmuch as seta *d* is very long. Legs IV of the protonymph have only three setae: *d*, *r*, and *w*.

The simple pretarsus generally characteristic of the Acaridiae is relatively complex in the Analgoidea, being modified to form a bell-like or ovoid ambulacrum (figs. 22, 23). According to Evans *et al* (1961), the ambulacrum is movable by a single levator tendon and a pair of depressor tendons originating from the tarsus and tibia respectively and inserting on a basilar piece (remnant of primitive apotele). In turn this structure is articulated with two lateral condylophores of the tarsus. In *Proctophyllodes* the apotele and claws are represented by a compact sclerotized region bearing

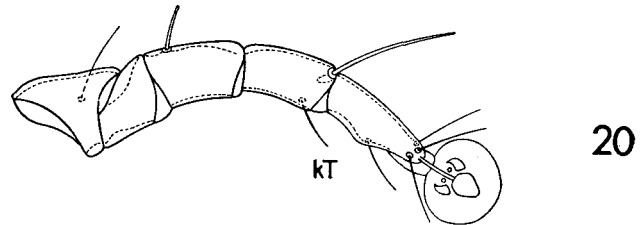
The Feather Mite Genus *Proctophyllodes*



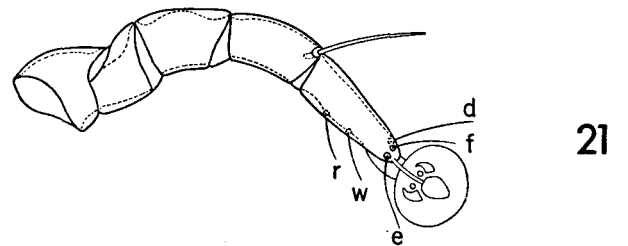
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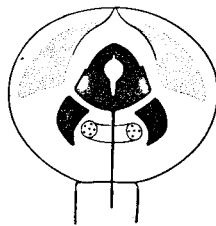
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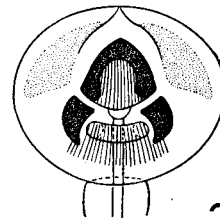
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21



22



23

FIGS. 18-23. Antiaxial (postaxial) aspect of legs I-IV (18-21) and dorsal (22) and ventral (23) aspects of ambulacrum. See text, p. 16 for explanation of figures.

medially the insertions of the dorsal levator and ventral depressor tendons and articulating laterally with the two unguiform condylophores.

DEVELOPMENTAL STAGES

Obligate parasites on birds, all species of *Proctophyllodes* have their complete life cycle—egg, larva, protonymph, tritonymph, and adult—on a bird host. Although some feather mite genera, e.g., *Thecarthra* (Dermoglyphidae), characteristically oviposit within the quills, *Proctophyllodes* have been found to oviposit exclusively along the rachis or vane.

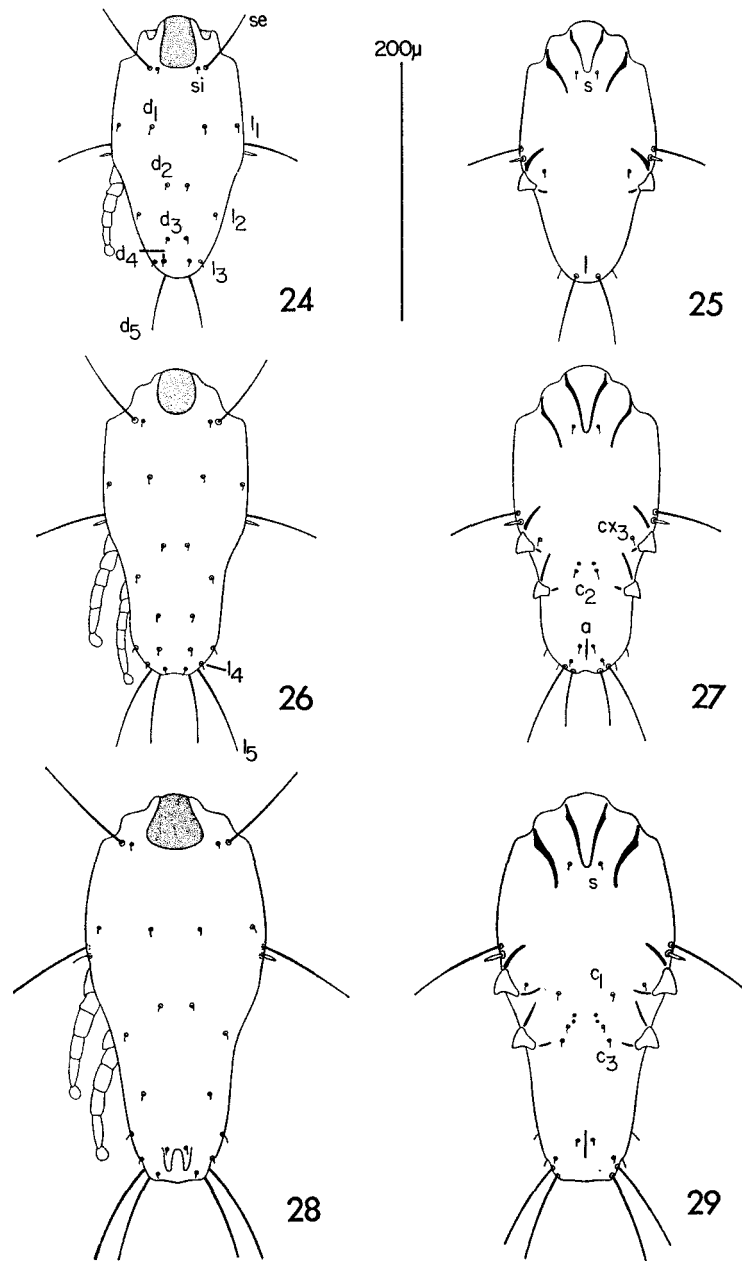
All *Proctophyllodes* are oviparous. Dubinin (1951, pp. 94–98, figs. 84–85) discusses and illustrates the developing egg in *Trouesartia*, a genus of Proctophyllodidae. Development and oviposition of a single egg is characteristic of *Proctophyllodes* as well as *Trouesartia*. In comparison to the size of the adult female, the egg is massive. Often a single, oblong egg may be observed with the longitudinal dimensions approximating the distance between the anal opening and the second pair of legs.

The larva (figs. 24, 25) appears virtually transparent and bears only three pairs of legs. Dorsally, the only evidence of well-developed sclerotization is the small, propodosomal shield which progressively develops in the remaining life stages. The scapular setae, ordinarily positioned on the propodosomal shield in the adult, maintain a transverse row, but because of the incomplete development of the propodosomal shield, appear posterior to the shield. The only other setae on the dorsum are setae d_{1-5} and l_{1-3} . Ventrally, the larva exhibits only moderate development of the epimerites and ventral setae; epimerites Ep1 display the typical U shape, and coxal setae s and cx_3 are present.

Increasing in size, particularly length, the protonymph (figs. 26, 27) is characterized by progressive development of the hysterosoma and the addition of legs IV. Devoid of a hysterosomal shield, the posterior hysterosoma is characterized by the addition of the remaining lateral setae (l_{4-5}) and the postanal setae (pae , pai) near the posterior margin. Ventrally the epimera have not markedly changed from the larval condition, other than development toward the meson, but the venter additionally bears one pair of adanal setae and one pair of central setae (c_2). The latter develop in association with a pair of medially located genital discs.

A deutonymph, characteristic of some genera of feather mites,

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FIGS. 24-29. Developmental stages of *Proctophyllodes pari*, n. sp.: dorsal and ventral aspects of larva (24, 25), protonymph (26, 27), and female tritonymph (28, 29), *a*, anal setae; *s*, *cx*₃, coxal setae; *d*₁₋₅, dorsal setae; *l*₁₋₅, lateral setae; *si*, internal scapular setae; *c*₁₋₃, central setae.

e.g., *Faculifer* (Dermoglyphidae) or *Ardeacarus* (Pterolichidae), is lacking in *Proctophyllodes*.

Still lacking a hysterosomal shield, the tritonymph (figs. 28, 29) completes the full complement of setae with the addition of two pairs of central setae, c_1 and c_3 ; also added is a second pair of genital discs. The female tritonymph is characterized further by having a pair of small, dorsal, fleshy protuberances positioned near the end of the hysterosoma. By insertion into the cylinders of the male adanal discs, the protuberances afford a means of attachment when the tritonymph is coupled with a male.

BIONOMICS

Dubinin (1951) provided an expository account of the biology and ecology of the analgoid group, but he provided only a limited discussion of *Proctophyllodes*. The species of *Proctophyllodes* reported to date have been taken almost exclusively from passeriform birds. Hosts exclusive of the perching birds are few and include representatives from the avian families Scolopacidae, Strigidae, and Anatidae (the latter record from *Anas acuta* is doubtful).

The developmental stages, all of which occur on the feathers, consist of an egg plus four active stages—larva, protonymph, tritonymph and adult. The inactive, non-feeding stage of deutonymph or hypopus, characteristic of pterolichid feather mites, *e.g.*, *Faculifer* or *Ardeacarus*, has not been observed within any of the *Proctophyllodes* species.

The underside of the primary and secondary remiges plus the rectrices provide the usual loci for the developmental stages of *Proctophyllodes*. Moderate to heavy infestations can be seen as dark patches when wing and tail feathers are spread. Microscopic examination, with the aid of a dissecting microscope, reveals the mites tandemly positioned between adjacent barbs of the rachis.

When present, the eggs usually appear to be affixed at the fusion level of barbs and rachis, however egg clusters have been observed on the vane. Immature forms also display random positioning along both rachis and vane. Adults particularly, perhaps because of their brownish-red pigmentation, are most readily observed when distributed on the vane either singly or coupled. Distribution patterns on the rachis exhibit considerable variation. The mites may infest the narrower, outer vane, but the majority are positioned on the broader, inner vane. In respect to the longitudinal axis of the feather, the position may vary between the proximal

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and distal aspects. In instances of generic multiplicity, overlapping distribution zones are evident. Heaviest infestations are seen on the medial portion of the wing and involve bilateral arrangement, *i.e.*, the position of mites on a bird's left wing approximates the same position on the right wing. Although mites are often observed in discrete patches somewhat removed from the rachis, they also are commonly observed clustered along the rachis.

Dubinín (1951) considered mite distribution on the host to be influenced by air temperature; generally, with a reduction in air temperature, mite populations tend to concentrate on the proximal portion of the vane. This has not been demonstrated for *Proctophyllodes* in this investigation. *Proctophyllodes* species exhibit very slow ambulations and do not migrate appreciably when subjected to changes in temperature. While collecting in the field, birds often were placed in ice chests until they could be examined. Under these conditions of reduced temperature, movement of mites to the proximal portions of the feathers was not observed.

Past authors have suggested that copulation takes place between the male and female tritonymph. Since the female tritonymph lacks a spermatheca, it is assumed here that copulation takes place only in the adult female. As both tritonymphal and adult females couple with the adult male, it is probable that the male clasps the tritonymph until the molt and then recouples with the adult female. During the period which broadly can be termed copulation, the terminal opisthosomae are in apposition. Utilizing in particular the fourth pair of legs, the male clasps the female; the male opisthosoma with its terminal lamellae is superimposed above the female opisthosoma. The female tritonymph bears a pair of small, dorsal peglike structures (fig. 28) which slip into the ventral, adanal discs of the male, comparable to fingers within a glove. In couplings where the tritonymphal structures are lacking or when an adult female is involved, the adanal discs enhance the juncture of the two sexes.

Proctophyllodid mites probably are scavengers and inflict no apparent damage on the host; observations of massive infestations, *e.g.*, *Proctophyllodes glandarinus* in association with *Bombycilla cedrorum*, indicate no skin abrasion or damage to feathers. Apparently the mites are nutritionally sustained by feather fragments and sloughed cells from the skin. Considering the use of mouthparts in feeding, Fritsch (unpublished) states that the chelicerae are alternately pushed forward beyond the pedipalps. With the advancement of a chelicera, the articulative digit opens and closes

when the chelicera is retracted; each chelicera is pushed forward about twice per second. Through alternate protraction and retraction, coupled with grasping movements of the terminal digits, food is conveyed to the mouth.

Because of their slow movement, feather mites probably are lost with the molted feather. As the primary or secondary feathers successively drop out and become replaced, mites from adjoining feathers serve as a source for reinfestation. Intraspecifically it is probable that mite transfer potentially could be achieved during host copulation, brooding of the young, and during roosting, at least in gregarious species.

Both field and museum samples suggest that infestation levels are low within most species of birds, and one cannot predict the incidence of *Proctophyllodes* in a population. However, from the samples, it can be ascertained that *Proctophyllodes* species are host or group specific within the limits outlined in the following section.

HOST-PARASITE RELATIONSHIPS

Species of the genus *Proctophyllodes* are usually parasites of birds of the order Passeriformes. Two species are restricted to non-passeriform hosts: *Proctophyllodes huitzilopochtlii*, new species, on Apodiformes (Trochilidae) and *P. scolopacinus* on Charadriiformes (Scolopacidae). The former species is unique and will be discussed below, whereas the latter species and *P. corvorum* form a small, morphologically unique species group. As stated, *P. scolopacinus* is restricted to the scolopacids, while the related *P. corvorum* occurs only on the passeriform family Corvidae. Although the two species of mites are mutually exclusive, it is probable that ancestral forms infested hosts in two avian orders.

A few species of mites occur on non-passeriform hosts but are invariably shared by passeriform groups. *Proctophyllodes anthi* is a good example of a species infesting members of disparate orders. This mite has been repeatedly collected from *Jynx torquilla* (Piciiformes: Jyngidae) and from *Macronyx capensis* plus five species of *Anthus* (Passeriformes: Motacillidae) and *Alauda arvensis* (Passeriformes: Alaudidae). It is noted that the taxonomic disparity of the host groups is accompanied by behavioral disparity; jyngids are arboreal whereas motacillids and alaudids are mainly terrestrial. A second example of interordinal association is *Proctophyllodes stenophyllus* Gaud and Mouchet, which occurs on the Apodiformes (Apodidae) and the Passeriformes (Pycnonotidae). Additional examples involve questionable records for the non-passeriform groups,

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namely, *P. polyxenus*, new species, on Strigiformes (Strigidae) and numerous passeriform families, *P. picae* (Koch) on Anseriformes (Anatidae) and Passeriformes (Corvidae), and *P. megaphyllus* Trouessart on Charadriiformes (Scolopacidae) and species of Fringillidae and Prunellidae.

The remaining forms occur exclusively on the Passeriformes and represent every suborder except Menurae. Conclusions regarding host-parasite relationships necessarily are provisional because of incomplete records and limitation of material. For convenience, associations are organized into arbitrary categories.

Host specificity at the species level. The present study cites 47 species (38 percent) of *Proctophyllodes* that are known from single hosts. Obviously additional examination of hosts may extend the host range of some species and thus reduce the percentage of the monoxenic associations. As a case in point, *Proctophyllodes reguli* Gaud, prior to this study had been reported only from *Regulus ignicapillus* in French Morocco. Currently the hosts have been shown to be more extensive and include *Regulus regulus* from England and *R. satrapa* from the United States.

Nevertheless, the possibility of strict species specificity cannot be negated. Potential specificities may occur among the following pairs of hosts and parasites.

Furnariidae	
<i>Xenops minutus</i>	<i>Proctophyllodes xenopis</i> , new species
Pittidae	
<i>Pitta brachyura</i>	<i>Proctophyllodes pittae</i> , new species
Dicruridae	
<i>Dicrurus adsimilis</i>	<i>Proctophyllodes anaxiphus</i> , new species
<i>Dicrurus atripennis</i>	<i>Proctophyllodes aphyllus</i> Gaud and Mouchet
Oriolidae	
<i>Oriolus larvatus</i>	<i>Proctophyllodes dasyxiphus</i> , new species
Paridae	
<i>Parus bicolor</i>	<i>Proctophyllodes pari</i> , new species
Sittidae	
<i>Sitta canadensis</i>	<i>Proctophyllodes canadensis</i> , new species
<i>Sitta europaea</i>	<i>Proctophyllodes vitzthumi</i> Fritsch
Timaliidae	
<i>Garrulax erythrocephalus</i>	<i>Proctophyllodes mcclurei</i> , new species
<i>Minla cyanouroptera</i>	<i>Proctophyllodes minlae</i> , new species
Pycnonotidae	
<i>Chlorocichla simplex</i>	<i>Proctophyllodes mecistocaulus</i> Gaud and Mouchet
Turdidae	
<i>Catharus aurantiirostris</i>	<i>Proctophyllodes cathari</i> , new species
<i>Luscinia svecica</i>	<i>Proctophyllodes caulifer</i> Trouessart
<i>Muscisylvia leucura</i>	<i>Proctophyllodes pennifer</i> (Trouessart and Neumann)
<i>Myadestes obscurus</i>	<i>Proctophyllodes myadestis</i> , new species
<i>Sialia mexicana</i>	<i>Proctophyllodes sialiae</i> , new species

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Muscicapidae	
<i>Batis capensis</i>	<i>Proctophyllodes batis</i> , new species
<i>Muscicapa striata</i>	<i>Proctophyllodes acanthicaulus</i> Gaud
<i>Muscicapa sundara</i>	<i>Proctophyllodes elegans</i> , new species
<i>Parisoma plumbeum</i>	<i>Proctophyllodes parisomae</i> , new species
<i>Pedilorhynchus comitatus</i>	<i>Proctophyllodes pachynotus</i> Gaud and Mouchet
<i>Platysteira cyanea</i>	<i>Proctophyllodes rhynchocaulus</i> Gaud and Mouchet
Motacillidae	
<i>Anthus cervinus</i>	<i>Proctophyllodes arcticus</i> Dubinin
<i>Anthus trivialis</i>	<i>Proctophyllodes poublani</i> Gaud
Laniidae	
<i>Lanius excubitor</i>	<i>Proctophyllodes polyandrius</i> Vitzthum
<i>Lanius ludovicianus</i>	<i>Proctophyllodes ludovicianus</i> , new species
Sturnidae or Picathartidae	
<i>Picathartes oreas</i>	<i>Proctophyllodes anisogamus</i> Gaud and Mouchet
Nectariniidae	
<i>Anthreptes malacensis</i>	<i>Proctophyllodes capitatus</i> , new species
Cyclarhidae	
<i>Cyclarhis gujanensis</i>	<i>Proctophyllodes cyclarhis</i> , new species
Parulidae	
<i>Coereba flaveola</i>	<i>Proctophyllodes coerebae</i> , new species
<i>Dendroica striata</i>	<i>Proctophyllodes longiquadratus</i> , new species
Icteridae	
<i>Dolichonyx oryzivorus</i>	<i>Proctophyllodes pullizonatus</i> , new species
<i>Gymnomystax mexicanus</i>	<i>Proctophyllodes gymnostacis</i> , new species
<i>Icterus gularis</i>	<i>Proctophyllodes gularis</i> , new species
<i>Psomocolax oryzivorus</i>	<i>Proctophyllodes psomocolacis</i> , new species
Thraupidae	
<i>Cyanerpes cyaneus</i>	<i>Proctophyllodes cyanerpis</i> , new species
<i>Poecilothraupis lunulatus</i>	<i>Proctophyllodes megathraupis</i> , new species
<i>Tanagra musica</i>	<i>Proctophyllodes tanagrae</i> , new species
Ploceidae	
<i>Euplectes axillaris</i>	<i>Proctophyllodes ornatus</i> , new species
<i>Petronia superciliaris</i>	<i>Proctophyllodes petroniae</i> , new species
Fringillidae	
<i>Calamospiza melanocorys</i>	<i>Proctophyllodes calamospizae</i> , new species
<i>Caryothraustes poliogaster</i>	<i>Proctophyllodes lordocaulus</i> , new species
<i>Chlorura chlorura</i>	<i>Proctophyllodes chlorurae</i> , new species
<i>Emberiza schoeniclus</i>	<i>Proctophyllodes schoenicli</i> , new species
<i>Junco phaeonotus</i>	<i>Proctophyllodes paramegaphyllus</i> , new species
<i>Spiza americana</i>	<i>Proctophyllodes tricetratus</i> , new species
<i>Tiaris olivacea</i>	<i>Proctophyllodes tiaris</i> , new species

Host specificity at the genus level. There are numerous examples of one mite species occurring on a small number of hosts of the same genus. The greatest host range in this category is that of *Proctophyllodes musicus* Vitzthum which is known from eleven species of *Turdus* from Africa, Asia, Europe and North America. The hosts of other *Proctophyllodes* species also include species of *Turdus*, but whether or not species duplexity is simultaneous is unknown. If two or more species of *Proctophyllodes* occur on the same host species, or on the same individual, then it is probable that discrete ecological niches are involved.

The Feather Mite Genus *Proctophyllodes*

Host specificity at the family level. This represents the usual relationship of *Proctophyllodes* species and their hosts. Each of fifty-one species occurs on two or more bird species of the same family. At present certain avian families have only single representatives as hosts, but this single host-parasite relationship probably indicates once again the limitation of material, e.g., *Proctophyllodes xenopsis*, new species on *Xenops minutus* (Furnariidae, a family of 215 species), *P. dasyxiphus*, new species, on *Oriolus larvatus* (Oriolidae, a family of 26 species), *P. pittae*, new species, on *Pitta brachyura* (Pittidae, a family of 23 species), and *P. cyclarhis*, new species, on *Cyclarhis gujanensis* (Cyclarhidae, a family of 2 species). In the above examples, the parasites exhibit such unique features that one would not expect these mites to occur on other avian families, but one would expect the parasites to occur on other species within the family.

There are many examples of mites known only from one geographical region although the bird family involved is cosmopolitan, but only a few examples of a mite species collected over a wide geographical range. *Proctophyllodes truncatus* Robin (= *P. passeris* Vitzthum) found primarily on *Passer domesticus*, illustrates only that the parasite has followed the ever increasing distribution of the host. However, in the case of *P. scolopacinus* (Koch), *P. paspalevi* Vassilev, and *P. microcaulus* Gaud, the geographical range of each is greater than that of any one of the host species. *P. scolopacinus* parasitizes both the American and European woodcock. These birds, respectively *Philohela minor* and *Scolopax rusticola*, which may be considered taxonomic and ecological equivalents, are an exception to the general rule that *Proctophyllodes* species are found on perching birds. The presence of *P. scolopacinus* on either of these birds is interesting but not surprising; however, the incidence of the parasite on both hosts suggests a long association with the Scolopacidae. *P. paspalevi* has been reported only from members of the family Cinclidae. This family is small—only five species—but its range is extensive, involving Europe, central Asia, and the western Americas. *P. paspalevi* occurs on a European species, *Cinclus cinclus*, and one species from the North American continent, *Cinclus mexicanus*. Finally, *P. microcaulus* has been found only on members of the widely distributed lark family, Alaudidae.

A particularly interesting example of group specificity is *Proctophyllodes huitzilopochtlii*, new species, which has been recovered from many species of hummingbirds (Trochilidae). Unique morphological characters of the parasite provide criteria which invari-

ably permit rapid correlation with a trochilid host. Carriker (1960) has established a mallophagan family which also is specific to the Trochilidae, suggesting that the unusual physiological and morphological characteristics of hummingbirds has promoted the development of a unique ectoparasitic fauna. Parallel studies in progress of feather mites exclusive of *Proctophyllodes*, e.g., *Pterodectes* and *Allodectes*, reveal several species each of which may be recovered from numerous species of hummingbirds.

An example of group specificity within the previously recognized Coerebidae complements recent avian systematics. Beecher (1951), basing his evidence on comparative morphology, suggested the elimination of Coerebidae and further suggested the transfer of the coerebid genera to Thraupidae (*Diglossa*, *Cyanerpes*, *Chlorophanes*, etc.) or Parulidae (*Coereba*, etc.) Mites recovered from the representative genera appear to support Beecher's division, particularly in respect to representatives from Thraupidae. The mite species found on any one of the genera cited have also been recovered from other species of Thraupidae. Specifically *Proctophyllodes diglossae*, new species, parasitizes both *Diglossa baritula* and *Piranga leucoptera*; and *P. thraupis*, new species, parasitizes *Chlorophanes spiza*, *Thraupis abbas* and three species of *Tanagra*. Neither mite species occurs on any of the genera transferred by Beecher to Parulidae.

Familial group specificity is also indicated by a species complex of mites correlated with a related group of birds. A natural group of five new species—*Proctophyllodes longiquadratus*, *P. quadrisetosus*, *P. quadratus*, *P. dendroicae*, and *P. brevisquadratus*—appear to infest only those avian species belonging to Sylviidae, Vireonidae (?), and Parulidae. Parulidae in particular contains nearly twenty species of birds which may harbor representatives of the species complex.

Host specificity at the suborder level. This level of specificity is very artificial and is included for the few species of *Proctophyllodes* that have wide host distributions. Two specific examples are *P. polyxenus*, new species, and *P. glandarinus* (Koch). The former species is now known from about forty host species which include members of the Motacillidae (1), Turdidae (2), Parulidae (4), Thraupidae (1), Fringillidae (30) and Strigidae (3, all questionable records); *P. glandarinus* is known from Corvidae (1), Bombycillidae (2), and Fringillidae (16). The high percentage of fringillid hosts may reflect the concentrated collecting from this group of birds.

In recapitulation, definitive statements about particular mite

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species and their hosts, particularly the monoxenic associations, can not be made with certainty. However, if the mite species reported from single hosts are combined with the species that occur on two or more host species of the same family, it can be said that approximately 80 percent of the known *Proctophyllodes* species are family specific. Of the remaining species, two occur on both passeriform and non-passeriform groups, and about 20 have hosts belonging to two or more passeriform families.

SYSTEMATIC RELATIONSHIPS WITHIN THE
FAMILY PROCTOPHYLLODIDAE

The family Proctophylloidae currently consists of twenty-four genera which are assigned to three subfamilies—Alloptinae, Trouessartinae, and Proctophylloinae. The extant genera are listed below and the correlative features are presented in Table I. Placement of genera in the respective subfamilies is unsatisfactory, especially within the Alloptinae, however numerous generic reassignments are contemplated and a number of new genera will be described in the near future by Gaud and Atyeo. Any detailed inter- or intrafamilial comparisons as genera are now assigned would be incomplete.

<p>ALLOPTINAE</p> <p><i>Alloptellus</i> Dub., 1955</p> <p><i>Alloptes</i> Can., 1879</p> <p><i>Alloptooides</i> Gaud, 1961</p> <p><i>Brephosceles</i> Hull, 1934</p> <p><i>Capelloptes</i> Dub., 1951</p> <p><i>Cryptosikya</i> Gaud, 1961</p> <p><i>Dinalloptes</i> Gaud & Mouchet, 1957</p> <p><i>Echinacarus</i> Dub., 1949</p> <p><i>Hyperpedalloptes</i> Dub., 1955</p> <p><i>Laminalloptes</i> Dub., 1955</p> <p><i>Nealloptes</i> Gaud & Mouchet, 1957</p> <p><i>Plicatalloptes</i> Dub., 1955</p> <p><i>Oxyalges</i> Gaud, 1958</p> <p><i>Thysanocercus</i> Gaud & Mouchet, 1957</p>	<p>TROUESSARTINAE</p> <p><i>Allanalgae</i> Trt., 1868</p> <p><i>Calcealges</i> Gaud, 1952</p> <p><i>Hemicalcealges</i> Gaud & Mouchet, 1957</p> <p><i>Trouessartia</i> Can., 1899</p>
<p>PROCTOPHYLLODINAE</p>	
<p><i>Anisodiscus</i> Gaud & Mouchet, 1957</p> <p><i>Allodectes</i> Gaud & Berla, 1963</p> <p><i>Hemipterodectes</i> Berla, 1963</p> <p><i>Monojoubertia</i> Radford, 1950</p> <p><i>Proctophyllodes</i> Robin, 1868</p> <p><i>Pterodectes</i> Robin, 1868</p>	

	ALLOPTINAE	TROUESSARTINAE	PROCTOPHYL- LODINAE
Genua and femora	Fused in all legs	Not fused; or partial fusion, legs III-IV	Not fused
σ_1 of genu II	Present	Present	Absent
Apotele of ambulacra	Inverted T or transverse bar	Inverted T	Delta

Distinct lobar region (♀)	Absent	Absent	Present, but may be reduced
Internal vertical setae	Usually present	Present	Absent
Epimera I	Y-shaped, rarely V-shaped	Free or shaped as U, V, or Y	U or V-shaped; rarely free
Primary hosts	Apodiformes Charadriiformes Ciconiiformes Pelecaniformes Procellariiformes	Cuculiformes Coraciiformes Passeriformes Piciformes	Apodiformes Passeriformes

Discussing the affinities of the proctophyllodine genera would necessitate a detailed morphological comparison between these groups. As new genera prospectively will be assigned to this subfamily, it is sufficient at this point to comment only that *Pterodectes* and *Anisodiscus* form a closely related duo. *Allodectes* is a highly evolved form restricted to Trochilidae and shows little affinity to the other genera. *Proctophyllodes* and *Monojoubertia* appear to be very closely related. Lastly, *Hemipterodectes* shows affinities with the *Proctophyllodes-Monojoubertia* complex, not to the *Pterodectes-Anisodiscus* group.

TAXONOMY HISTORICAL ACCOUNT

To date the acarine superfamily Analgoidea is comprised of six families collectively containing more than one hundred and forty genera which live in or on the feathers of birds. The investigations establishing the manifold analgoid taxa largely have been undertaken by French, German and Russian workers; check-lists devoted to the feather mites have been published by Canestrini and Kramer (1899), Radford (1953, 1958), and Turk (1953). The first major generic revision was implemented by Trouessart (1916), while more recent revisions have been supplied by Dubinin (1951, 1953, 1956) and Gaud and Mouchet (1957-1959). At present only a few acarologists are actively contributing to the study of analgoid mites, however progress is evident in the continuing work of Gaud (France) plus the contributions of Berla (Brazil), Vassilev (Bulgaria), Černý (Czechoslovakia), Lichard (Bulgaria), Fritsch (Germany), and McDaniel (United States).

Limiting the broad spectrum of feather mites to the genus *Proctophyllodes*, one must recognize Vitzthum's monograph (1922*b*)

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as the first attempt to produce an intensive study of the genus. Although Vitzthum questioned the validity of several previously reported species, *e.g.*, *Proctophyllodes furcatus* occurring on *Mus musculus*, he nevertheless included these species in the publication and considered the extant species as forty in number; this total included eight species which he had newly described.

Except for the several reports of Bonnet and Timon-David (1932–1934), which cited incidences of previously described species, there was little interest in *Proctophyllodes* until near the beginning of the last decade.

Renewed interest in *Proctophyllodes*, concomitant with feather mites in general, was initiated by Dr. Jean Gaud, who has been a major contributor to the growing literature. Gaud and Petitot (1948*a*, 1948*b*) initially provided determinations and host records from collections made in Morocco and Indochina. After this modest beginning, Gaud (1953, 1957, 1960) described numerous new species of *Proctophyllodes* from African birds. Continuing the emphasis on the African fauna, Gaud and Mouchet (1958) were impressed by the relative rarity of *Proctophyllodes* in the Ethiopian fauna as compared to the European fauna. This rarity was further marked by the inclusion of only seventeen species in Africa south of the Sahara Desert (Gaud and Till, 1961).

With the contributions of Gaud *et al*, the bulk of the *Proctophyllodes* studies have been concentrated in Africa and Europe. Additional studies of European *Proctophyllodes* have been supplied by Atyeo and Vassilev (1964), Dubinin (1952), Fritsch (1961), Lichard (1952), and Vassilev (1958, 1959*a*, 1959*b*, 1959*c*, 1960). These citations represent the current research devoted to *Proctophyllodes*. Considering there are approximately 8600 species of birds in the world, one can validly assume rich resources for continued investigations.

DEPOSITION OF TYPE MATERIAL

In the descriptive sections, the repositories for the primary and secondary types are denoted by the following abbreviations:

André: Dr. Marc André, Laboratoire d'Acarologie, 8 bis Avenue Thiers, La Varenne (Seine), France.

BAS: Bulgarische Akademie der Wissenschaften Zoologisches Institut mit Museum, Boulev. Ruski 1, Sofia, Bulgaria.

BMNH: British Museum (Natural History), Cromwell Road, London S. W. 7, England.

Bulletin of the University of Nebraska State Museum

- BYU: Department of Zoology and Entomology, Brigham Young University, Provo, Utah.
- CAS: Institute of Parasitology of the Czechoslovak Academy of Sciences, Praha 6, Flemingovo nám. 2.
- Gaud: Dr. J. Gaud, Direction de la Santé, 3 rue de Fougères, Rennes, Ille et Vilaine, France.
- CNHM: Chicago Natural History Museum, Roosevelt Road and Lake Shore Drive, Chicago, Illinois.
- MN: Museu Nacional, Rio de Janeiro, G. B. Brazil.
- MU: Department of Entomology, University of Missouri, Columbia, Missouri.
- NU: Department of Entomology, University of Nebraska, Lincoln, Nebraska.
- Radford: Dr. C. D. Radford, "Lampagoes", 33, Grosvenor Avenue, Torquay, Devon, England.
- RNH: Rijkmuseum van Natuurlijke Historie, Leiden, Netherlands.
- SAIMR: The South African Institute for Medical Research, Hospital Street, Post Office Box 1038, Johannesburg, Republic of South Africa.
- SEA: Stazione Entomologia Agraria, via Romana 15-17, Florence, Italy.
- SEM: Snow Entomological Museum, University of Kansas, Lawrence, Kansas.
- TC: The Trouessart Collection, c/o M. André (see above).
- Turk: Dr. Frank A. Turk, "Shang-ri-la", Reskadinnick, Camborne, Cornwall, England.
- USNM: United States National Museum, Washington, D.C.
- Wilson: Dr. Nixon Wilson, Department of Entomology, Bernice P. Bishop Museum, Honolulu, Hawaii.
- ZSBS: Zoologische Sammlung des Bayerischen Staates, Menzingerstrasse 67, München 19, Germany.
- ZSZM: Zoologisches Staatsinstitut und Zoologisches Museum, von-Melle-Park 10, Hamburg 13, Germany.

CHARACTERS AND DESCRIPTIVE METHODS

Morphological features utilized in the species descriptions have been fully discussed in the morphology section. The characters and descriptive methods which may be considered subject to individual preference, *e.g.*, delimiting body length, are explained as follows and parallel the sequence found in the formal descriptions. All cited measurements are in microns.

The Feather Mite Genus Proctophyllodes

Male

Length, excluding lamellae. Distance between pedipalp apex and internal postanal setae (*pai*).

Length, propodosomal shield. Anterior margin to greatest length of posterior margin, either medially or laterally, whichever is longest.

Width, propodosomal shield. Approximately behind legs II, the widest portion.

Distance between external scapular setae. Measured center-to-center.

Shape, subhumeral setae. Lanceolate: dagger or spear-shaped, broadly tapering to point; spiculiform: slender, needlelike; setiform: long and threadlike.

Length, hysterosomal shield. From most anterior point of anterior margin to internal postanal setae (*pai*).

Width, hysterosomal shield. Widest portion, usually at the level of setae d_1 .

Ventrolateral extensions. Small, triangular extensions, arising as internal projections from the hysterosomal shield; present or absent.

Length, lamellae. From internal postanal setae (*pai*) to lamellar tips.

Width, lamellae. Widest portion.

Shape, lamellae. Oval: length approximately equivalent to width; oblong: length exceeding width; spatulate: round, broad apex with narrow base; triangular: short, broad, with apex forming a point; linear: long, narrow; flagelliform: excessively long with taper to blunted point.

Venation, lamellae. Pinnate: strong median vein, with lateral branchings; palmate: several strong veins originating at lamellar base and diverging; radial: numerous veins originating from common base as in spokes of a wheel.

Tip, genital sheath. Entire: penis and genital sheath confluent; bifid: sheath appearing as extensions lateral to penis; trifid: bifid sheath and tip of penis.

Arrangement, opisthogastric setae. Rectangular: distance between anterior and posterior pair of setae is equivalent; square: all setae equidistant; trapezoidal: distance between posterior pair of setae is greater than that between anterior pair of setae.

Shields, opisthogastric. Divided: two discrete units; fragmented: several small distinct units; joined: one unit, variously shaped.

Accessory glands, adanal. Reniform: heavily sclerotized and anterior to adanal discs; triangular: lightly sclerotized, and mesal to adanal discs.

Female

Length, excluding terminal appendages. Distance between pedipalp apex and posterior extremity of hysterosomal lobes excluding appendages.

Supranal concavity. Absent, or present only when hysterosomal lobes form continuum with anterior hysterosoma; appears as an oval or round depression.

Lobar region, connection. Freely articulated, fused (*i.e.*, forming continuum), or absent.

Lobes, hysterosomal cleft. Convergent: proximae of lobes projecting toward meson; divergent: proximae of lobes projecting away from meson; parallel-sided: proximae of lobes of equivalent distance to meson.

Spermatheca. Pinnatus type: see figs. 3, 166; *corvorum* type: see fig. 229.

Family PROCTOPHYLLODIDAE Trouessart and Mégnin
Genus *PROCTOPHYLLODES* Robin

Proctophyllodes Robin, 1868, Compt. rend. Acad. Sci. Paris, 66(16): 786. Type: *Dermaleichus glandarinus* Koch, 1840 (first included species).

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Proctophyllodes, Haller, 1882*a*, Arch. Naturgeschichte, Jahrb. 48, 1: 52.

Proctophyllodes, Trouessart and Mégnin, 1883*a*, Compt. rend. Acad. Sci. Paris, 97: 1319–1321.

Proctophyllodes, Trouessart and Mégnin, 1883*b*, Compt. rend. Acad. Sci. Paris, 97: 1500–1502.

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Proctophyllodes, Canestrini, 1886, Prospetto dell'Acarofauna Ital., 2: 248.

Proctophyllodes, Trouessart, 1886, Bull. Soc. Etud. Sci. Angers, 16: 145–146.

Proctophyllodes, Canestrini and Kramer, 1899, Tierreich, 7: 117–119.

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Proctophyllodes, Oudemans, 1905, Entomol. Ber., 1(24): 240-241.
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Proctophyllodes, Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 506-508.
Proctophyllodes, Fritsch, 1961, Z. Parasitenk, 21: 1-29.
Proctophyllodes, Gaud and Till, 1961, Publ. So. Afr. Inst. Med. Res., 11(L): 239, 249.

Analgooid mites with subhumeral setae posteroventral to humeral setae, males with terminal lamellae, females usually with distinct terminal region bearing well-developed lobes and ensiform appendages. Idiosoma with dorsal shields; propodosoma without internal vertical setae, with or without minute external vertical setae, with minute internal scapular setae, with long external scapular setae; hysterosoma with five pairs of dorsal (d_{1-5}) and five pairs of lateral setae (l_{1-5}), setae d_{1-4} and l_{1-4} are microsetae, setae d_5 and l_5 long macrosetae. Idiosomal venter without shields except

in opisthogastric region of male; epimerites I U-shaped, rarely a V; genital arch of male between legs III-IV; pregenital apodeme of female not connected with epimerites III. Legs subequal, segments freely articulated; solendion σ_1 absent on genu II; ambulacrum ovoid with triangular apotele and unguiform condylophores.

Key to species groups

1. Genital organ long and in repose extending almost to or beyond insertions of internal postanal setae, usually extending beyond origins of lamellae; genital sheath without distal bifurcation..... group I, p. 35
Genital organ shorter, not extending to posterior limits of adanal discs; genital sheath with or without distal bifurcation 2
2. Distal end of genital sheath bifid..... group II, p. 86
Distal end of genital sheath simple (normally this portion of sheath equal to or less than diameter of penis or sheath is shorter than penis)..... 3
3. Opisthogastric setae arranged in a square or rectangle and inserted on well-developed shields..... group III, p. 116
Opisthogastric setae arranged in a trapezoid (if in rectangle or square, then opisthogastric shields fragmented)..... 4
4. Opisthogastric shield with deep cleft in anterior margin; cleft from articulations of genital arch to posterior opisthogastric setae; opisthogastric setae arranged in a shallow curve (low trapezoid)..... group IV, p. 131
Opisthogastric shield differently formed; opisthogastric setae not arranged in a shallow curve..... 5
5. Tips of genital arch not supported nor in contact with major elements of the opisthogastric shields (small, weakly developed shields may be present at tips of arch).....
..... group V, p. 137
Genital arch in contact with well-developed opisthogastric shields 6
6. Base of genital sheath in form of heavily sclerotized ring positioned at the apex of the genital arch..... group VI, p. 148
Base of genital sheath differently formed, without basal sclerotized ring..... 7
7. Genital organ extending to the posterior row of opisthogastric setae; anterior row of opisthogastric setae usually not inserted on shields..... group VII, p. 207

The Feather Mite Genus Proctophyllodes

- Genital organ shorter, not extending to posterior row of opisthogastric setae; setae variously inserted..... 8
8. Posterior opisthogastric setae inserted on small, separate shields or on striated area..... group VIII, p. 248
- Posterior opisthogastric setae inserted on well-developed shields 9
9. Opisthogastric shield of each side weakly connected anteriorly or divided; anterior opisthogastric setae inserted off shields (rarely on margins)..... group IX, p. 262
- Opisthogastric shield of each side broadly joined to opposite member; anterior opisthogastric setae inserted on shields(s)..... group X, p. 293

Group I—the *glandarinus* group

The grouping of the twenty species included within the complex is based on an arbitrary character, namely, that the male genital organ extends beyond the origins of the terminal lamellae (except *P. pennifer*). The typical species have the genital organ extending anteriorly from a small genital arch to approximately the middle of the ventral idiosoma and then reflexed rearward and extending to or beyond the lamellar origins and the genital organ anterior to the genital arch is enclosed in an external cavity. Other included species are quite diverse in the structures of the male genital region. A few species have the genital organ reflexed from the apex of the genital arch and have none of the genital organ enclosed in an external cavity.

Pertinent characters for species differentiation, males:

1. Reflexion of genital organ in relation to setae c_1 and c_2 .
2. Length of genital organ in relation to lamellar apices and/or setae *pai*.
3. Development of pregenital apodeme.
4. Lamellar shape and venation.
5. Positions of the opisthogastric setae in relation to each other and to the opisthogastric shield(s).
6. Presence and type of adanal accessory glands.
7. Size and shape of the adanal discs.
8. Development of surface fields on epimerites III and IV.

Pertinent characters for species differentiation, females:

1. Size and shape of terminal cleft.
2. Development of hysterosomal lobes and terminal appendages.
3. Positions of setae d_4 .

4. Presence or absence of a supranal concavity.
5. Relative lengths of setae d_5 and l_5 .
6. Relative lengths of seta d_5 and the terminal appendages.

Key to the species of group I

1. Large, heavily sclerotized, reniform adanal accessory glands present 2
 Reniform adanal accessory glands absent..... 4
2. Female with terminal lobes and terminal appendages, without supranal concavity..... 3
 Female without terminal lobes and appendages, with supranal concavity.....*curtiglandarinus*, n. sp., p. 38
3. Anterior margin of opisthogastric plate shallowly concave; genital organ extending to or beyond apices of lamellae; median vein of lamella without strong bifurcation; female with cleft square.....*glandarinus*, p. 40
 Anterior margin of opisthogastric plate incised to anterior opisthogastric setae; genital organ not extending to apices of lamellae; median vein of lamella usually with strong bifurcation; female with cleft longer than wide
 *capensis*, n. sp., p. 44
4. Terminal lamellae not longer than hysterosoma..... 5
 Terminal lamellae narrow and longer than hysterosoma ...
 *longiphyllus*, n. sp., 47
5. Terminal lamellae over 130 μ in length and leaflike..... 6
 Terminal lamellae usually under 75 μ (if 80–100 μ , then linear) and variously shaped, including leaflike..... 7
6. Genital organ extending to midlength of lamellae; anterior and posterior row of opisthogastric setae widely separated*huitzilopochtlii*, n. sp., p. 49
 Genital organ extending almost to origins of lamellae; rows of opisthogastric setae approximate.....*pennifer*, p. 52
7. Terminal lamellae parallel-sided, apices attenuate..... 8
 Terminal lamellae leaflike (or vestigial in *curtiphyllus*).....11
8. Opisthogastric setae inserted on shields; external ring of adanal discs symmetrical..... 9
 Opisthogastric setae not inserted on shield(s), shield restricted to small sclerotized area connecting tips of genital arch; external ring and teeth of adanal discs asymmetrical*stenophyllus*, p. 54
9. Female without supranal concavity, with normal terminal appendages; male with relatively broad opisthogastric

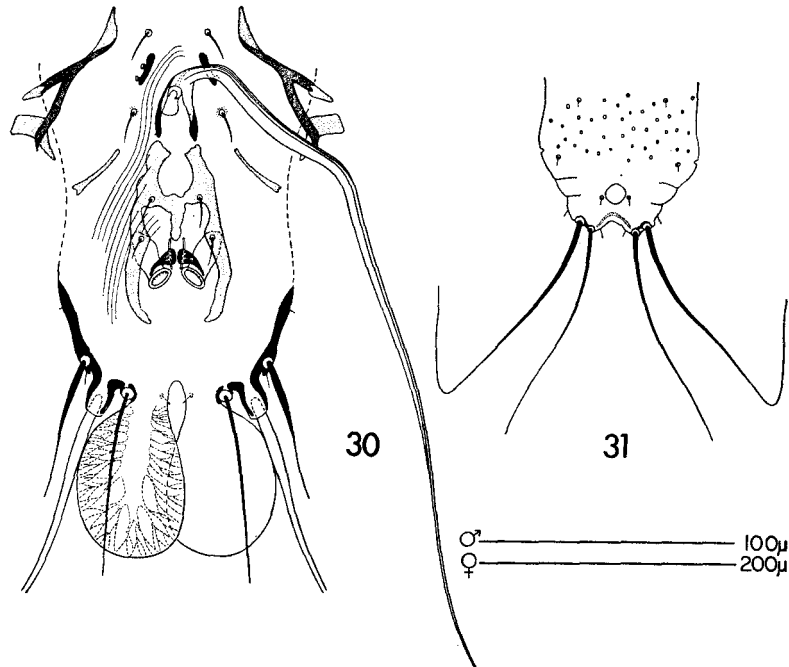
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shields which may be weakly connected anterior to opisthogastric setae.....	10
Female with supranal concavity and vestigial terminal appendages; male with very narrow and divided opisthogastric shields.....	<i>gymnomystacis</i> , n. sp., p. 57
10. Terminal lamellae narrow, about 90 μ in length; setae d_5 of female about $\frac{1}{5}$ length of terminal appendages.....	59
.....	<i>stoddardi</i> , n. sp., p.
Terminal lamellae short, about 35 μ in length; setae d_5 of female about $\frac{2}{3}$ length of terminal appendages.....	61
.....	<i>dicruri</i> , n. sp., p.
11. Genital organ directed anteriorly beyond epimerites IV and setae c_1 before reflexing to the posterior.....	12
Genital organ, if directed anteriorly, not extending to epimerites IV or setae c_2 , before reflexing to the posterior.....	17
12. Genital organ not extending beyond apices of lamellae.....	13
Genital organ extending well beyond apices of lamellae.....	63
.....	<i>mecistocaulus</i> , p.
13. Female with internal margins of cleft converging anteriorly or doubly-concave; males with genital organ to origins of lamellae	14
Female with internal margins of cleft approximately parallel-sided; males with genital organ extending beyond origins of lamellae.....	15
14. Female with internal margins of cleft converging anteriorly; male without reticulate adanal accessory glands and lamellae with pinnate venation.....	64
.....	<i>rubeculinus</i> , p.
Female with internal margins of cleft doubly-concave; male with reticulate adanal accessory glands and lamellae with palmate venation.....	67
.....	<i>cotyledon</i> , p.
15. Male with terminal lamellae leaflike; supranal concavity open posteriorly; tips of genital arch not widely separated....	16
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.....	<i>dicruri</i> , n. sp., p.
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.....	<i>caulifer</i> , p.
Male without conspicuous pregenital apodeme and with divided opisthogastric shields; female with wide cleft, about 20 μ in width.....	73
.....	<i>doleophyes</i> , p.

- 17. Opisthogastric setae inserted on large shields; lamellae leaflike18
- Opisthogastric setae not inserted on conspicuous shields; lamellae vestigial.....*curtiphyllus*, n. sp., p. 76
- 18. Genital organ extending to origins of lamellae.....19
- Genital organ extending beyond apices of lamellae.....20
- 19. Lamellae capitate; rows of opisthogastric setae widely separated; setae c_2 inserted on surface fields.....
-*capitatus*, n. sp., p. 78
- Lamellae ovoid; rows of opisthogastric setae approximate; setae c_2 not inserted on surface fields.....*parisomae*, n. sp., p. 80
- 20. Terminal cleft of female wider than long.....
-*tchagrae*, n. sp., p. 81
- Terminal cleft of female longer than wide.....
-*vassilevi*, n. sp., p. 84

Proctophyllodes curtiglandarinus, new species

Proctophyllodes curtiglandarinus, new species, *P. glandarinus*, and *P. capensis*, new species, are characterized in part as having



Figs. 30-31. *Proctophyllodes curtiglandarinus*, new species: holotype male (30), allotype female (31).

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large, heavily sclerotized reniform adanal accessory glands, and as lacking lateral extensions on epimerites I. *P. curtiglandarinus* can be distinguished as the females lack terminal appendages and lobes, have a distinct supranal concavity flanked by setae d_4 , and both sexes have the subhumeral setae setaceous.

MALE (holotype). Length, excluding lamellae, 303μ ; width, 153μ . *Dorsal idiosoma*: Propodosomal shield 79μ in length, 97μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 69μ . Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae setiform, 20.7μ in length. Hysterosomal shield 183μ in length, 116μ in width; anterior margin sinuous, with small lacunae on posterior half; without ventrolateral extensions; supranal concavity 43μ in length. Lamellae 79μ in length, 41μ in width, ovoid with internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs united; genital organ reflexion to level slightly posterior to anterior articulations of legs III; genital organ extending well beyond apices of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields weakly joined at level of anterior opisthogastric setae and bearing two pairs of setae. Adanal discs circular, each about $19\mu \times 9\mu$ and bearing approximately 5–6 teeth on anterior half; reniform accessory glands present.

FEMALE (allotype). Length, excluding terminal appendages, 423μ ; width, 183μ . *Dorsal idiosoma*: Propodosomal shield 83μ in length, 114μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 69μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae setiform, 24.2μ in length. Hysterosoma with lobes and without terminal appendages; anterior shield 235μ in length, 133μ in width, with anterior margin sinuous, with small lacunae; with supranal concavity. Lobar region fused with anterior shield; 32μ in length; setae d_4 inserted lateral to supranal concavity and separated by 19μ ; lobes vestigial; cleft in the form of a small arch, 10μ in length; setae d_5 and l_5 very long. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Passer melanurus* (Ploceidae), Union of South Africa: holotype ♂ (SAIMR), allotype ♀ (SAIMR), 3 ♂♂, 3 ♀♀ paratypes, Potchefstroom, Transvaal, May 15, 1953, F. Zumpt; paratypes: 3 ♂♂, Cape Province, July 9, 1953; 11 ♂♂, 18 ♀♀, Cape Province, July 26, 1953. Paratypes deposited: Gaud, NU, SAIMR.

Additional material. Ploceidae: 5 ♂♂, 7 ♀♀, from *Passer griseus*, Bechuanaland, Union of South Africa.

Remarks. The females of this species are modified similarly to other species of *Proctophyllodes* collected from species of *Passer*, that is, the terminal appendages and terminal lobes are wanting or vestigial. Further collections may reveal females with reduced and/or normal hysterosomal lobes and terminal appendages. The species is named *curtiglandarinus* for the abortive construction of the caudal portions of the females and for the closely related species, *P. glandarinus*. The drawings are of the holotype and allotype.

HOSTS

Ploceidae

<i>Passer melanurus</i> (Müller), 1776	Un. So. Africa	Present study
<i>Passer griseus</i> (Vieillot), 1817	Un. So. Africa	Present study

Proctophyllodes glandarinus (Koch)

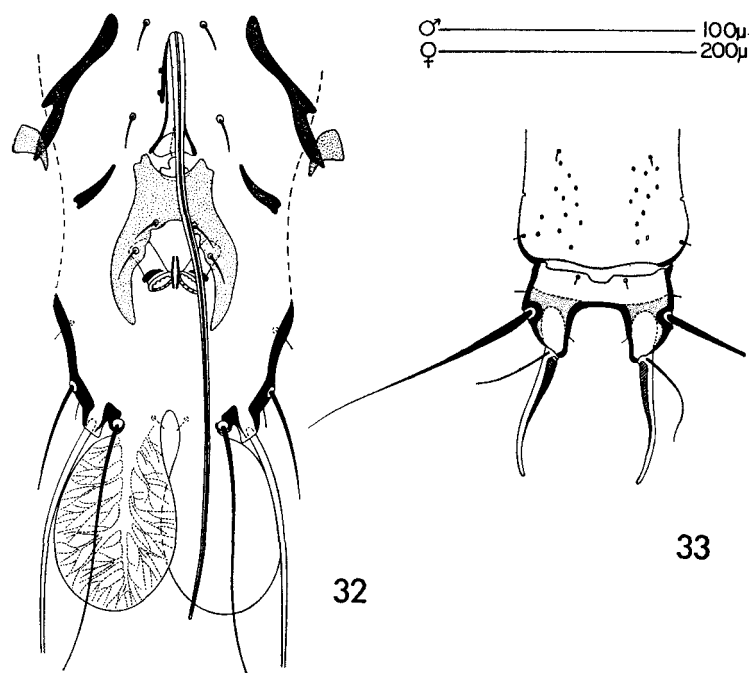
- Dermaleichus glandarinus* Koch, 1841, Deut. C. M. A., fasc. 33, nr. 20, 21. Type host: *Garrulus glandarius* (Corvidae).
- Dermaleichus ampelidis* Buchholz, 1869, Bemerk. Gatt. *Dermaleichus*, p. 20–22, figs. 6, 7. Type host: *Bombycilla garrulus* (Bombycillidae).
- Proctophyllodes glandarinus*, Robin (and Mégnin), 1877, J. Anat. Physiol., 13: 632–635, pl. 36, figs. 1–5.
- Proctophyllodes glandarinus*, Canestrini, 1879, Atti Societa Veneto-Trentina sci. Nat., 6(1): 36–37, pl. IV, fig. 6, 7.
- Proctophyllodes arcuaticaulis* Trouessart, 1886, Bull. Soc. Angers, 16: 148. Type host: *Acanthis* spp. (Fringillidae).
- Proctophyllodes glandarinus*, Berlese, 1888, A. M. S., fasc. 65, nr. 7.
- Proctophyllodes arcuaticaulis*, Poppe, 1889, Abhandl. Naturwiss. Ver. Bremen, 10: 230. (Synonomized with *P. ampelidis*.)
- Proctophyllodes arcuaticaulis*, Berlese, 1897, A. M. S., fasc. 89, nr. 8.
- Proctophyllodes arcuaticaulis*, Canestrini & Kramer, 1899, Tierreich, 7: 118.

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- Proctophyllodes glandarinus*, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 14–20, figs. 2–11.
- Proctophyllodes ampelidis*, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 38–45, figs. 32–37.
- Proctophyllodes glandarinus* and *P. ampelidis*, Vitzthum, 1929, Tierwelt Mitteleuropas, 3(3): 100.
- Proctophyllodes glandarinus*, Balogh, 1937, Acta Biol., Szeged Sec. Biol., 4(20): 207.
- Proctophyllodes glandarinus*, Gaud, 1957, Soc. Sci. nat. Phys. Maroc, 37(2): 119.
- Proctophyllodes ampelidis*, Radford, 1958, Rev. Brasil Entomol., 8: 161–162.
- Proctophyllodes ampelidis*, Vassilev, 1960, Bulg. Acad. Sci. Proc. Zool. Inst., 9: 432.
- Proctophyllodes ampelidis* (in part), Fritsch, 1961, Z. Parasitenk., 21: 6, figs. 2a–b. (New synonymy.)
- Proctophyllodes mirus* Černý, 1961, Acarologia, 3(4): 599–601, fig. 1. Type host: *Garrulus glandarius*. (New synonymy.)
- Proctophyllodes glandarinus*, Lichard, 1962, Biológia, 17(7): 533.
- Proctophyllodes ampelidis*, Vassilev, 1962, Bulg. Acad. Sci., Bull. Dept. Biol. Sci., p. 157.
- Proctophyllodes glandarinus*, Vassilev, 1962, Bulg. Acad. Sci., Bull. Dept. Biol. Sci., p. 158.

The shape of the opisthogastric shield of the male and the shape of the terminal cleft of the female are characters useful in separating *Proctophyllodes glandarinus* from the closely related *P. capensis*, new species. In the former species, the anterior margin of the opisthogastric shield is shallowly concave and the terminal cleft of the female has the length approximately equal to the width. In *P. capensis*, the anterior margin of the opisthogastric shield is recessed to the level of the anterior opisthogastric setae and in the female, the cleft is about two times longer than wide.

MALE. Length, excluding lamellae, 318 μ ; width, 146 μ . *Dorsal idiosoma*: Propodosomal shield 86 μ in length, 91 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 64 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7 μ in length, 4.1 μ in width. Hysterosomal shield 285 μ in length, 104 μ in width; anterior margin straight; without lacunae; without ventrolateral extensions; supranal concavity 54 μ in length. Lamellae 73 μ in length, 41 μ in width, ovoid,



FIGS. 32-33. *Proctophyllodes glandarinus* (Koch): male (32), female (33), from *Garrulus glandarius*.

internal margins slightly overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme narrow, connecting genital discs of each side of body around anterior margin of genital organ; genital organ reflexion to level of anterior articulations of legs III; genital organ extending to distal limits of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields joined by broad connection and bearing two pairs of setae. Adanal discs circular, each about $17\mu \times 8\mu$, teeth barely discernible; reniform accessory glands present.

FEMALE. Length, excluding terminal appendages, 512μ ; width, 192μ . *Dorsal idiosoma*: Propodosomal shield 110μ in length, 110μ in width; lateral margins incised behind external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 80μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 23.5μ in length, 5.5μ in width. Hysterosoma with lobes

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and with terminal appendages; anterior shield 263 μ in length, 122 μ in width, with anterior margin straight or shallowly concave, with small lacunae; without supranal concavity. Lobar region articulated with anterior shield; 59 μ in length; setae d_4 inserted on lobar shield and separated by 37 μ ; lobes short; cleft parallel-sided or slightly divergent, 59 μ in length, 33 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Garrulus glandarius* (Corvidae), Germany; location of type unknown.

Material examined. Corvidae: 15 $\delta\delta$, 14 ♀♀ , from *Garrulus glandarius*, Bulgaria, England, Germany. Bombycillidae: 13 $\delta\delta$, 26 ♀♀ , from *Bombycilla cedrorum*, from Texas, Georgia, Michigan, Alaska. Fringillidae: 10 $\delta\delta$, 13 ♀♀ , from *Coccothraustes coccothraustes*, Bulgaria, Europe; 1 δ , from *Emberiza hortulana*, Germany; 3 $\delta\delta$, 2 ♀♀ , from *Eophona migratoria*, China; 1 δ , 1 ♀ , from *Fringilla montifringilla*, Europe; 1 ♀ , from *Hesperiphona abeillei*, México; 6 $\delta\delta$, 7 ♀♀ , from *Hesperiphona vespertina*, Mass., Washington, México; 11 $\delta\delta$, from *Loxia curvirostra*, Virginia; 2 $\delta\delta$, 2 ♀♀ , from *Pinicola euclator*, Newfoundland; and 3 $\delta\delta$, 3 ♀♀ , from *Pyrrhula pyrrhula*, Bulgaria.

Remarks. Host records in the literature are impossible to assess. Different authors have had various ideas as to the mites constituting *Proctophyllodes glandarinus*, *P. ampelidis*, and *P. pinnatus*; in addition, species described in contemporary investigations undoubtedly were included under one or more of the above three species. For example, Canestrini (1879), in his host list for *P. glandarinus*, included seven species of Turdidae; these included the type hosts of *P. caulifer*, *P. cotyledon*, and *P. rubeculinus*. Only the most probable records are listed below. A male and a female from *Garrulus glandarius* collected in Bulgaria are the bases for the redescription and drawings.

HOSTS

Corvidae		
<i>Garrulus glandarius</i> (L.), 1758	Europe	Koch, 1840 Vitzthum, 1922b Vassilev, 1959, 1962 Černý, 1961 Fritsch, 1961 Lichard, 1962 Present study
	Fr. Morocco	Gaud, 1957

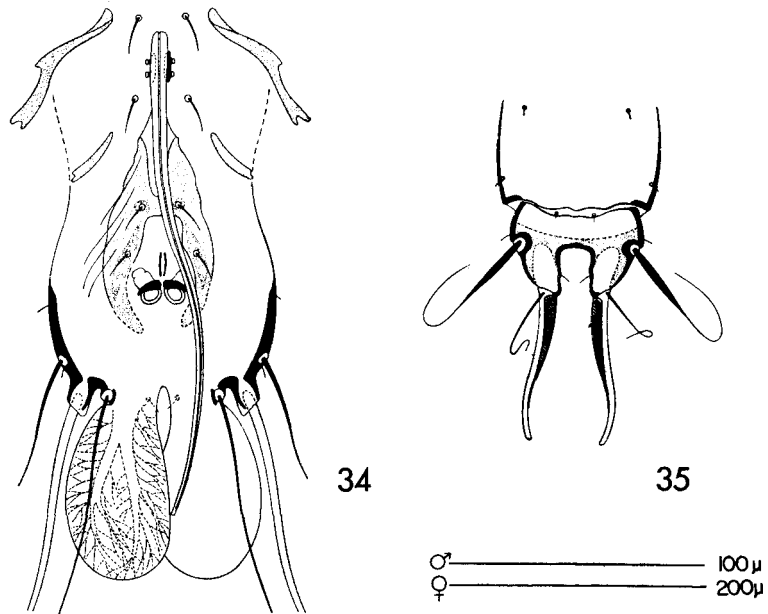
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Bombycillidae		
<i>Bombycilla garrulus</i> (L.), 1758	Europe	Buchholz, 1869 Vitzthum, 1922 <i>b</i> Fritsch, 1961 Lichard, 1962 Present study
<i>Bombycilla cedrorum</i> Vieillot, 1808	Alaska United States	Present study Present study
Fringillidae		
<i>Acanthis</i> spp.	Europe	Trouessart, 1886
<i>Acanthis cannabina</i> (L.), 1758	Europe	Lichard, 1962
<i>Acanthis flammea</i> (L.), 1758	Europe	Radford, 1958
<i>Acanthis flavirostris</i> (L.), 1758	Europe	Radford, 1958
<i>Carduelis carduelis</i> (L.), 1758	Europe	Canestrini, 1879 Present study
<i>Carduelis chloris</i> (L.), 1758	Europe	Canestrini, 1879 Radford, 1958
<i>Coccothraustes</i> spp.	Europe	Berlese, 1897
<i>Coccothraustes coccothraustes</i> (L.), 1758	Europe	Robin (& Mégnin), 1877 Vassilev, 1960, 1962 Fritsch, 1961 Lichard, 1962 Present study
<i>Emberiza citrinella</i> L., 1758	Europe	Canestrini, 1879
<i>Emberiza hortulana</i> (L.), 1758	Europe	Present study
<i>Eophona migratoria</i> Hartert, 1903	China	Present study
<i>Fringilla montifringilla</i> L., 1758	Europe	Present study
<i>Hesperiphona abeillei</i> (Lesson), 1839	México	Present study
<i>Hesperiphona vespertina</i> (Cooper), 1825	United States	Present study
<i>Loxia curvirostra</i> L., 1758	México United States	Present study Present study
<i>Pinicola enucleator</i> (L.), 1758	Newfoundland	Present study
<i>Pyrrhula pyrrhula</i> (L.), 1758	Europe	Vassilev, 1960 Fritsch, 1961 Lichard, 1962 Present study

Proctophyllodes capensis, new species

This new species is differentiated from the related *Proctophyllodes glandarinus* by the shape of the male opisthogastric shield. In this new species the right and left shields are weakly connected

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FIGS. 34-35. *Proctophyllodes capensis*, new species: holotype male (34), allotype female (35).

at the level of the anterior opisthogastric setae, whereas in *P. glandarinus* the shields are joined by a broad connection extending from the anterior opisthogastric setae almost to the genital arch. The females of these species may be differentiated by the shape of the hysterosomal cleft; the new species has the cleft longer than wide, while *P. glandarinus* has the cleft extremely broad. In addition, setae d_4 of the females are inserted on the conjunctiva in the new species and on the anterior margin of the lobar shield in the named species.

MALE (holotype). Length, excluding lamellae, 318μ; width 143μ. *Dorsal idiosoma*: Propodosomal shield 79μ in length, 86μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 57μ. Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 17.3μ in length, 3.5μ in width. Hysterosomal shield 173μ in length, 95μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 55μ in length. Lamellae 73μ in length, 32μ in width, ovoid, internal margins overlapping, each lamella

with venation in form of an inverted Y, stem and branches with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs joined; genital organ reflexion to level of anterior articulations of legs III; genital organ extending beyond midlength of lamellae, but not to apices; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields broadly joined and bearing two pairs of setae. Adanal discs circular, $18\mu \times 11\mu$ and apparently without teeth; reniform accessory glands present.

FEMALE (allotype). Length, excluding terminal appendages, 498μ ; width, 187μ . *Dorsal idiosoma*: Propodosomal shield 109μ in length, 125μ in width; lateral margins entire; without lacunae; with external vertical setae(?); distance between external scapular setae, 84μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 21.4μ in length, 4.8μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 251μ in length, 123μ in width, with anterior margin straight or shallowly concave, with lacunae; with supranal concavity. Lobar region articulated with anterior shield; 60μ in length; setae d_4 inserted on anterior edge of lobar shield and separated by 29μ ; lobes normal; cleft parallel-sided, 39μ in length, 21μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Motacilla capensis* (Motacillidae): holotype δ (SAIMR), allotype ♀ (SAIMR), 11 $\delta \delta$, 17 $\text{♀} \text{♀}$ paratypes, Ventersdorp, Transvaal, Union of South Africa, April 4, 1954. Paratypes deposited: Gaud, NU, SAIMR.

Additional material. Fringillidae: 7 $\delta \delta$, 5 $\text{♀} \text{♀}$, from *Fringillaria capensis*, Transvaal; 4 $\delta \delta$, 2 $\text{♀} \text{♀}$, from *Pyrrhula nipalensis*, Malaya.

Remarks. The bifurcate venation in the male lamellae are typical only for the type series. Specimens collected from *Fringillaria* and *Pyrrhula* lack the bifurcation although the venation has large and distinct branches. Even in the type series the bifurcation may be basal as illustrated or it may occur beyond the midlength of the lamella. The species is named *capensis* for the trivial name of the type host as well as a second species of bird from which this mite has been collected. The drawings are of the holotype and allotype.

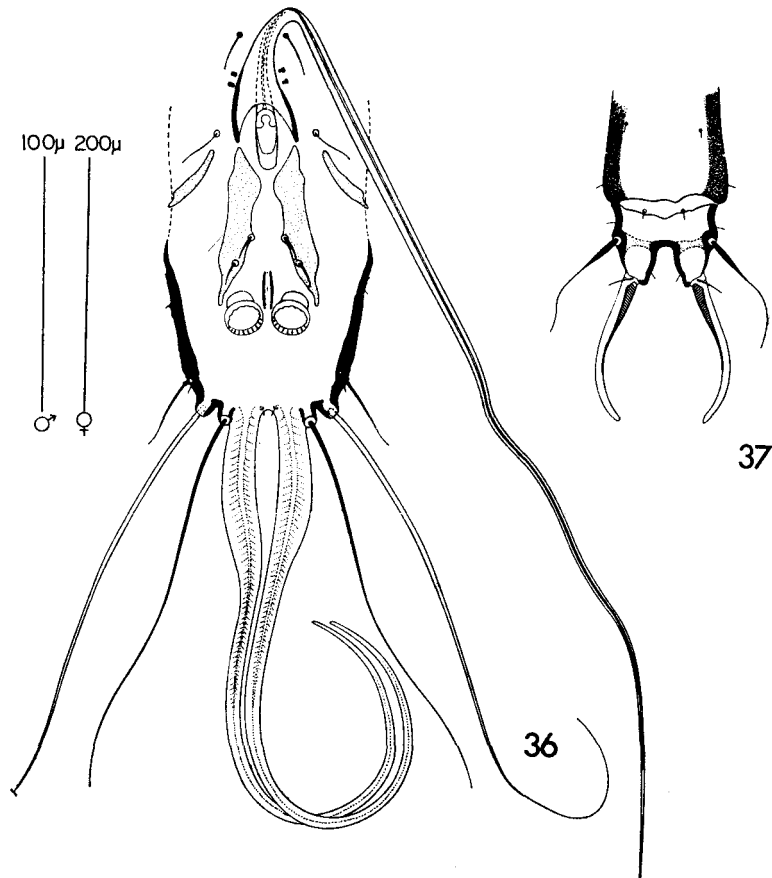
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HOSTS

Motacillidae		
<i>Motacilla capensis</i> (L.), 1766	Un. So. Africa	Present study
Fringillidae		
<i>Fringillaria capensis</i> (L.), 1766	Un. So. Africa	Present study
<i>Pyrrhula nipalensis</i> (Hodgson), 1836	Malaya	Present study

Proctophyllodes longiphyllus, new species

The extraordinary lengths of the genital organ and lamellae are unique to this species. The genital organ is longer than the



FIGS. 36-37. *Proctophyllodes longiphyllus*, new species: holotype male (36), allotype female (37).

idiosoma, and the lamellae are longer than the hysterosomal shield.

MALE (holotype). Length, excluding lamellae, 296 μ ; width, 139 μ . *Dorsal idiosoma*: Propodosomal shield 78 μ in length, 87 μ in width; lateral margins incised behind external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 60 μ . Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15 μ in length, 3 μ in width. Hysterosomal shield 173 μ in length, 91 μ in width; anterior margin straight; without lacunae; without ventrolateral extensions; supranal concavity 60 μ in length. Lamellae 250 μ in length, 14 μ in width, flagelliform with internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital organ reflexion to level of subhumeral setae; genital organ extending approximately 200 μ beyond posterior limits of idiosoma; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing two pairs of setae. Adanal discs circular, each about 13 μ x 8 μ and bearing approximately 18 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 397 μ ; width, 139 μ . *Dorsal idiosoma*: Propodosomal shield 78 μ in length, 87 μ in width; lateral margins incised behind external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 60 μ . Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15 μ in length, 3 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 202 μ in length, 108 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 102 μ in length; setae d_4 inserted on anterior margin of lobar shield and separated by 43 μ ; lobes normal; cleft convergent, 41 μ in length, 20 μ in width; setae d_5 approximately $\frac{1}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Icterus galbula* (Icteridae): holotype δ (NU), allotype ♀ (NU), 2 δ δ , 9 ♀ ♀ paratypes, Weslaco, Hidalgo County, Texas, May 4, 1945. Paratypes deposited: BMNH, Gaud, NU.

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Additional material. Icteridae: 2 ♂♂, from *Icterus dominicensis*, Cuba. Fringillidae: 6 ♂♂, 4 ♀♀, from *Cyanocompsa parellina*, México; 9 ♂♂, 10 ♀♀, from *Richmondia cardinalis*, United States.

Remarks. The spermathecal duct is enlarged from the bursa copulatrix to a point slightly beyond its reflexion in the region of the genital discs. *In copulo* the male genital organ, when inserted in the female genital tract, is also reflexed caudally in the region of the latigynial apodemes. The long spermathecal duct provides evidence that the males and females from the various hosts are correctly correlated. Two characters which could be used for species differentiation are presence or absence of lacunae and presence or absence of melanization on the lateral hysterosomal margins. Within any series of mites from a given host, the dorsal shields of males and/or females may have various conditions of lacunation. Furthermore, the females on the non-type hosts lack melanized lateral margins on the hysterosomal shield. Thus it is apparent that lacunation varies intraspecifically and, as shown in this and other species, the melanization under discussion probably is a physiological adaptation to some species of Icteridae.

Additional variations within the species are: propodosomal shield may be entire, and the opisthogastric shields of the males may be divided or weakly joined at their anterior margins.

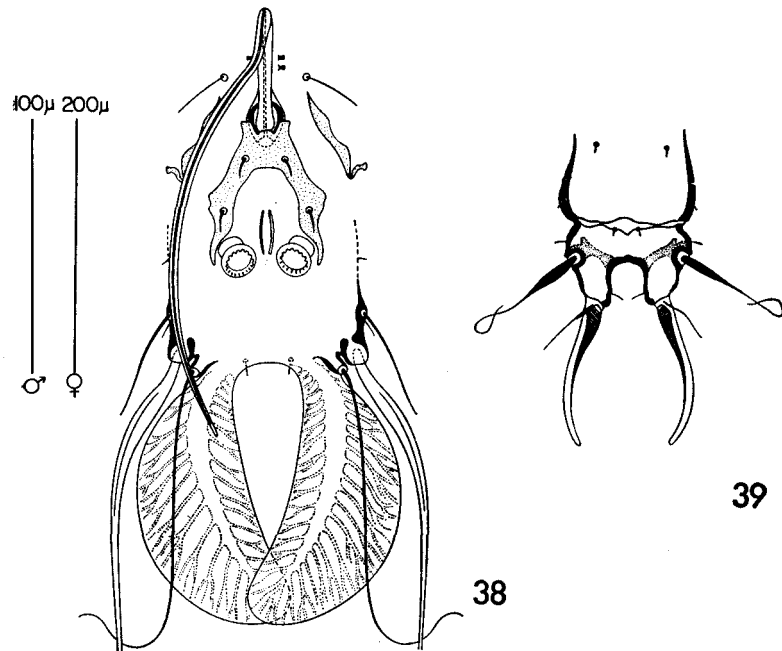
The name *P. longiphyllus* calls attention to the long, narrow lamellae of the male. The drawings are of the holotype and allotype.

HOSTS

Icteridae		
<i>Icterus galbula</i> (L.), 1758	United States	Present study
<i>Icterus dominicensis</i> (L.), 1766	Cuba	Present study
Fringillidae		
<i>Cyanocompsa parellina</i> (Bonaparte), 1850	México	Present study
<i>Richmondia cardinalis</i> (L.), 1758	United States	Present study

Proctophyllodes huitzilopochtlii, new species

The similarity in the configuration of the opisthogastric shields, arrangement of opisthogastric setae, and structure of the genital organs indicate that *Proctophyllodes glandarinus* and especially *P. capensis* are related to the new species being described. *P. huitzilopochtlii*, the only known species of *Proctophyllodes* from



FIGS. 38-39. *Proctophyllodes huitzilopochtlii*, new species: holotype male (38), allotype female (39).

Trochilidae, can be differentiated from the related species by the lack of reniform adanal accessory glands, by the shape of the lamellae, and by epimerites I being V-shaped.

MALE (holotype). Length, excluding lamellae, 309 μ ; width, 140 μ . *Dorsal idiosoma*: Propodosomal shield 75 μ in length, 63 μ in width; lateral margins deeply incised to include internal scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 44 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 24 μ in length, 3 μ in width. Hysterosomal shield 162 μ in length, 71 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 65 μ in length. Lamellae 96 μ in length, 43 μ in width, spatulate with internal margins apically overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I V-shaped with strong connective, without lateral extensions; epimerites II with narrow surface field on medial surface. Pregenital apodeme absent; genital discs separate; genital organ reflexion to level of articulation of legs III; genital organ extending

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to level of posterior limits of legs IV; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields broadly joined and bearing two pairs of setae. Adanal discs circular, each about $20\mu \times 16\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 481μ ; width, 170μ . *Dorsal idiosoma*: Propodosomal shield 106μ in length, 98μ in width; lateral margins deeply incised to include internal scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 68μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 30μ in length, 4μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 182μ in length, 70μ in width, with anterior margin irregular, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 27μ in length; setae d_4 inserted on anterior margin of lobar shield and separated by 28μ ; lobes normal; cleft parallel-sided, 80μ in length, 35μ in width; setae d_5 $\frac{1}{2}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Lampornis clemenciae* (Trochilidae): holotype δ (NU), allotype φ (NU), 1 δ , 1 φ paratypes, Boot Spring, 6500', Chisos Mountains, Brewster County, Texas, June 26, 1944, W. B. Davis; paratypes: 1 δ , 1 φ , October 26, 1934 and 4 φ , November 1, 1934, Palos Verde Mine, 1 mile E. Santa Lucia, Sinaloa, México; 1 δ , east side Mt. Mohinora, Chihuahua, México, May 19, 1937. Paratypes deposited: Gaud, NU, USNM.

Additional material. Trochilidae: 7 $\delta\delta$, 5 $\varphi\varphi$, from *Amazilia beryllina*, Sinaloa, México; 3 $\delta\delta$, 2 $\varphi\varphi$, from *Amazilia rutila*, México; 4 $\delta\delta$, 4 $\varphi\varphi$, from *Amazilia violiceps*, México; 1 δ , 4 $\varphi\varphi$, from *Chlorostilbon canivettii*, Chiapas, México; 7 $\delta\delta$, 5 $\varphi\varphi$, from *Colibri thalassinis*, México; 3 $\delta\delta$, 5 $\varphi\varphi$, from *Cynanthus latirostris*, México; 4 $\delta\delta$, 4 $\varphi\varphi$, from *Cynanthus sordidus*, México; 17 $\delta\delta$, 13 $\varphi\varphi$, from *Eugenes fulgens*, México; 9 $\delta\delta$, 15 $\varphi\varphi$, from *Hylocharus leucotis*, México; 2 $\delta\delta$, 3 $\varphi\varphi$, from *Selasphorus platycercus*, México; 2 $\delta\delta$, 2 $\varphi\varphi$, from *Selasphorus rufus*, México; 1 δ , 3 $\varphi\varphi$, from *Selasphorus sasin*, México; 3 $\delta\delta$, 5 $\varphi\varphi$, from unidentified hummingbird, California.

Remarks. Trochilids are primarily restricted to South and Central America; *P. huitzilopochtlii* is widely distributed among

these birds and apparently is restricted to the family Trochilidae. This parallels mallophagan systematics in which one family is known to occur exclusively on hummingbirds (Carriker, 1960).

This new species is named for Huitzilopochtli, a great god of the Aztec pantheon, also called the Hummingbird Wizard. The drawings are of the holotype and allotype.

HOSTS

Trochilidae		
<i>Amazilia beryllina</i> (Lichtenstein), 1830	México	Present study
<i>Amazilia rutila</i> (DeLatre), 1842	México	Present study
<i>Amazilia violiceps</i> (Gould), 1859	México	Present study
<i>Chlorostilbon canivettii</i> (Lesson), 1832	México	Present study
<i>Colibri thalassinis</i> (Swainson), 1827	México	Present study
<i>Cynanthus latirostris</i> (Swainson), 1827	México	Present study
<i>Cynanthus sordidus</i> (Gould), 1859	México	Present study
<i>Eugenes fulgens</i> (Swainson), 1827	México	Present study
<i>Hylocharis leucotis</i> (Vieillot), 1818	México	Present study
<i>Lamprolaima clemenciae</i> (Lesson), 1830	México United States	Present study Present study
<i>Selasphorus platycercus</i> (Swainson), 1827	México	Present study
<i>Selasphorus rufus</i> (Gmelin), 1788	México	Present study
<i>Selasphorus sasin</i> (Lesson), 1829	México	Present study

Proctophyllodes pennifer (Trouessart and Neumann)

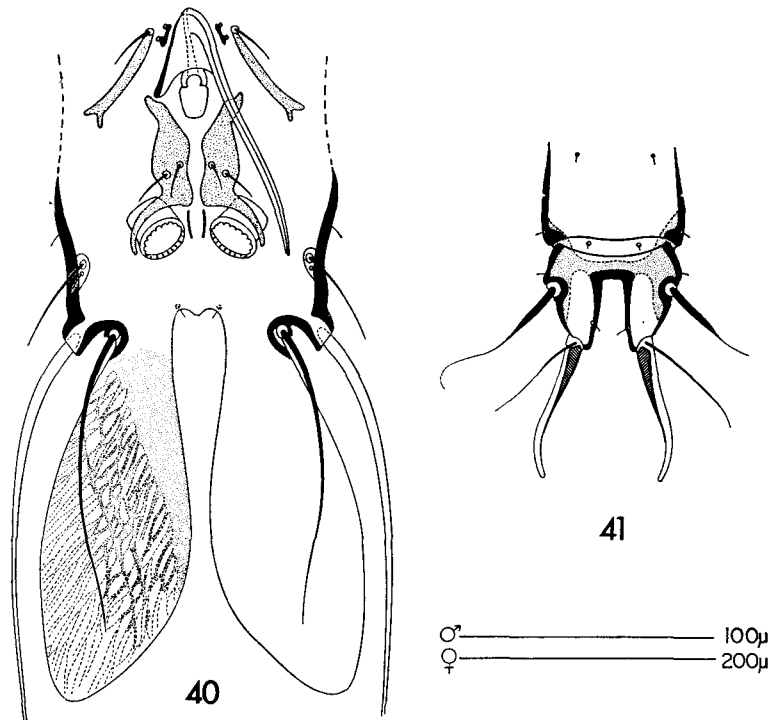
Pterodectes pennifer Trouessart and Neumann, 1888, Bull. Sci. France Belgique, 19: 371, pl. 25, figs., 8, 9. Type host: *Muscisylvia leucura* (Turdidae).

Proctophyllodes pennifer, Canestrini and Kramer, 1899, Tierreich, 7: 118-119.

The terminal lamellae of this species are unique. These structures have the venation unilateral, the main veins are mesal and all branchings are directed toward the lateral margins.

MALE. Length, excluding lamellae, 318 μ ; width, 158 μ . *Dorsal idiosoma*: Propodosomal shield 86 μ in length, 97 μ in width; lateral margins entire; with few small lacunae on anterior portion; with-

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FIGS. 40-41. *Proctophyllodes pennifer* Trouessart and Neumann: male (40), lectotype female (41).

out external vertical setae; distance between external scapular setae, 34μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.6μ in length, 4.8μ in width. Hysterosomal shield 283μ in length, 117μ in width; anterior margin shallowly concave or straight; without lacunae; with ventrolateral extensions; supranal concavity 35μ in length. Lamellae, 145μ in length, 52μ in width, each lamella with shape and venation similar to winged fruit of the maple tree (*Acer*), with unilateral pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong, broad connective, without lateral extensions; epimerites I and II with narrow surface field along their lengths, epimerites III and IIIa connected laterally by narrow surface field, epimerites IV and IVa connected laterally by narrow surface field. Pregenital apodeme absent; genital discs united; genital organ reflexion to level of posterior articulations of legs III; genital organ extending halfway between anal sclerites and origin of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate

and bearing two pairs of setae. Adanal discs round, each about $17\mu \times 17\mu$ and bearing approximately 24 well-developed teeth; accessory glands absent.

FEMALE (lectotype). Length, excluding terminal appendages, 415μ ; width, 145μ . *Dorsal idiosoma*: Propodosomal shield 93μ in length, 114μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 74μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 19.3μ in length, 4.1μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 200μ in length, 119μ in width, with anterior margin sinuous, without lacunae; without supranal concavity. Lobar region articulated or incompletely fused with anterior shield; 79μ in length; setae d_4 inserted on conjunctiva and separated by 36μ ; lobes normal; cleft parallel-sided, 57μ in length, 21μ in width; setae d_5 and terminal appendages approximately equal in length. Spermatheca not visible. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites IVa fan-shaped; epimerites without surface fields.

Type material. From *Muscisylvia* (= *Notodela*) *leucura* (Turdidae): lectotype ♀ (TC), syntype ♀ (TC), from the Himalayas.

Additional material. Turdidae: 1 ♂, from *Muscisylvia leucura*, Malaya.

Remarks. The type slide from the Trouessart Collection has the notation "*Proctophyllodes pennifer*, n. sp., ♀." Males were not found in the collection, but as the drawings of Trouessart and Neumann clearly show that the male is distinctive, one of the females has been elevated to lectotype. The drawing and redescription of the male are of the specimen from Malaya, the drawing and redescription of the female are of the lectotype.

HOSTS

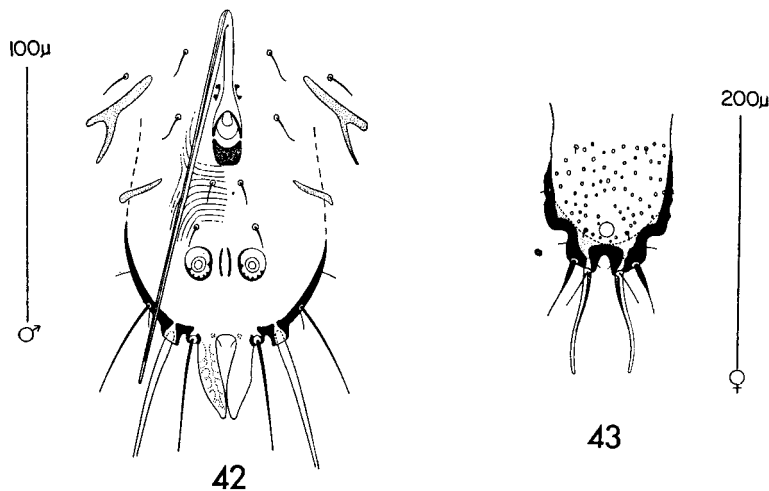
Turdidae		
<i>Muscisylvia leucura</i> (Hodgson)	Himalayas	Trouessart & Neumann, 1888
	Malaya	Present study Present study

Proctophyllodes stenophyllus Gaud and Mouchet

Proctophyllodes stenophyllus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32: 513, figs. 10C, 9D. Type host: *Pycnonotus barbatus* (Pycnonotidae).

Proctophyllodes stenophyllus, Gaud and Till, 1961, Publ. So. Afr.

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FIGS. 42-43. *Proctophyllodes stenophyllus* Gaud and Mouchet: paratype male (42), paratype female (43).

Inst. Med. Res., 11(L): 251.

The males of this species lack obvious opisthogastric shields; there is only a small remnant connecting the tips of the genital arch. The opisthogastric setae are inserted in the striated opisthogastric region. Another feature of *P. stenophyllus* males is the asymmetrical adanal discs on which there are large teeth on the posterior half, and possibly small ones on the anterior half.

MALE (paratype). Length, excluding lamellae, 220 μ ; width, 114 μ . *Dorsal idiosoma*: Propodosomal shield 56 μ in length, 85 μ in width; lateral margins entire; with lacunae; with external vertical setae; distance between external scapular setae 55 μ . Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 10.4 μ in length. Hysterosomal shield 137 μ in length, 94 μ in width; anterior margin straight; with lacunae; without ventrolateral extensions; supranal concavity 31 μ in length. Lamellae 31 μ in length, 9 μ in width, narrow, pointed, internal margins separated at origins, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernable connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs weakly joined; genital organ to level of humeral setae; genital organ extending to tips of lamellae or slightly beyond; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields absent except for small remnant connecting

the arms of the genital arch but not extending to the anterior pair of opisthogastric setae. Adanal discs asymmetrical, unmeasurable, length less than diameter and bearing approximately 8-11 teeth on posterior half, without teeth on anterior half; accessory glands absent.

FEMALE (paratype). Length, excluding terminal appendages, 338 μ ; width, 150 μ . *Dorsal idiosoma*: Propodosomal shield 70 μ in length, 47 μ in width; lateral margins entire; with lacunae; with external vertical setae; distance between external scapular setae, 75 μ . Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 110 μ in length. Hysterosoma with lobes and with terminal appendages; anterior shield 166 μ in length, 117 μ in width, with anterior margin straight, with lacunae; with supranal concavity. Lobar region fused with anterior shield; 31 μ in length; setae d_4 inserted lateral to supranal concavity and separated by 32 μ ; lobes short; cleft in the form of a small arch 24 μ in length; setae d_5 $\frac{1}{3}$ and setae l_5 $\frac{1}{2}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernible connective, without lateral extensions; epimerites without surface fields.

Type material. From *Pycnonotus barbatus* (Pycnonotidae): holotype δ (Gaud), allotype φ (Gaud), 1 δ , 1 φ paratypes (Gaud), Yaoundé, Nyong and Sanaga region, French Cameroons, September, 1955.

Additional material. Pycnonotidae: 3 δ δ , 2 φ φ , from *Pycnonotus xanthopygos*, Union of South Africa; 6 δ δ , 4 φ φ , from *P. goiavier*, Malaya. Apodidae: 1 δ , 1 φ , from *Apus affinis*, Union of South Africa.

Remarks. In the specimens from *Apus affinis* and *Pycnonotus goiavier*, the propodosomal shield of the males appears to be divided at the level of the scapular setae, however, the shield is undivided; this impression is due to a reduction in the surface granulations in the area. In these same specimens, the ventral apodemes are reddish-brown and better developed than in specimens from other hosts, and the small opisthogastric shield is divided at the center. The drawings are of male and female paratypes.

HOSTS

Pycnonotidae		
<i>Pycnonotus barbatus</i>	Fr. Cameroons	Gaud & Mouchet, 1957
(Des Fontaines), 1789		Present study
	Belgian Congo	Gaud & Till, 1961

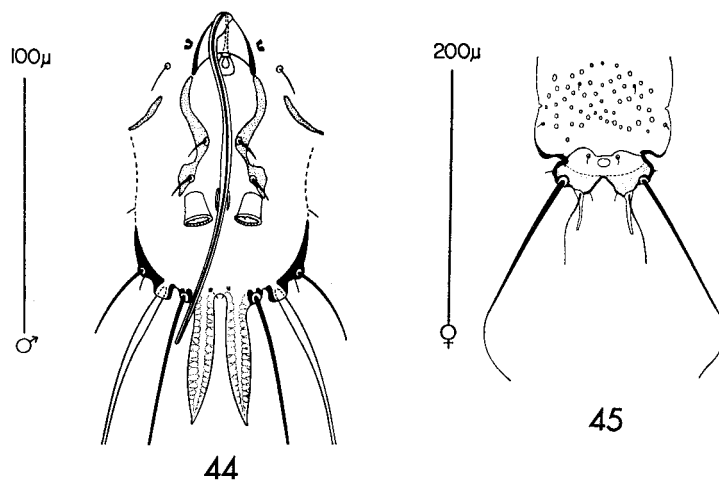
The Feather Mite Genus *Proctophyllodes*

<i>Pycnonotus xanthopygos</i> (Ehrenberg), 1833	Un. So. Africa	Present study
<i>Pycnonotus goiavier</i> (Scopoli), 1786	Malaya	Present study
<i>Thescelocichla leucopleura</i> (Cassin), 1856	Fr. Cameroons	Gaud & Mouchet, 1957
Apodidae (questionable record)		
<i>Apus affinis</i> (J. E. Gray), 1830	Un. So. Africa	Present study

Proctophyllodes gymnomystacis, new species

The males of this new species are similar to the males of *Proctophyllodes stoddardi*, new species, but the females are quite distinct. The males of *P. gymnomystacis* have lanceolate lamellae; the lamellae of *P. stoddardi* are narrowly linear. The females of *P. gymnomystacis* have reduced hysterosomal lobes and reduced terminal appendages; in *P. stoddardi*, the hysterosomal lobes and terminal appendages are not reduced.

MALE (holotype). Length, excluding lamellae, 280 μ ; width, 125 μ . Dorsal idiosoma: Propodosomal shield 83 μ in length, 79 μ in width; lateral margins entire; with large lacunae; with external vertical setae; distance between external scapular setae, 48 μ . Humeral shields well developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae setiform, 12.4 μ in length. Hysterosomal shield 159 μ in length, 90 μ in width; anterior margin



FIGS. 44-45. *Proctophyllodes gymnomystacis*, new species: holotype male (44), allotype female (45).

straight; with lacunae; without ventrolateral extensions; supranal concavity 31μ in length. Lamellae 50μ in length, 11μ in width, long, parallel-sided, attenuate, internal margins approximate, with reduced pinnate venation. *Ventral idiosoma*: Apodemes weakly developed; epimerites I U-shaped with broad, weak connective, without lateral extensions; epimerites without surface fields. Pre-genital apodeme absent; genital discs joined; genital arch reflexion to level midway between anterior and posterior articulations of legs III; genital organ extending to midlength of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate, narrow and bearing two pairs of setae. Adanal discs circular, each about $12\mu \times 10\mu$ and bearing approximately 22 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 355μ ; width 130μ . *Dorsal idiosoma*: Propodosomal shield 81μ in length, 81μ in width; lateral margins entire; with lacunae; with external vertical setae; distance between external scapular setae, 53μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae setiform, 12.4μ in length. Hysterosoma with short terminal appendages; anterior shield 187μ in length, 107μ in width, with anterior margin shallowly concave, with lacunae; with supranal concavity. Lobar region articulated with anterior shield; 29μ in length; setae d_4 inserted anterolateral of supranal concavity and separated by 21μ ; lobes vestigial; cleft in form of small arch, 14μ in length; setae d_5 twice length of terminal appendages; setae l_5 about three times length of setae d_5 . Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Gymnomystax mexicanus* (Icteridae): holotype ♂ (NU), allotype ♀ (NU), 1 ♀ paratype (NU), Tumero, Arauca, Venezuela, September 3, 1937, V. Barnes.

Remarks. The anterolateral projections of the propodosomal shield connect laterally with epimerites Ia in the male, but in the females these projections are weakly developed. The solenidion σ_1 in both sexes is short and thick. The species is named *gymnomystacis* for the host. The drawings are of the holotype and allotype.

HOSTS

Icteridae		
<i>Gymnomystax mexicanus</i> (L.), 1766	Venezuela	Present study

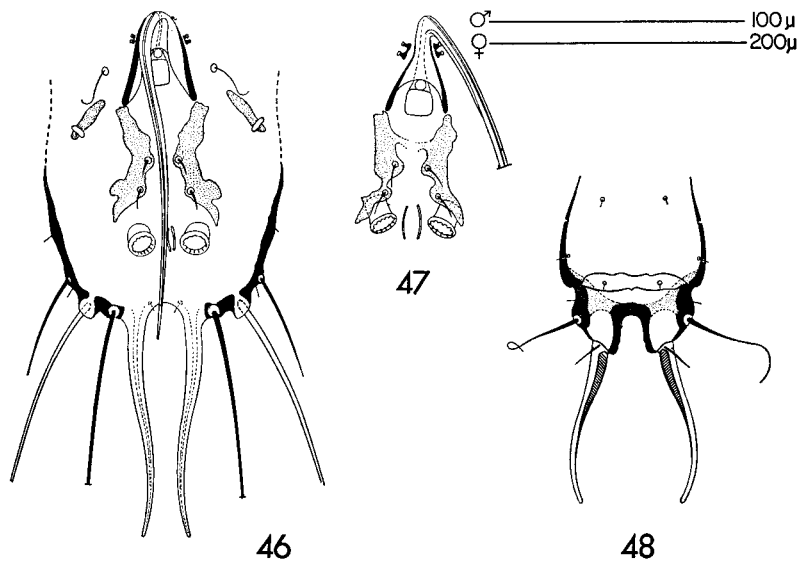
The Feather Mite Genus *Proctophyllodes*

Proctophyllodes stoddardi, new species

Although this species has a long genital organ and is related to *P. longiphyllus*, new species, the modification of the male terminal lamellae is unique; these structures are extremely long, narrow, and well separated at their origins.

Within the group characterized by a long genital organ, setae d_5 of the females is extremely short in *Proctophyllodes stoddardi*, *P. longiphyllus* and *P. stenophyllus*. In the former two species, the hysterosomal lobes and terminal appendages are not reduced, whereas in *P. stenophyllus*, these structures are modified.

MALE (holotype). Length, excluding lamellae, 278 μ ; width, 142 μ . *Dorsal idiosoma*: Propodosomal shield 78 μ in length, 88 μ in width; lateral margins entire; without lacunae; without vertical setae; distance between external scapular setae 63 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 14 μ in length, 2 μ in width. Hysterosomal shield 160 μ in length, 91 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity, 33 μ in length. Lamellae 90 μ in length, 6.5 μ in basal width, linear with internal margins not overlapping, with vestigial venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites IVa with small surface field at base. Pregenital



FIGS. 46-48. *Proctophyllodes stoddardi*, new species: holotype male (46), paratype male (47), allotype female (48).

apodeme absent; genital discs united; genital organ reflexion to level of legs III; genital organ extending beyond opisthosomal margin approximately one fourth length of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing two pairs of setae. Adanal discs circular, each about $10\mu \times 10\mu$ and bearing approximately 14 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 405μ ; width, 180μ . Dorsal idiosoma: Propodosomal shield 96μ in length, 104μ in width; lateral margins entire; without lacunae; without vertical setae; distance between external scapular setae, 76μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 21μ in length, 3μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 198μ in length, 101μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 55μ in length; setae d_4 inserted on conjunctiva and separated by 42μ ; lobes short; cleft slightly convergent, 33μ in length, 22μ in width; setae d_5 $\frac{1}{5}$ length of terminal appendages. Spermatheca as in *pinnatus*. Ventral idiosoma: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

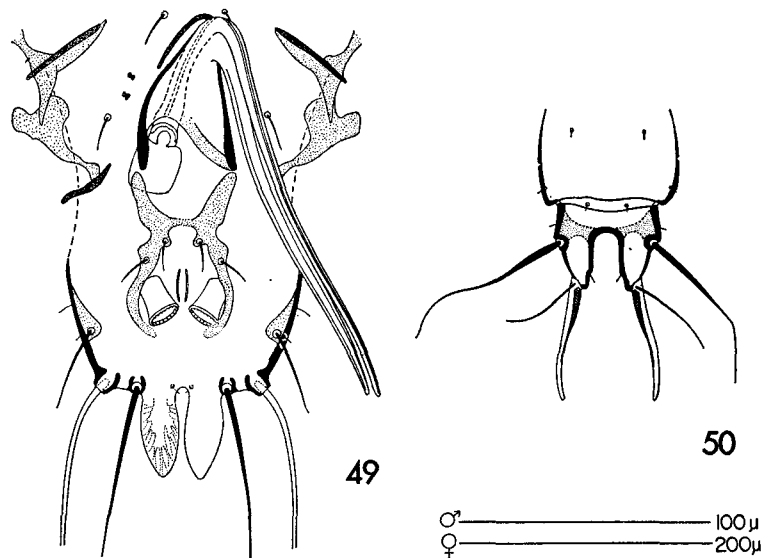
Type material. From *Vireo olivaceus* (Vireonidae): holotype δ (NU), allotype ♀ (NU), 1 δ , 2 $\text{♀}\text{♀}$ paratypes, April 21, 1958 and 1 δ , 6 $\text{♀}\text{♀}$ paratypes, March 11, 1958, Tall Timbers Research Station, Leon County, Florida, H. L. Stoddard; 1 δ paratype, Georgia, March 10, 1958, E. Odum. Paratypes deposited: Gaud, NU, USNM.

Additional material. Vireonidae: 1 δ , 7 $\text{♀}\text{♀}$, from *Vireo flavifrons*, East Baton Rouge Parish, Louisiana.

Remarks. The genital organs of all males examined were juxtaposed, thus, figures 46 and 47 are probable reconstructions. The latter figure illustrates an incomplete connection between the opisthogastric shields. This species is named *Proctophyllodes stoddardi* for the collector of the type series, H. L. Stoddard, who has been extremely helpful in supplying material for this study. The drawings are of the holotype, allotype, and one male paratype.

HOSTS

Vireonidae		
<i>Vireo flavifrons</i> (Vieillot), 1807 (1808)	United States	Present study
<i>Vireo olivaceus</i> (L.), 1766	United States	Present study



FIGS. 49-50. *Proctophyllodes dicruri*, new species: holotype male (49), allotype female (50).

Proctophyllodes dicruri, new species

The length of the genital organ and the shape of the opistogastric shields in this species are similar to those of *P. gymnomystacis*, new species. The new species being described can be differentiated by the supranal concavity being closed and by the extremely well-developed genital hood and genital organ. *P. gymnomystacis* has the supranal concavity open posteriorly and has a weakly developed genital hood and a narrow genital organ.

MALE (holotype). Length, excluding lamellae, 314 μ ; width, 155 μ . *Dorsal idiosoma*: Propodosomal shield 76 μ in length, 86 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 53 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.0 μ in length, 2.1 μ in width. Hysterosomal shield 207 μ in length, 104 μ in width; anterior margin straight; without lacunae; without ventrolateral extensions; supranal concavity 28 μ in length. Lamellae 35 μ in length, 17 μ in width, short, bluntly rounded, internal margins approximate, with palmate or modified pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, with lateral extensions; epimerites I-II with surface fields along their lengths, III and IV connected laterally by

narrow surface fields, IV and IVa connected by narrow surface field. Pregenital apodeme present, narrow, not connecting genital discs; genital discs separate, genital organ reflexion to level of anterior articulations of legs III; genital organ extending to mid-length of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields narrow, weakly joined anterior to opisthogastric setae and bearing two pairs of setae. Adanal discs circular, each about $15\mu \times 11\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 439μ ; width, 156μ . *Dorsal idiosoma*: Propodosomal shield 90μ in length, 100μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 62μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 23.5μ in length, 3.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 221μ in length, 121μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 66μ in length; setae d_4 inserted on conjunctiva and separated by 31μ ; lobes normal; cleft parallel-sided, 45μ in length, 20μ in width; setae d_5 $\frac{2}{3}$ length of terminal appendages; setae l_5 $1\frac{1}{2}$ times length of terminal appendages. Spermatheca with long secondary ducts and with primary duct enlarged posteriorly. *Ventral idiosoma*: Apodomes well developed; epimerites I U-shaped with weak connective, with small lateral extensions; epimerites I-II with narrow surface fields along their lengths, epimerites III and IIIa connected laterally by narrow surface fields.

Type material. From *Dicrurus ludwigii* (Dicruridae): holotype δ (SAIMR), allotype ♀ (SAIMR), 1 δ , 1 ♀ paratypes, Buzi, Mozambique, November 7, 1961, F. Zumpt. Paratypes deposited: NU.

Additional material. Muscicapidae: 1 δ , 1 ♀ , from *Melaenornis pammelaina*, Mozambique.

Remarks. The large diameter of the genital organ and the extremely well-developed genital hood are characteristic of this species. Other species of *Proctophyllodes* whose genital apparatus would approach this size and shape would be *P. caulifer* and *P. mecistocaulus*. The drawings are of the holotype and allotype.

HOSTS

Dicruridae

Dicrurus ludwigii
(A. Smith), 1834

Mozambique

Present study

The Feather Mite Genus *Proctophyllodes*

Muscicapidae

Melaenornis pammelaina
(Stanley), 1814

Mozambique

Present study

Proctophyllodes mecistocaulus Gaud and Mouchet

Proctophyllodes mecistocaulus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32: 511, fig. 7D. Type host: *Chlorocichla simplex* (= *Pyrrhurus simplex*) (Pycnonotidae).

Gaud and Mouchet (1957) were impressed by the size of the genital organ of this species. The structure extends beyond the apices of the lamellae and in comparison with *P. glandarinus* and related species, the length is great. However, more impressive is the fact that the epimerites I are apparently not connected and the short opisthogastric shields extend from the genital arch to midway between the opisthogastric setae.

MALE (holotype). Length, excluding lamellae, 250 μ ; width, 115 μ . *Dorsal idiosoma*: Propodosomal shield 72 μ in length, 88 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 58 μ . Humeral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae setiform, 14.5 μ in length. Hysterosomal shield 154 μ in length, 107 μ in width; anterior margin shal-

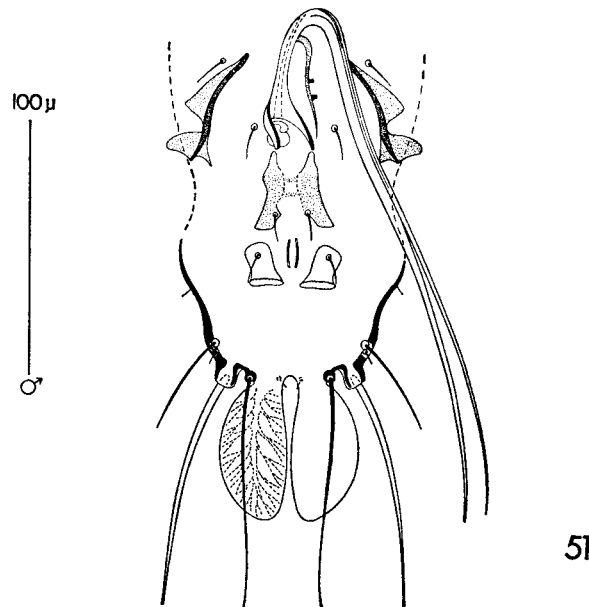


FIG. 51. *Proctophyllodes mecistocaulus* Gaud and Mouchet: holotype male.

lowly concave; without lacunae; without ventrolateral extensions; supranal concavity 38μ in length. Lamellae 54μ in length, 25μ in width, elongate, rounded, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I not visibly connected, without lateral extensions; epimerites without surface fields. Pregenital apodeme narrow, connecting discs of each side; genital organ reflexion to level of humeral setae; genital organ extending to or slightly beyond tips of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields reduced to small plates weakly connected and bearing the anterior pair of opisthogastric setae. Adanal discs circular, each about $14\mu \times 10\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE. Unknown.

Type material. From *Chlorocichla simplex* (Pycnonotidae): holotype δ (Gaud), Yaoundé, Nyong and Sanaga region, French Cameroons, August, 1956, J. Mouchet.

Remarks. This species is known from a single specimen, the holotype male. A tritonymph associated with the male is undoubtedly not a *Proctophyllodes* as epimerites I are fused in a Y and the dorsoterminal papillae so characteristic of tritonymph females are absent. The drawing is of the holotype.

HOSTS

Pycnonotidae		
<i>Chlorocichla simplex</i> (Hartlaub), 1855 (= <i>Pyrhrurus simplex</i>)	Fr. Cameroons	Gaud and Mouchet, 1957 Present study

Proctophyllodes rubeculinus (Koch)

- Dermaleichus rubeculinus* Koch, 1841, Deut. C. M. A., Heft. 33, no. 22, 23. Type host: *Erithacus rubecula* (Turdidae).
- Proctophyllodes rubeculinus*, Haller, 1878, Z. wiss. Zool., 30: 537.
- Proctophyllodes rubeculinus*, Poppe, 1888, Abhandl. Naturwiss. Ver. Bremen, 10: 228.
- Proctophyllodes rubeculinus*, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 25.
- Proctophyllodes rubeculinus*, Gaud, 1952, Mém. Inst. sci. Madagascar, Sér. A, 7(1): 87.
- Proctophyllodes rubeculinus*, Gaud, 1957, Bull. Soc. Sci., nat. Phys. Maroc, 37(2): 124.
- Proctophyllodes rubeculinus*, Gaud & Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 513.

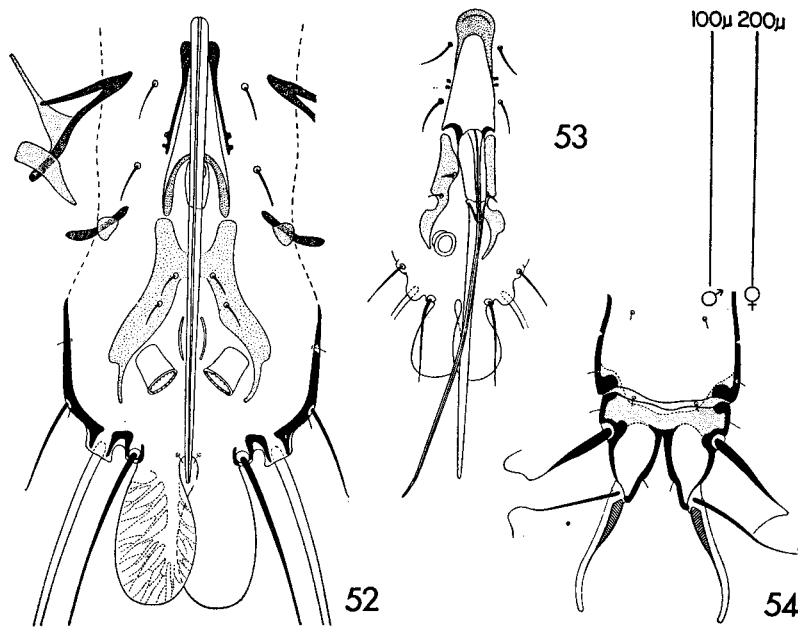
The Feather Mite Genus *Proctophyllodes*

Proctophyllodes mandulovi Vassilev, 1960, Zool. Inst. Bulgarian Acad. Sci., 9: 434-436, figs. 1, 2. Type host: *Erithacus rubecula*. (New synonymy)

Proctophyllodes glandarinus, Fritsch, 1961, Z. Parasitenk., 21: 4-6, figs. 1a-d.

Proctophyllodes rubeculinus, *P. cotyledon*, *P. caulifer*, and *P. doleophyes* each have small to well-developed lateral extensions of epimerites I. Further, these extensions may be present in one of both sexes. The females of the first two named species have peculiarly shaped terminal clefts and are easily distinguished by this character. In *P. rubeculinus*, the cleft is doubly concave, the inner margins are approximate at midlength of the cleft.

MALE. Length, excluding lamellae, 319 μ ; width, 151 μ . *Dorsal idiosoma*: Propodosomal shield 73 μ in length, 81 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 53 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7 μ in length, 4.1 μ in width. Hysterosomal shield 179 μ in length, 79 μ in width; anterior margin



FIGS. 52-54. *Proctophyllodes rubeculinus* (Koch): male (52) and female (54) from *Erithacus rubecula*; male genital region adapted from Fritsch, 1961 (53).

shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 50μ in length. Lamellae 48μ in length, 30μ in width, ovoid, internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, with lateral extensions; epimerites III-IIIa incompletely joined laterally by narrow surface band, epimerite IV with posterolateral surface extension, epimerite IVa with small circular surface field; pregenital apodeme broad with narrow caudal extensions connecting genital discs on each side; genital organ reflexion to level of subhumeral setae; genital organ extending slightly beyond origins of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields joined by weak connective anterior to anterior opisthogastric setae and bearing two pairs of setae. Adanal discs circular, each about $17\mu \times 14\mu$ and bearing approximately 26 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 463μ ; width, 155μ . *Dorsal idiosoma*: Propodosomal shield 93μ in length, 99μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 67μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 24.9μ in length, 5.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 217μ in length, 95μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 81μ in length; setae d_4 inserted on conjunctiva and separated by 46μ ; lobes wide; cleft convergent, 57μ in length; setae d_5 approximately equal in length to terminal appendages. Spermatheca with secondary ducts long, posterior portion of primary duct wide. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with strong connective, with lateral extensions; epimerites IVa fan-shaped; epimerites without surface fields.

Type material. From *Erithacus rubecula* (Turdidae), Germany; location of type unknown.

Material examined. Turdidae: 5 ♂♂, 8 ♀♀ from *Erithacus rubecula*, England, France; 2 ♂♂, 3 ♀♀, from *Luscinia cyane*, Malaya.

Remarks. Gaud (1952) and Gaud and Mouchet (1957) state that this species occurs on two species of Muscicapidae (see below). In the University of Nebraska collection there are a few specimens from *Terpsiphone paradisi* (Muscicapiade) which deviate from the specimens identified as *Proctophyllodes rubeculinus*. Differences in

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the females are as follows: terminal cleft is narrow and parallel-sided, the lobar shield is heavily sclerotized, and the anterior portion of the primary spermathecal duct is thickened. These specimens are provisionally included in *P. rubeculinus*. It is possible that these feather mites occurring on species of Muscicapidae are not *P. rubeculinus*, but a closely allied form.

Until Vitzthum synonymized the species with *P. glandarinus*, *P. rubeculinus* had been mentioned only twice in the literature (Haller, 1878; Poppe 1888). After this, presumably many workers overlooked *P. rubeculinus* as one of the species associated with species of Turdidae. Thus, distribution records are questionable. The drawing of the male is from a specimen collected in England, that of the female from a specimen collected in France.

HOSTS

Turdidae		
<i>Erithacus rubecula</i> (L.), 1758	Europe	Koch, 1841 Haller, 1878 Poppe, 1888 Vitzthum, 1922 <i>b</i> Vassilev, 1960 Fritsch, 1961 Present study
	Fr. Morocco	Gaud, 1957
<i>Luscinia cyane</i> (Pallas), 1776	Malaya	Present study
Muscicapidae (provisionally included)		
<i>Tchitrea mutata</i> L.	Madagascar	Gaud, 1952
<i>Terpsiphone paradisi</i> (L.), 1758	Malaya	Present study
<i>Terpsiphone viridis</i> (Müller), 1776	Fr. Cameroons	Gaud & Mouchet, 1957

Proctophyllodes cotyledon Trouessart

Proctophyllodes cotyledon Trouessart, 1899, Bull. Soc. Étud. Sci. Angers, 28: 176–177. Type host: *Toxostoma redivivum* (= *Harpyrhynchus redivivus*) (Mimidae).

Proctophyllodes cotyledon, Canestrini & Kramer, 1899, Tierreich, 7: 118.

Proctophyllodes cotyledon, Vitzthum, 1922*b*, Arch. Naturgeschichte, A, 88(5): 63.

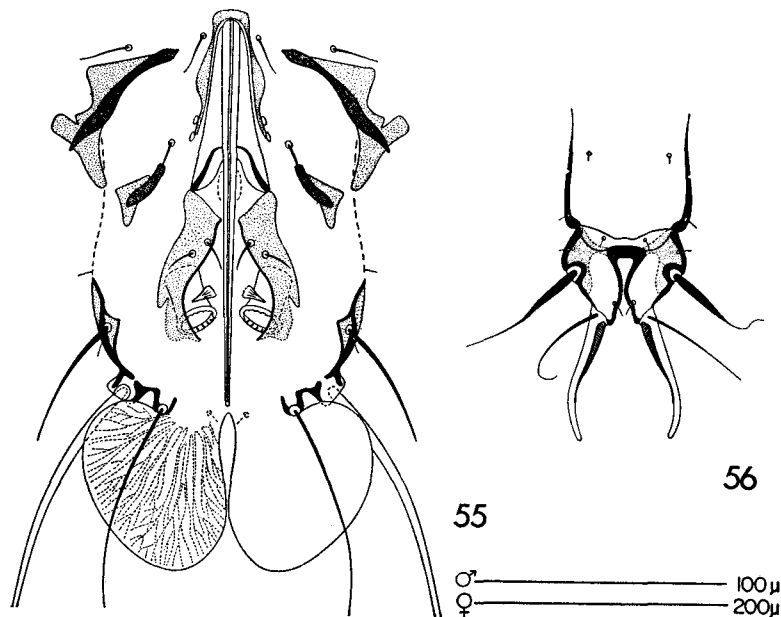
Proctophyllodes cotyledon, Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37(2): 117.

Proctophyllodes dontschevi Vassilev, 1958, Proc. Bulgarian Acad. Sci., 4: 27–29, figs. 3, 4. Type host: *Phoenicurus ochruros* (Turdidae) (New synonymy).

Proctophyllodes cardifolius Fritsch, 1961, Z. Parasitenk., 21: 6-9, figs. 2c-d, 3, 4, 5. Type host: *Phoenicurus ochruros* (New synonymy).

Of the species of *Proctophyllodes* with males possessing genital organs that extend to or beyond the apices of the lamellae, *P. cotyledon* are unique in the formation of the terminal cleft. In this species, the internal margins of the cleft are doubly concave, i.e., the inner margins are distant at each end. The males have reticulate adanal accessory glands.

MALE (holotype). Length, excluding lamellae, 330 μ ; width, 155 μ . *Dorsal idiosoma*: Propodosomal shield 81 μ in length, 99 μ in width; lateral margins entire; with few lacunae on anterior quarter; with external vertical setae; distance between external scapular setae, 64 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles. Hysterosomal shield 195 μ in length, 104 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 69 μ in length. Lamellae 62 μ in length, 55 μ in width, broadly ovoid, lateral margins extending beyond setae l_5 , internal margins approximate, with palmate venation. *Ventral idiosoma*: Apodemes well developed; epi-



FIGS. 55-56. *Proctophyllodes cotyledon* Trouessart: holotype male (55), female (56).

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merites I U-shaped with strong connective, with lateral extensions; epimerites I and II with narrow surface fields along their lengths, epimerites III and IIIa connected laterally by narrow surface field, epimerites IV and IVa connected laterally by narrow surface field. Pregenital apodeme well developed, extending caudad to connect the genital discs of each side; genital organ reflexion to anterior articulations of legs III; genital organ extending to origins of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing two pairs of setae. Adanal discs circular, each about $21\mu \times 10\mu$ and bearing approximately 28 teeth; with triangular accessory glands.

FEMALE. Length, excluding terminal appendages, 445μ ; width, 165μ . *Dorsal idiosoma*: Propodosomal shield 90μ in length, 110μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 76μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 21.1μ in length, 4.8μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 211μ in length, 102μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 69μ in length; setae d_4 inserted on conjunctiva and separated by 33μ ; lobes wide; cleft doubly concave, inner margins almost touching, 55μ in length; setae d_5 approximately equal length to terminal appendages. Spermatheca with secondary ducts long; posterior of primary duct wide. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, with lateral extensions; epimerites IVa fan-shaped; epimerites without surface fields.

Type material. From *Toxostoma redivivum* (Mimidae): holotype ♂ (TC), South America.

Additional material. Turdidae: 22 ♂♂, 52 ♀♀, from *Phoenicurus ochruros*, Fr. Morocco, Bulgaria; 13 ♂♂, 6 ♀♀, from *Copsychus saularis*, Malaya; 12 ♀♀, from *Saxicola torquata*, Bulgaria; 3 ♂♂, 2 ♀♀, from *Enicurus ruficapillus*, Malaya; 3 ♂♂, 5 ♀♀, from *Muscisylvia leucura*, Malaya; 2 ♂♂, 2 ♀♀, from *Tarsiger cyanurus*, Japan. Muscicapidae: 2 ♂♂, 4 ♀♀, from *Muscicapa adusta*, South Africa; 5 ♂♂, 5 ♀♀, from *Muscicapa grandis*, Malaya; 5 ♂♂, 7 ♀♀, from *Rhipidura javanica*, Malaya. Timaliidae: 1 ♂, 2 ♀♀, from *Stachyris chrysaea*, Malaya.

Remarks. The data for the type slide, as written by Trouessart, is "*Harporhynchus redivivus*, Merle de l'Amerique Sud." This data

is questionable! The avian host is a Mimidae, not a Turdidae as might be indicated by "Merle" and most important, the range of the host does not include South America. Attempts to recollect *P. cotyledon* from the type host have been unsuccessful.

The question of the presence or absence of lacunae as being a valid specific character is well answered with the specimens examined of *P. cotyledon*. The Malayan specimens, regardless of the host, have portions of the dorsal shields lacunate. For example, within the series of specimens collected from *Copsychus saularis*, both males and females may have large lacunae on the anterior portion of the propodosomal shield, and medium-sized lacunae on the posterior propodosomal shield and hysterosomal shield; the specimens from *Rhipidura javanica* and *Stachyris chrysaea* have large lacunae on both shields. The European and Japanese material lack lacunae.

The terminal lamellae of the males attain a maximal length of 87 μ in specimens from *Tarsiger cyanurus*. The drawing of the male is of the holotype, that of the female is from a paratype of *P. dontschevi*.

HOSTS

Mimidae		
<i>Toxostoma redivivum</i> (Gambel), 1845	So. America	Trouessart, 1899 Vitzthum, 1922b Present study
Turdidae		
<i>Copsychus saularis</i> (L.), 1758	Malaya	Present study
<i>Enicurus ruficapillus</i> Temminck, 1832	Malaya	Present study
<i>Muscisylvia leucura</i> (Hodgson)	Malaya	Present study
<i>Phoenicurus moussieri</i> (Olphe Gallard), 1852 (= <i>Diplootocus m.</i>)	Fr. Morocco	Gaud, 1957
<i>Phoenicurus ochruros</i> (Gmelin), 1774	Europe	Fritsch, 1961 Vassilev, 1958 Present study
	Fr. Morocco	Gaud, 1957 Present study
<i>Saxicola rubetra</i> (L.), 1758	Fr. Morocco	Gaud, 1957
<i>Saxicola torquata</i> (L.), 1766	Fr. Morocco Europe	Gaud, 1957 Present study
<i>Tarsiger cyanurus</i> (Pallas), 1773	Japan	Present study
Timaliidae		
<i>Stachyris chrysaea</i> Blyth	Malaya	Present study

The Feather Mite Genus *Proctophyllodes*

Muscicapidae		
<i>Muscicapa grandis</i> (Blyth)	Malaya	Present study
<i>Muscicapa adusta</i> (Boie), 1828	So. Africa	Present study
<i>Rhipidura javanica</i> (Sparrman), 1788	Malaya	Present study

Proctophyllodes caulifer Trouessart

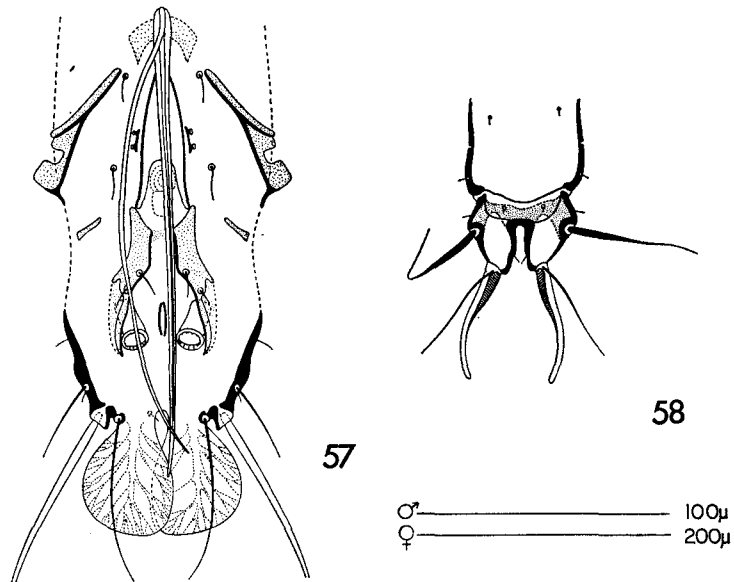
Proctophyllodes caulifer Trouessart, 1886, Bull. Soc. Étud. Sci. Angers, 16: 147. Type host: *Luscinia svecica* (= *Cyanosylvia svecica*) (Turdidae).

Proctophyllodes caulifer, Canestrini and Kramer, 1899, Tierreich, 7: 119.

Proctophyllodes caulifer, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 69–60.

This species, known only from the type series, is distinguished most easily from the closely related *P. doleophyes* by the narrow terminal cleft of the females. In *P. caulifer*, the cleft is less than 10 μ in width and in *P. doleophyes*, the cleft is approximately 20 μ in width. In the males, the opisthogastric shields are weakly joined, and the pregenital apodeme is large in *P. caulifer*; the shields are divided, and the pregenital apodeme is weak or absent in *P. doleophyes*.

MALE (lectotype). Length, excluding lamellae, 285 μ ; width, 130 μ . *Dorsal idiosoma*: Propodosomal shield 76 μ in length, 79 μ in width; lateral margins entire; without lacunae; without external vertical setae (?); distance between external scapular setae, 54 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.9 μ in length, 2.8 μ in width. Hysterosomal shield 169 μ in length, 80 μ in width; anterior margins shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 39 μ in length. Lamellae 47 μ in length, 35 μ in width, ovoid, internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, with small lateral extensions; epimerites without surface fields. Pregenital apodeme well developed in the form of a short broad arch; genital discs united; genital organ reflexion to level of humeral setae; genital organ extending to midlength of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields apparently separate, but with very weak connection between anterior portions of shields and



FIGS. 57, 58. *Proctophyllodes caulifer* Trouessart: lectotype male (57), syntype female (58).

bearing two pairs of setae. Adanal discs circular, each about $14\mu \times 8\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (syntype). Length, excluding terminal appendages, 415μ ; width, 138μ . *Dorsal idiosoma*: Propodosomal shield 84μ in length, 98μ in width; lateral margins entire; without lacunae; without external vertical setae (?); distance between external scapular setae, 67μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.0μ in length, 4.8μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 217μ in length, 95μ in width at level of setae l_2 , with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 45μ in length; setae d_4 inserted on conjunctiva and separated by 28μ ; lobes wide; cleft parallel-sided, 38μ in length, 8μ in width; setae d_5 $\frac{2}{3}$ length of terminal appendages. Spermatheca with secondary ducts long, posterior primary duct wide. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, with small lateral extensions; epimerites without surface fields.

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Type material. From *Luscinia svecica* (= *Cyanosylvia svecica*) (Turdidae): lectotype ♂ (TC), 10 ♂♂, 11 ♀♀ syntypes (TC), France.

Remarks. *Proctophyllodes caulifer* and the morphologically similar species *P. doleophyes*, occur on *Luscinia*. The former species has never been recollected from the type host; possibly *P. caulifer* represents a small unique population, and the species should be diagnosed to include that form known as *P. doleophyes*. The drawing of the male is from the lectotype, that of the female from one of the syntypes.

HOSTS

Turdidae		
<i>Luscinia svecica</i> (L.), 1758	France	Trouessart, 1886 Present study

Proctophyllodes doleophyes Gaud

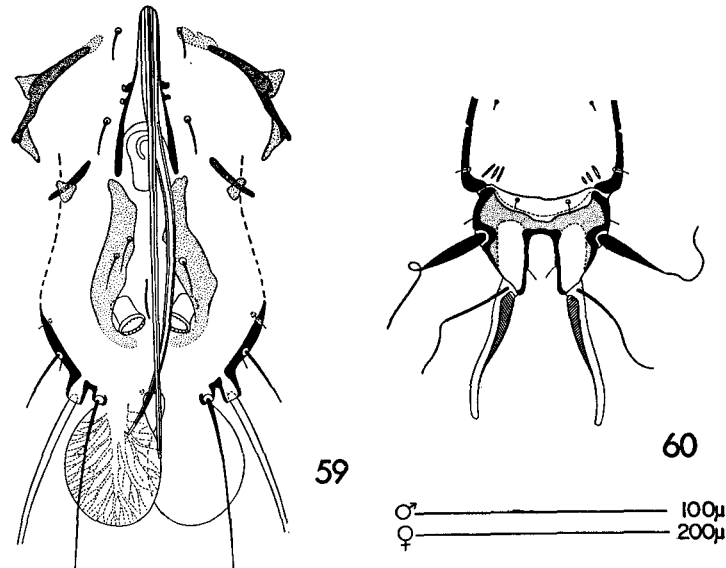
Proctophyllodes doleophyes Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37: 118–119, fig. 5C. Type host: *Muscicapa striata* (Muscicapidae).

Proctophyllodes doleophyes, Gaud & Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5–6): 510.

Proctophyllodes doleophyes, Gaud & Till, 1961, Publ. So. Afr. Inst. Med. Res., 11(L): 250.

The males of this species may be separated from the related *Proctophyllodes caulifer* by having divided opisthogastric shields and by having the pregenital apodeme weak or absent. In *P. caulifer* the shields are weakly joined, and the pregenital apodeme is large and conspicuous.

MALE. Length, excluding lamellae, 303 μ ; width, 143 μ . *Dorsal idiosoma*: Propodosomal shield 70 μ in length, 74 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 49 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.0 μ in length, 3.5 μ in width. Hysterosomal shield 164 μ in length, 79 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 28 μ in length. Lamellae 49 μ in length, 36 μ in width, ovoid, internal margins overlapping, with pinnate to palmate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites IIIa and IVa with small surface fields.



FIGS. 59, 60. *Proctophyllodes doleophyes* Gaud: male (59) and female (60) from *Ficedula hypoleuca*.

Pregenital apodeme absent; genital discs united; genital organ reflexion to level of anterior articulations of legs III, nearly to level of subhumeral setae; genital organ extending to midlength of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields divided and bearing two pairs of setae. Adanal discs circular, each about $14\mu \times 10\mu$ and bearing approximately 24 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 488μ ; width, 173μ . *Dorsal idiosoma*: Propodosomal shield 98μ in length, 102μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 72μ . Humeral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 26.0μ in length, 5.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 235μ in length, 104μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 74μ in length; setae d_4 inserted on conjunctiva and separated by 37μ ; lobes normal; cleft parallel-sided, 47μ in length, 19μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_5 about $1\frac{1}{2}$ times length of terminal

The Feather Mite Genus Proctophyllodes

appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, with small lateral extensions; epimerites IVa fan-shaped; epimerites without surface fields.

Type material. From *Muscicapa striata* (Muscicapidae): holotype ♂ (Gaud), 3 ♂♂, 4 ♀♀ paratypes (Gaud), Rabat, Rabat region, French Morocco, September, 1951, J. Gaud.

Material examined. Muscicapidae: 4 ♂♂, 4 ♀♀, from *Ficedula hypoleuca*, Fr. Morocco; 1 ♂, 5 ♀♀, from *Ficedula hypoleuca*, Bulgaria. Sylviidae: 1 ♂, 3 ♀♀, from *Phylloscopus sibilatrix*, Bulgaria; 3 ♂♂, 1 ♀, from *Phylloscopus trochilus*, Bulgaria. Turdidae: 16 ♂♂, 25 ♀♀, from *Luscinia megarhynchus*, Bulgaria.

Remarks. Gaud (1957) states that differences between *P. doleophyes* and *P. cotyledon* are exemplified by the following measurements:

	<i>P. cotyledon</i>	<i>P. doleophyes</i>
Genital organ, posterior to anterior (basal)	60-70μ	40-50μ
Genital organ, anterior to posterior (distal)	85-95μ	60-70μ
Lamellar length	50-55μ	40-45μ
Lamellar width	55-60μ	35-40μ
Idiosomal length	340-350μ	290-300μ
Idiosomal width	160-180μ	120-130μ

In the present study the discontinuity shown above in lamellar sizes does not exist. As would be expected with more and varied material, these particular structures do have a wider range in both length and width. The redescription and drawings are of a male and female from *Ficedula hypoleuca*, French Morocco.

HOSTS

Turdidae		
<i>Cercotrichas galacototes</i> (Temminck), 1820 (= <i>Agrobates g.</i>)	Fr. Morocco	Gaud, 1957
<i>Luscinia megarhynchus</i> Brehm, 1831	Europe	Present study
Sylviidae		
<i>Hippolais polyglotta</i> (Vieillot), 1817	Fr. Morocco	Gaud, 1957
<i>Phylloscopus trochilus</i> (L.), 1758	Fr. Morocco Bulgaria	Gaud, 1957 Present study
<i>Phylloscopus sibilatrix</i> (Bechstein), 1793	Fr. Morocco Fr. Cameroons Bulgaria	Gaud, 1957 Gaud & Mouchet, 1957 Present study

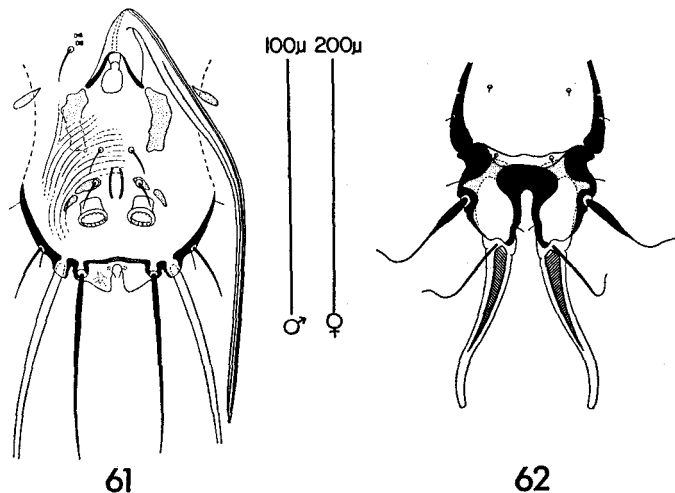
Muscicapidae

<i>Ficedula hypoleuca</i> (Pallas), 1764 (= <i>Muscicapa h.</i>)	Fr. Morocco Europe	Gaud, 1957 Present study
<i>Muscicapa striata</i> (Pallas), 1764	Fr. Morocco	Gaud, 1957

Proctophyllodes curtiphyllus, new species

Males of *Proctophyllodes curtiphyllus*, new species, and *P. stenophyllus* are similar in that both have long genital organs and short lamellae, both have the opisthogastric setae inserted on small shields or on striated areas, and both have reduced opisthogastric shields. In the new species, the males have the opisthogastric setae arranged in a square, the adanal discs are symmetrical, and the lamellae are truncate; the females have normally developed hysterosomal lobes. In *P. stenophyllus*, the males have the opisthogastric setae arranged in a trapezoid, the adanal discs are asymmetrical, and the lamellae are attenuate; the females have reduced hysterosomal lobes.

MALE (holotype). Length, excluding lamellae, 240 μ ; width, 125 μ . *Dorsal idiosoma*: Propodosomal shield 70 μ in length, 75 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 48 μ . Humeral shields well developed and bearing setae l_1 at extreme antero-



FIGS. 61, 62. *Proctophyllodes curtiphyllus*, new species: holotype male (61), allotype female (62).

The Feather Mite Genus Proctophyllodes

medial angles; subhumeral setae lanceolate, 15.9 μ in length, 3.5 μ in width. Hysterosomal shield 129 μ in length, 83 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 30 μ in length. Lamellae 10 μ in length, 8 μ in width, small, triangular, with vestigial venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital organ reflexion to posterior articulations of legs III; genital organ extending well beyond posterior limits of legs IV; genital sheath not bifid distally. Opisthogastric setae in square arrangement; opisthogastric shields fragmented with one pair of setae borne on separate fragments. Adanal discs circular, each about 8 μ x 8 μ and bearing approximately 16 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 405 μ , width 155 μ . *Dorsal idiosoma*: Propodosomal shield 88 μ in length, 106 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 70 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 16.6 μ in length, 4.1 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 197 μ in length, 100 μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 70 μ in length; setae d_4 inserted on conjunctiva and separated by 33 μ ; lobes wide; cleft divergent, 48 μ in length, 8 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_5 approximately equal length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Malacopteron cinereum* (Timaliidae): holotype δ (NU), allotype φ (NU), 4 δ δ , 7 φ φ paratypes, Subang, Malaya, October 12, 1962. Paratypes deposited: Gaud, NU, USNM.

Additional material. Timaliidae: 2 δ δ , 3 φ φ , from *Alcippe poiocephala*, Malaya.

Remarks. The species is named *curtiphyllus* to indicate the truncated lamellae of the males. The drawings are of the holotype and allotype.

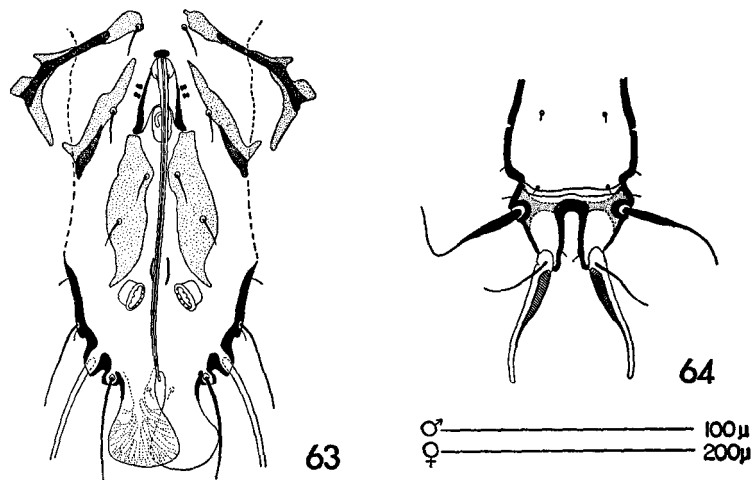
HOSTS

Timaliidae		
<i>Alcippe poiocephala</i>	Malaya	Present study
(Jerdon)		
<i>Malacopteron cinereum</i>	Malaya	Present study
Eyton, 1839		

Proctophyllodes capitatus, new species

The large opisthogastric shields with widely separated setae and the shape of terminal lamellae are sufficient to distinguish *Proctophyllodes capitatus*, new species, from the related *P. parissomae*, new species. The latter species, in contrast, has small opisthogastric shields with the setae arranged in a low trapezoid, and the lamellae are ovoid.

MALE (holotype). Length, excluding lamellae, 293 μ ; width, 130 μ . *Dorsal idiosoma*: Propodosomal shield 69 μ in length, 77 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 57 μ . Humeral shields moderately developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 18.0 μ in length, 3.5 μ in width. Hysterosomal shield 166 μ in length, 95 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 31 μ in length. Lamellae 37 μ in length, 29 μ in width, capitate, internal margins overlapping apically, with



FIGS. 63, 64. *Proctophyllodes capitatus*, new species: holotype male (63), allotype female (64).

The Feather Mite Genus Proctophyllodes

palmate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad, weak connective, without lateral extensions; epimerites I and II with narrow surface fields along their lengths, epimerites IV and IVa with medial surface fields each including a ventral seta. Pregenital apodeme small; genital discs united; genital organ reflexion to level slightly anterior to posterior articulations of legs III; genital organ extending to origins of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields divided and bearing two pairs of setae. Adanal discs circular, not measurable, although length is less than diameter and each bears approximately 26 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 395 μ ; width, 150 μ . *Dorsal idiosoma*: Propodosomal shield 83 μ in length, 99 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 73 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 19.3 μ in length, 4.1 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 177 μ in length, 94 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 63 μ in length; setae d_4 inserted on posterior margin of anterior shield and separated by 55 μ ; lobes normal; cleft parallel-sided, 48 μ in length, 12 μ in width; setae d_5 $\frac{1}{2}$ length of terminal appendages; setae l_5 slightly longer than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites IVa well developed; epimerites without surface fields.

Type material. From *Anthreptes malacensis* (Nectariniidae): holotype δ (NU), allotype ♀ (NU), 2 δ δ , 1 ♀ paratypes, Rantau Panjang, Selangor, Malaya, November 2, 1961. Paratypes deposited: NU, USNM.

Remarks. One unique feature of this species is the dorsal hysterosomal shield of the males. Normally, there is a distinct termination of the melanized dorsal surface at the level of the internal postanal setae, however, in *P. capitatus*, the melanization is continuous with the veins of the lamellae. Another feature is that setae d_5 of the male are short and thick. The name *capitatus* has been selected to call attention to the peculiar shape of the lamellae. The drawings are of the holotype and allotype.

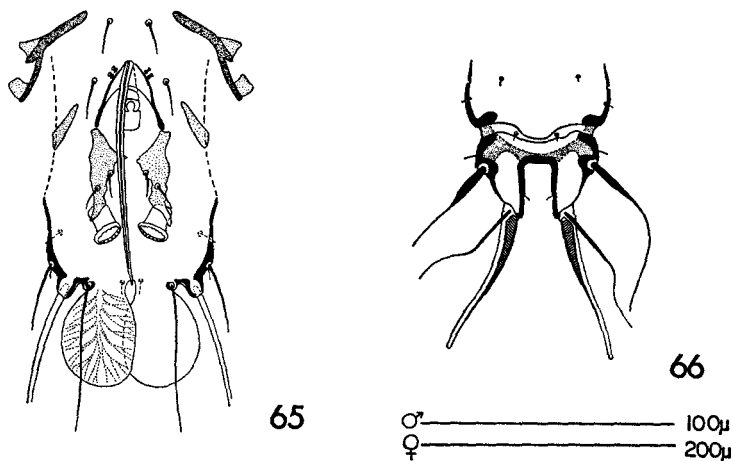
HOSTS

Nectariniidae		
<i>Anthreptes malacensis</i>	Malaya	Present study
(Scopoli), 1786		

Proctophyllodes parisomae, new species

The characteristics employed to separate *Proctophyllodes parisomae*, new species, from *P. capitatus*, new species, are: ventral setae not arising from surface fields, the opisthogastric region as delimited by the shields approximately square, and the opisthogastric setae arranged in a small trapezoid. *P. capitatus*, the allied species, has setae c_1 and c_2 arising from surface fields of epimerites IV and IVa, the opisthogastric region rectangular, and the opisthogastric setae widely separated.

MALE (holotype). Length, excluding lamellae, 241μ ; width, 111μ . *Dorsal idiosoma*: Propodosomal shield 62μ in length, 65μ in width; lateral margins incised around external scapular setae to internal scapular setae; without lacunae; with external vertical setae (?); distance between external scapular setae, 42μ . Humeral shields weakly developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae rounded, 15.9μ in length, 2.8μ in width. Hysterosomal shield 133μ in length, 72μ in width; anterior margin strongly concave; without ventrolateral extensions; supranal concavity 28μ in length. Lamellae 36μ in length, 29μ in width, ovoid, internal margins overlapping, with pinnate venation. *Ventral idio-*



Figs. 65, 66. *Proctophyllodes parisomae*, new species: holotype male (65), paratype female (66).

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soma: Apodemes moderately developed; epimerites I V-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch reflexion to level of posterior articulations of legs III; genital organ extending to origins of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields weakly united anterior to opisthogastric setae and bearing two pairs of setae. Adanal discs circular, each about $11\mu \times 10\mu$ and bearing approximately 22–24 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 427μ ; width, 146μ . *Dorsal idiosoma*: Propodosomal shield 86μ in length, 90μ in width; lateral margins incised around external scapular setae; without lacunae; with external vertical setae; distance between external scapular setae, 64μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; sub-humeral setae lanceolate, 22.1μ in length, 4.8μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 201μ in length, 99μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 66μ in length; setae d_4 inserted on conjunctiva and separated by 35μ ; lobes normal; cleft parallel-sided, 46μ in length, 22μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_3 slightly longer than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Parisoma plumbeum* (Muscicapidae): holotype ♂ (Gaud), allotype ♀ (Gaud), 6 ♂♂, 6 ♀♀ paratypes, N'Gaoundere, French Cameroons, July, 1960. Paratypes deposited: Gaud, NU.

Remarks. The species is named *parisomae* for the host. The drawing of the male is of the holotype, that of the female from a paratype.

HOSTS

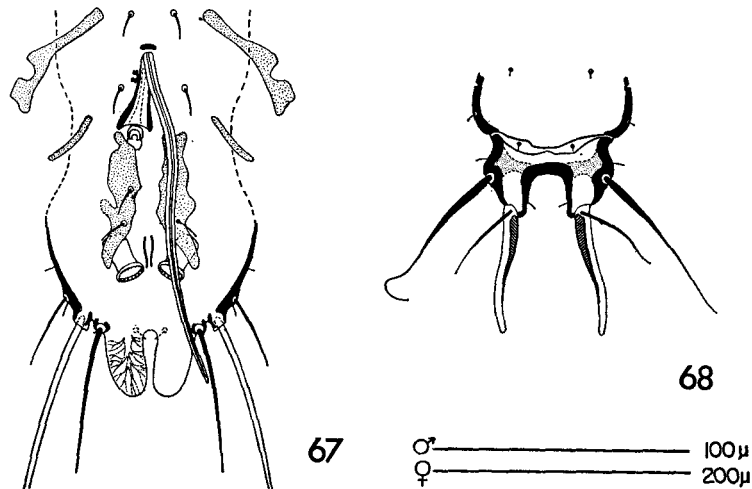
Muscicapidae		
<i>Parisoma plumbeum</i> (Hartlaub), 1858	Fr. Cameroons	Present study

Proctophyllodes tchagrae, new species

Small differences between the males of *Proctophyllodes tchagrae*, new species, and *P. vassilevi*, new species, are: in the former species,

the opisthogastric shields are not joined, these shields extend midway between the tip of the genital arch and the apices of the small, parallel-sided lamellae, and the genital organ extends to the lamellar apices. *P. vassilevi* has the opisthogastric shields weakly joined at their anterior margins, these shields extend less than midway between the tips of the genital arch and the apices of the ovoid lamellae, and the genital organ extends beyond the lamellar apices.

MALE (holotype). Length, excluding lamellae, 269 μ ; width, 132 μ . *Dorsal idiosoma*: Propodosomal shield 67 μ in length, 74 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 49 μ . Humeral shields weakly developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae attenuate, 15.9 μ in length, 2.8 μ in width. Hysterosomal shield 152 μ in length, 79 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 29 μ in length. Lamellae 23 μ in length, 15 μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme present, very small; genital discs joined, genital organ reflexion to level of posterior articulations of legs III; genital organ extending to apices of lamellae; genital sheath not bifid distally. Opisthogastric



FIGS. 67, 68. *Proctophyllodes tchagrae*, new species: holotype male (67), allotype female (68).

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setae in trapezoidal arrangement; opisthogastric shields separate and bearing two pairs of setae. Adanal discs circular, each about $15\mu \times 10\mu$ and bearing approximately 22 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 418μ ; width, 151μ . *Dorsal idiosoma*: Propodosomal shield 96μ in length, 101μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 69μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 22.1μ in length, 3.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 221μ in length, 97μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 43μ in length; setae d_4 inserted on conjunctiva and separated by 39μ ; lobes short; cleft parallel-sided, 33μ in length, 28μ in width; setae d_5 $\frac{2}{3}$ length of terminal appendages; setae l_5 $1\frac{1}{2}$ times length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

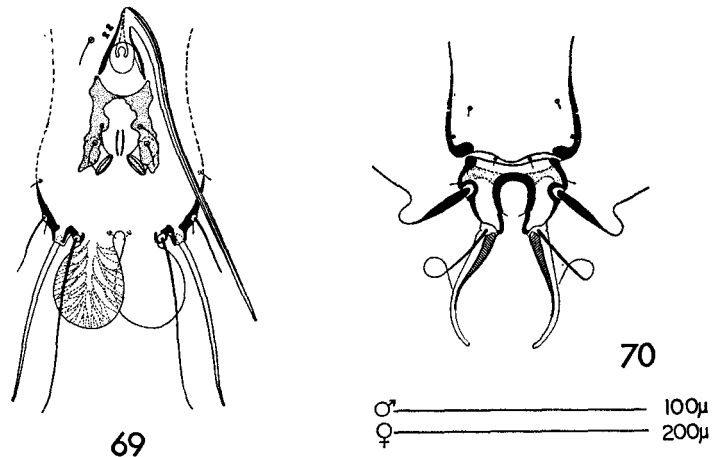
Type material. From *Tchagra senegala* (Laniidae): holotype δ (SAIMR), allotype ♀ (SAIMR), 1 ♀ paratype (SAIMR), Buzi, Mozambique, November 14, 1961.

Additional material. Motacillidae: 1 δ , 2 ♀ , from *Macronyx croceus*, Mozambique (otherwise same data as holotype).

Remarks. The specimens on which this new species is based were collected on the same day and at the same locality, but from different hosts. Although the families of the host birds are closely related, there is a possibility that one of the records might be based on contamination or that birds in possible contact with each other might harbor the same mites for a short period of time. If the latter case were true, would it be possible for the ectoparasite to establish itself on the new host? The species is named *tchagrae* for one of the hosts from which collections have been made. The drawings are of the holotype and allotype.

HOSTS

Laniidae		
<i>Tchagra senegala</i>	Mozambique	Present study
(L.), 1766		
Motacillidae		
<i>Macronyx croceus</i>	Mozambique	Present study
(Vieillot), 1816		



FIGS. 69, 70. *Proctophyllodes vassilevi*, new species: holotype male (69), allotype female (70).

Proctophyllodes vassilevi, new species

Closely related to *Proctophyllodes tchagrae*, new species, the new species being described has females with the terminal cleft at least two times longer than wide, whereas the females of *P. tchagrae* have the cleft width equal to or greater than the length.

MALE (holotype). Length, excluding lamellae, 249μ; width, 124μ. *Dorsal idiosoma*: Propodosomal shield 68μ in length, 65μ in width; lateral margins incised around external scapular setae to internal scapular setae; without lacunae; without external vertical setae; distance between scapular setae, 46μ. Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.9μ in width. Hysterosomal shield 128μ in length, 73μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 28μ in length. Lamellae 34μ in length, 28μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites I and II with narrow surface fields along their lengths. Pregenital apodeme absent; genital discs separate; genital organ reflexion to level of posterior articulations of legs III; genital organ extending beyond apices of lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields weakly connected at anterior margin and bearing two pairs of setae. Adanal

The Feather Mite Genus Proctophyllodes

discs circular, each about $14\mu \times 8\mu$ and bearing approximately 18 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 423μ ; width, 171μ . *Dorsal idiosoma*: Propodosomal shield 83μ in length, 93μ in width; lateral margins incised around external scapular setae to internal scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 61μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7μ in length, 4.1μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 193μ in length, 97μ in width, with anterior margins strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 62μ in length; setae d_4 inserted on conjunctiva and separated by 27μ ; lobes normal; cleft convergent, 40μ in length, 15μ in width; setae d_5 approximately equal to length of terminal appendages; setae l_5 slightly longer than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites IVa fan-shaped; epimerites without surface fields.

Type material. From *Acrocephalus palustris* (Sylviidae): holotype ♂ (BAS), allotype ♀ (BAS), 1 ♂, 3 ♀♀ paratypes (BAS), Pazardzhik, Plovdiv district, Bulgaria, July 15, 1960, I. D. Vassilev.

Additional material. Sylviidae: 1 ♂, 8 ♀♀, from *Acrocephalus scirpaceus*, Bulgaria.

Remarks. Of the species partly characterized by long genital organs, this new species and *P. doleophyes* are the only ones to have been collected from the Sylviidae. Records indicate that *P. vassilevi* is restricted to the Sylviidae while *P. doleophyes* has a much wider host range. The species is named *vassilevi* for Dr. I. D. Vassilev, who not only collected the type series, but has provided many host records for other *Proctophyllodes* species. The drawings are of the holotype and allotype.

HOSTS

Sylviidae		
<i>Acrocephalus palustris</i> (Bechstein), 1789	Bulgaria	Present study
<i>Acrocephalus scirpaceus</i> (Herman), 1804	Bulgaria	Present study

Group II—the *stylifer* group

A homogeneous assemblage of fourteen species, this group is distinguished by the unusual apices of the male genital sheath and

by the divided or fragmented opisthogastric shields. The genital sheath may be expanded apically to form a structure with a relatively large diameter; it may have two posterolaterally directed extensions, or rarely, the sheath may be parallel-sided. Regardless of the structure, the apex of the genital sheath appears bifid when viewed from a dorsal or lateral aspect.

In certain species, the external ring of the adanal discs (corona) may be notched on the medial surface or may be thickened on the anteromedial surface. Both conditions are unique to the *stylifer* group.

Pertinent characters for species differentiation, males:

1. Type of genital sheath expansion.
2. Relative size and length of genital organ.
3. Structure of external ring of adanal disc—edentate, notched, or thickened.
4. Size, shape and venation of the lamellae.
5. Development of the opisthogastric shields.
6. The positions of the opisthogastric setae.

Pertinent characters for species differentiation, females:

1. Development of the hysterosomal lobes.
2. Shape of the terminal cleft.
3. Presence or absence of a supranal concavity.
4. Relative lengths of setae d_5 and the terminal appendages.

Key to the species of group II

1. Genital organ at most extending only slightly beyond the tips of the genital arch..... 2
Genital organ extending almost to, or beyond, the anterior opisthogastric setae 5
2. Genital organ not extending to tips of genital arch..... 3
Genital organ extending slightly beyond tips of genital arch... 4
3. Anterior opisthogastric setae not inserted on shields; genital organ conspicuously trifold distally.....*stylifer*, p. 88
Anterior opisthogastric setae inserted on shields; genital organ bifid distally.....*tanagrae*, n. sp., p. 90
4. Hysterosomal cleft of female rectangular, length about two times width.....*empidonis*, n. sp., p. 92
Hysterosomal cleft of female with anterior margin curved, length and width approximately equal.....
.....*corvinellae*, n. sp., p. 94
5. Lamellae of male small, not leaflike, *i.e.*, apices may be pointed or rounded, but lamellae widest at origins..... 6

The Feather Mite Genus Proctophyllodes

Lamellae of male leaflike, <i>i.e.</i> , apices rounded and lamellae at midlength wider than at origins.....	8
6. Adanal discs of male symmetrical; female with lobes articulated with anterior hysterosomal shield and without supranal concavity	7
Adanal discs of male asymmetrical; female with lobes fused to anterior hysterosomal shield and with circular supranal concavity.....	<i>aphyllus</i> , p. 96
7. Length of adanal discs about twice diameter; female with rectangular cleft two times wider than long and without terminal appendages.....	<i>anaxiphus</i> , n. sp., p. 98
Length of adanal discs much less than diameter; female with rectangular cleft two times longer than wide and with terminal appendages.....	<i>rhynchocaulus</i> , p. 100
8. Genital organ extending midway between top of genital arch and origins of lamellae; length of genital organ longer than length of opisthogastric shields.....	9
At most, genital organ extending $\frac{2}{5}$ the distance between top of genital arch and origins of lamellae; length of genital organ equal to or less than length of opisthogastric shields....	11
9. Lamellae under 35 μ in length.....	10
Lamellae over 50 μ in length.....	<i>parsi</i> , n. sp., p. 102
10. External ring of adanal discs notched on medial surface....
.....	<i>reguli</i> , p. 104
External ring of adanal disc complete, not notched.....	<i>ateri</i> , p. 106
11. Lamellae over 50 μ in length.....	12
Lamellae less than 35 μ in length.....	13
12. External ring of adanal disc notched on medial surface; female with terminal cleft in form of irregular arch, terminal lobes articulated with anterior hysterosomal shield, and supranal concavity absent.....	<i>vesca</i> , n. sp., p. 108
External ring of adanal discs complete; female with terminal cleft in form of smooth arch, terminal lobes fused with anterior hysterosomal shield, and supranal concavity present.....	<i>legaci</i> , p. 110
13. Distally genital sheath forms two spinelike structures each directed posterolateral; terminal cleft of female rectangular	<i>acanthicaulus</i> , p. 112
Distally genital sheath bifid, but bifurcations not forming spinelike structures; terminal cleft of female about 4 times longer than wide.....	<i>hylocichlae</i> , n. sp., p. 114

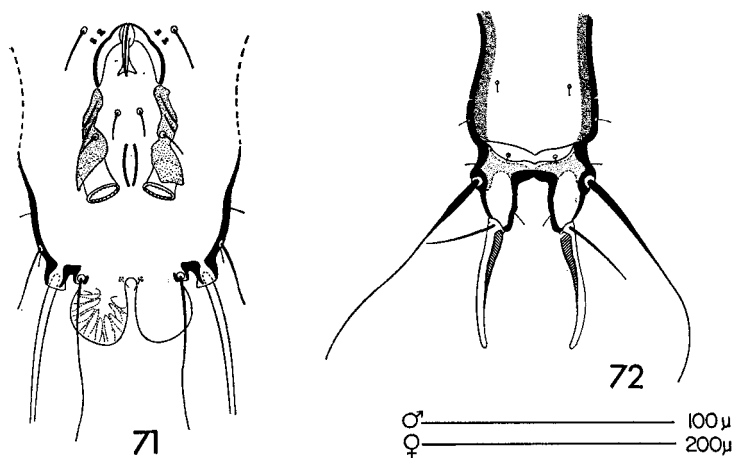
Proctophyllodes stylifer (Buchholz)

- Dermaleichus stylifer* Buchholz, 1869, *Bemerk. Gatt., Dermaleichus*, pp. 19–20, pl. 1, figs. 4, 5. Type host: *Parus caeruleus* (first included host).
- Dermaleichus acredulinus* Koch, 1841, *Deut. C. M. A.*, fasc. 33, no. 24 (*fede* Oudemans, 1937, 3: 2205).
- Dermaleichus stylifer*, Kramer, 1881, *Z. ges. Naturwiss.*, 54: 417–421.
- Proctophyllodes stylifer*, Berlese, 1883, *A.M.S.*, fasc. 24, no. 8.
- Proctophyllodes stylifer*, Canestrini & Kramer, 1899, *Tierreich*, 7: 119.
- Proctophyllodes stylifer*, Vitzthum, 1922b, *Arch. Naturgeschichte*, A, 88(5): 33–37, figs. 26–31.
- Proctophyllodes stylifer*, Vitzthum, 1929, *Tierwelt Mitteleuropas*, 3(3): 100.
- Proctophyllodes stylifer*, Bonnet and Timon-David, 1932, *Bull. Soc. Linn. Provence*, 5: 28–29.
- Proctophyllodes stylifer*, Bonnet and Timon-David, 1934, *Ann. Parasitol. hum. comp.*, 12(4): 265.
- Proctophyllodes acredulinus*, Oudemans, 1937, *Kritisch Historisch Overzicht der Acarologie*, 3: 2205.
- Proctophyllodes stylifer*, Fritsch, 1961, *Z. Parasitenk.*, 21: 24–27, figs. 19a–d.
- Proctophyllodes stylifer*, Gaud, 1957, *Bull. Soc. Sci. nat. Phys. Maroc*, 37(2): 124.
- Proctophyllodes stylifer*, Radford, 1958, *Rev. Brasil. Entomol.*, 8: 152.
- Proctophyllodes stylifer*, Lichard, 1962, *Biológia*, 17(7): 534.
- Proctophyllodes stylifer*, Vassilev, 1962, *Bulg. Acad. Sci. Bull. Dept. Biol. Sci.*, p. 159.

The short genital organ which does not extend beyond the tips of the genital arch presents a unique appearance. The genital sheath is slightly shorter than the penis and extends posterolaterally to form triangular expansions; these structures confer the trifold aspect noted by several authors.

MALE. Length, excluding lamellae, 280 μ ; width, 143 μ . *Dorsal idiosoma*: Propodosomal shield 78 μ in length, 88 μ in width; lateral margins entire; with large lacunae on anterior half; without external vertical setae; distance between external scapular setae, 64 μ . Humeral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 17.3 μ in length, 2.1 μ in width. Hysterosomal shield 169 μ in length, 100 μ in width; anter-

The Feather Mite Genus *Proctophyllodes*



FIGS. 71, 72. *Proctophyllodes styliifer* (Buchholz): male (71) and female (72) from *Parus caeruleus*.

ior margin straight; with small lacunae over entire surface; without ventrolateral extensions; supranal concavity 41μ in length, lamellae 23μ in length, 20μ in width, ovoid, internal margins approximate, with palmate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch reflexion to level of anterior articulations of legs IV; genital organ not extending to tips of genital arch; genital sheath bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing posterior pair of setae. Adanal discs circular, each about $14\mu \times 10\mu$ bearing approximately 20 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 416μ ; width, 158μ . *Dorsal idiosoma*: Propodosomal shield 98μ in length, 113μ in width; lateral margins entire; with few large lacunae on anterior quarter; without external vertical setae; distance between external scapular setae, 76μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 21.4μ in length, 2.8μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 211μ in length, 116μ in width, with anterior margin sinuous, with few small lacunae; without supranal concavity. Lobar region articulated with anterior shield; 70μ in length; setae d_4 inserted on conjunctiva and separated by 35μ ; lobes normal; cleft parallel-sided, 45μ in length, 26μ in

width; setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_6 $1\frac{1}{2}$ times longer than terminal appendages. Spermatheca not visible. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Parus caeruleus* (Paridae), Europe; location of type unknown.

Material examined. Paridae: 13 ♂♂, 4 ♀♀, from *Parus caeruleus*, England.

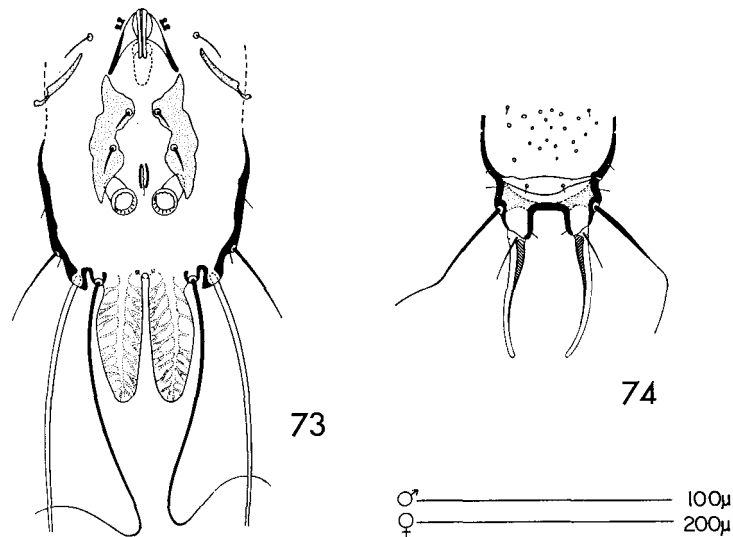
Remarks. Buchholz (1869) indicated that this species of mite had been collected from such diverse hosts as: *Alauda arvensis* (Alaudidae), *Sylvia nisoria* (Sylviidae), *Fringilla coelebs* (Fringillidae) and *Emberiza calandra* (Fringillidae). Vitzthum (1922*b*) reported that other authors had collected this species from *Carduelis spinus* and *Acanthis cannabina* (Fringillidae). In addition, the senior author examined slides of *P. stylifer* in the Trouessart Collection with the host data recorded as *Troglodytes europeus* (Troglodytidae) from France. It is doubtful if any of the aforementioned species of birds are the normal hosts for *P. stylifer*, as recent records indicate that this mite species is restricted to birds of the family Paridae.

HOSTS		
Fringillidae (questionable record) <i>Pyrrhula pyrrhula</i> (L.), 1758	Europe	Vassilev, 1962
Paridae <i>Parus caeruleus</i> L., 1758	Europe	Buchholz, 1869 Vitzthum, 1922 <i>b</i> Vitzthum, 1929 Radford, 1958 Fritsch, 1961 Lichard, 1962 Present study
<i>Parus major</i> L., 1758	Fr. Morocco Europe	Gaud, 1957 Vitzthum, 1922 <i>b</i> Bonnet & Timon- David, 1934 Fritsch, 1961
<i>Parus palustris</i> L., 1758	Fr. Morocco Europe	Gaud, 1957 Vitzthum, 1922 <i>b</i> Fritsch, 1961 Lichard, 1962

Proctophyllodes tanagrae, new species

Considering the species in which the male possesses a bifid genital sheath, only *Proctophyllodes tanagrae* has the opisthogastric setae

The Feather Mite Genus *Proctophyllodes*



FIGS. 73, 74. *Proctophyllodes tangarae*, new species: holotype male (73), allotype female (74).

inserted on the divided opisthogastric shields. The remaining species have only the posterior opisthogastric setae inserted on the divided shields. The structure of the genital organ is unique in that the sheath is short and parallel-sided and the penis is extremely narrow.

MALE (holotype). Length, excluding lamellae, 293 μ ; width, 144 μ . *Dorsal idiosoma*: Propodosomal shield 83 μ in length, 88 μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 64 μ . Humeral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 14.2 μ in length, 2.5 μ in width. Hysterosomal shield 165 μ in length; 100 μ in width; anterior margin straight; without lacunae; without ventrolateral extensions; supranal concavity 41 μ in length. Lamellae 48 μ in length, 17 μ in width, oblong, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs weakly joined; genital arch reflexion to level of posterior articulations of legs III; genital organ not extending to tips of genital arch; genital sheath bifid distally. Opisthogastric setae in

trapezoidal arrangement; opisthogastric shields separate and bearing both pairs of opisthogastric setae. Adanal discs circular, each about $15\mu \times 8\mu$ and bearing approximately 16 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 392μ ; width, 162μ . *Dorsal idiosoma*: Propodosomal shield 98μ in length, 108μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 81μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.5μ in length, 3.4μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 206μ in length, 111μ in width, with anterior margin straight, with few small lacunae posteromedially; without supranal concavity. Lobar region articulated with anterior shield; 44μ in length; setae d_4 inserted on conjunctiva and separated by 25μ ; lobes normal; cleft parallel-sided, 24μ in length, 24μ in width; setae d_5 $\frac{1}{3}$ length of terminal appendages; setae l_5 $1\frac{1}{2}$ times longer than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Tanager musica* (Thraupidae): holotype ♂ (NU), allotype ♀ (NU), 6 ♂♂, 16 ♀♀ paratypes, 20 kilometers NE Cuatla, Morelos, México, 6500', December 26, 1948, W. B. Davis. Paratypes deposited: BMNH, Gaud, NU, USNM.

Remarks. The male genital organ is unusual as the sheath forms a tube which surrounds an extremely narrow and distally bent penis (not illustrated). The species is named *tanagrae* for the type host. The drawings are of the holotype and allotype.

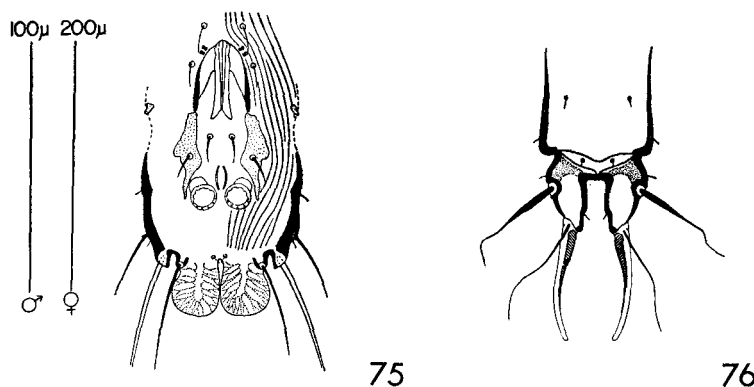
HOSTS

Thraupidae		
<i>Tanager musica</i> (Gmelin), 1789	México	Present study

Proctophyllodes empidonis, new species

Two new species, *Proctophyllodes empidonis* and *P. corvinellae*, are closely related. Both species are characterized in part by the distally widened genital sheath which extends slightly beyond the tips of the genital arch. The males of these species can be most easily distinguished by small adanal accessory glands in *P. corvinellae* and by the lack of these structures in *P. empidonis*. Females can be distinguished as follows by the terminal clefts: two times

The Feather Mite Genus *Proctophyllodes*



FIGS. 75, 76. *Proctophyllodes empidoncis*, new species: holotype male (75), allotype female (76).

longer than wide in *empidoncis* and approximately square in *P. corvinellae*.

MALE (holotype). Length, excluding lamellae, 240 μ ; width, 109 μ . *Dorsal idiosoma*: Propodosomal shield 60 μ in length, 67 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 47 μ . Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 13 μ in length, 3 μ in width. Hysterosomal shield 134 μ in length, 70 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 29 μ in length. Lamellae 23 μ in length, 17 μ in width, ovoid, with inner margins not overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch reflexion to level of posterior articulations of legs III; genital organ extending slightly beyond the posterior extremities of genital arch; genital sheath bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing one pair of setae. Adanal discs circular, each about 10 μ x 10 μ and bearing approximately 14 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 372 μ ; width, 139 μ . *Dorsal idiosoma*: Propodosomal shield 81 μ in length, 91 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 66 μ . Humeral shields well developed and bearing setae l_1 at extreme

anteromedial angles; subhumeral setae lanceolate, 17μ in length, 4μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 192μ in length, 84μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 60μ in length; setae d_4 inserted on conjunctiva and separated by 24μ ; lobes normal; cleft parallel-sided with slight concavity toward lobal apices, 43μ in length, 17μ in width; setae d_5 $\frac{4}{5}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites III with rectangular posterolateral surface field.

Type material. From *Empidonax hammondii* (Tyrannidae): holotype ♂ (NU), allotype ♀ (NU), 5 ♂♂, 9 ♀♀ paratypes, Agua del Obispo, 3300', Guerrero, México, December 25, 1958, W. B. Davis. Paratypes deposited: Gaud, NU, USNM.

Additional material. Tyrannidae: 1 ♂, from *Empidonax wrighti*, Utah; 4 ♂♂, 6 ♀♀, from *Nuttallornis borealis*, Texas, México; 2 ♂♂, 2 ♀♀, from *Pyrocephalus rubinus*, Texas; 2 ♂♂, 3 ♀♀, from *Sayornis sayi*, Utah.

Remarks. The name *empidonicensis* is selected to designate the type host. The drawings are of the holotype and allotype.

HOSTS

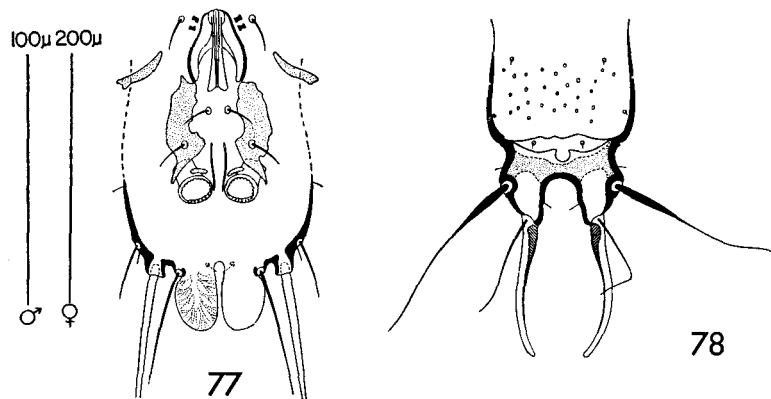
Tyrannidae		
<i>Empidonax hammondii</i> (Xanthus), 1858	México	Present study
<i>Empidonax wrighti</i> Baird, 1858	United States	Present study
<i>Nuttallornis borealis</i> (Swainson), 1831	United States	Present study
(= <i>N. mesoleucos</i>)	México	Present study
<i>Pyrocephalus rubinus</i> (Boddaert), 1783	United States	Present study
<i>Sayornis sayi</i> (Bonaparte), 1825	United States	Present study

Proctophyllodes corvinellae, new species

This species is closely related to the North American species, *Proctophyllodes empidonicensis*, new species. These two species are separated most easily by the shape of the terminal clefts of the females: in *P. corvinellae*, the cleft is in the shape of an arch; in *P. empidonicensis*, the cleft is in the shape of a long rectangle with the length approximately twice the width.

MALE (holotype). Length, excluding lamellae, 280μ ; width,

The Feather Mite Genus *Proctophyllodes*



FIGS. 77, 78. *Proctophyllodes corvinellae*, new species: holotype male (77), allotype female (78).

135µ. *Dorsal idiosoma*: Propodosomal shield 71µ in length, 78µ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 52µ. Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae narrow, attenuate, 14.5µ in length, 2.1µ in width. Hysterosomal shield 159µ in length, 90µ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 38µ in length. Lamellae 27µ in length, 18µ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch reflexion to level midway between legs III and IV; genital organ extending to tips of genital arch; genital sheath bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing posterior pairs of setae. Adanal discs circular, each about 9µ x 9µ and bearing approximately 26 teeth; small, indistinct accessory glands present.

FEMALE (allotype). Length, excluding terminal appendages, 580µ; width, 190µ. *Dorsal idiosoma*: Propodosomal shield 97µ in length, 114µ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 71µ. Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7µ in length, 4.8µ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 242µ in length, 119µ in width, with anterior margin straight, without lacunae; without supranal con-

cavity. Lobar region articulated with anterior shield; 62μ in length; setae d_4 inserted on conjunctiva and separated by 37μ ; lobes normal; cleft slightly divergent, 35μ in length, 21μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_5 about $1\frac{1}{2}$ times length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Corvinella melanoleuca* (Laniidae): holotype ♂ (SAIMR), allotype ♀ (SAIMR), 6 ♂♂, 11 ♀♀ paratypes, Gravelotte, Transvaal, Union of South Africa, July 10, 1958, F. Zumpt. Paratypes deposited: Gaud, NU, SAIMR.

Additional material. Laniidae: 4 ♂♂, 4 ♀♀, from *Lanius collaris*, Transvaal, Union of South Africa.

Remarks. The presence or absence of small lacunae on the hysterosomal shields of the females is varied. In the specimens from *Corvinella*, the females may have or may lack lacunae. In the females from *Lanius*, there are a few poorly defined lacunae on the posterior quarter of the anterior hysterosomal shield. The name *corvinellae* is selected to designate the type host. The drawings are of the holotype and allotype.

HOSTS

Laniidae

<i>Corvinella melanoleuca</i> (Jardine), 1831 (= <i>Urolestes melanoleucus</i>)	Un. So. Africa	Present study
<i>Lanius collaris</i> L., 1766	Un. So. Africa	Present study

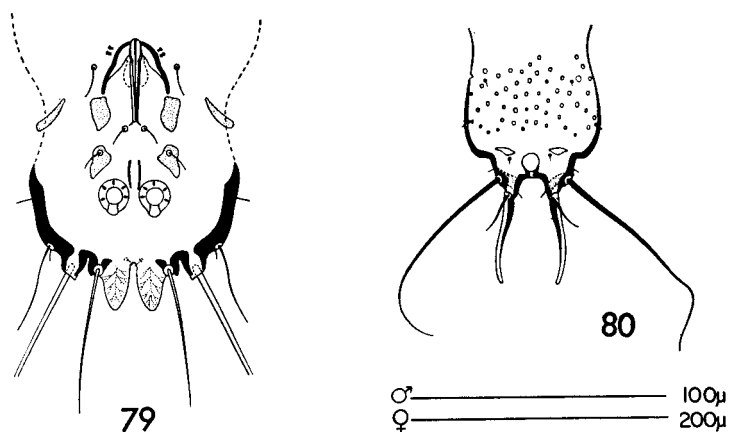
Proctophyllodes aphyllus Gaud and Mouchet

Proctophyllodes aphyllus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32: 509–510, figs. 8B, 9A. Type host: *Dicrurus atripennis* (Dicruridae).

Proctophyllodes aphyllus, Gaud and Till, 1961, Publ. So. Afr. Inst. Med. Res., 11(L): 250.

The adanal discs are unique in this species. Each disc is asymmetrical and has less than ten teeth restricted to the anterior three-quarters of the external ring. Within the group, *Proctophyllodes aphyllus* is the only species in which the opisthogastric shield of the male is fragmented into four units and one of two species in which the female has a supranal concavity; also the terminal lobes of the female are fused with the anterior hysterosomal shield.

The Feather Mite Genus *Proctophyllodes*



FIGS. 79, 80. *Proctophyllodes aphyllus* Gaud and Mouchet: paratype male (79), paratype female (80).

MALE (paratype). Length, excluding lamellae, 217 μ ; width, 127 μ . *Dorsal idiosoma*: Propodosomal shield 53 μ in length, 78 μ in width; lateral margins entire; with few lacunae on anterior half of shield; without external vertical setae; distance between external scapular setae, 54 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae setiform, 12.4 μ in length. Hysterosomal shield 128 μ in length, 96 μ in width; anterior margin straight; with lacunae; without ventrolateral extensions; supranal concavity 37 μ in length. Lamellae 16 μ in length, 10 μ in width, triangular, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites III connected to epimerites IV at distal ends by narrow surface field, distal end of epimerite IV with small posterolateral field. Pregenital apodeme absent; genital discs separate; genital arch reflexion to level of posterior articulations of legs III; genital organ extending to anterior pair of opisthogastric setae; genital sheath minutely bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields fragmented into four units, posterior units bearing posterior pair of opisthogastric setae. Adanal discs asymmetrical, each non-measurable, length less than diameter and bearing approximately 4-5 teeth; accessory glands absent.

FEMALE (paratype). Length, excluding terminal appendages, 313 μ ; width, 148 μ . *Dorsal idiosoma*: Propodosomal shield 66 μ in length, 95 μ in width; lateral margins entire; with few lacunae on

anterior half; without external vertical setae; distance between external scapular setae, 66μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 13.8μ in length. Hysterosoma with lobes and with terminal appendages; anterior shield 166μ in length, 114μ in width, with anterior margin straight or shallowly concave, with lacunae; with supranal concavity. Lobar region fused to anterior shield; 31μ in length; setae d_4 inserted lateral of supranal concavity and separated by 31μ ; lobes extremely short; cleft 14μ in length, 14μ in width; setae d_5 $1/2$ length of terminal appendages; setae l_5 about three times length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites III and IIIa connected laterally by narrow surface field, epimerites IV with narrow surface field directed posteriorly from distal end.

Type material. From *Dicrurus atripennis* (Dicruridae): holotype ♂ (Gaud), 4 ♂♂, 4 ♀♀ paratypes (Gaud), Yaoundé, Nyong and Sanaga region, French Cameroons, November, 1955, J. Mouchet.

Material examined. Dicruridae: 3 ♂♂, 1 ♀ (paratypes), from *Dicrurus atripennis*.

Remarks. Even though the redescription states that the propodosomal shield is entire, there is a semicircular indentation of the margin anterior to the external scapular setae. Another modification of this shield is an anterolateral projection which connects the dorsal extensions of the epimerites between legs I and II. Finally, the tactile setae on the dorsal surface of genua I and II each have a single bifurcation at approximately midlength. The redescription and drawings are of the paratypes.

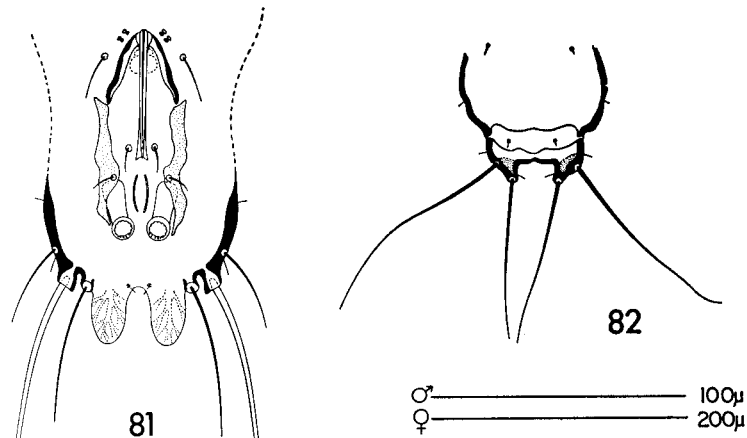
HOSTS

Dicruridae		
<i>Dicrurus atripennis</i>	Fr. Cameroons	Gaud and Mouchet,
Swainson, 1837		1957
		Present study

Proctophyllodesanaxiphus, new species

The genital organ is similar to those of *Proctophyllodes ateri* and *P. reguli*, but the relative lengths of the genital organ and the opisthogastric shields are quite different. In the new species being described, the genital organ is approximately the same length as the opisthogastric shields, whereas in *P. ateri* and *P. reguli*, the genital organ is longer than the opisthogastric shields. Another char-

The Feather Mite Genus *Proctophyllodes*



Figs. 81, 82. *Proctophyllodes anaxiphus*, new species: holotype male (81), allotype female (82).

acter for distinguishing these species is the length to diameter ratio of the adanal discs: *P. anaxiphus* has a 2:1 ratio and the named species have this ratio as approximately 1:1. The females of *P. anaxiphus* lack terminal appendages and have the terminal cleft much wider than long. The females of *P. ateri* and *P. reguli* have terminal appendages and have the cleft longer than wide.

MALE (holotype). Length, excluding lamellae, 261 μ ; width, 130 μ . *Dorsal idiosoma*: Propodosomal shield 74 μ in length, 86 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 57 μ . Humeral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae setiform, 18.0 μ in length. Hysterosomal shield 152 μ in length, 99 μ in width; anterior margins straight; without lacunae; without ventrolateral extensions; supranal concavity 36 μ in length. Lamellae 20 μ in length, 15 μ in width, small, ovoid, internal margins separated, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernable connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level of posterior articulations of legs III; genital organ extending slightly beyond anterior pair of opisthogastric setae; genital sheath bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields divided and bearing posterior pair of setae. Adanal discs circular, each about 17 μ x 8 μ and bearing approximately 18 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 390 μ ; width, 165 μ . *Dorsal idiosoma*: Propodosomal shield 90 μ in length, 114 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 77 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae setiform, 25.0 μ in length. Hysterosoma with lobes and without terminal appendages; anterior shield 210 μ in length, 114 μ in width, with anterior margin straight, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 31 μ in length; setae d_4 inserted on conjunctiva and separated by 35 μ ; lobes extremely short; cleft parallel-sided, 10 μ in length, 20 μ in width; setae d_5 and l_5 long. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernible connective, without lateral extensions; epimerites without surface fields.

Type material. From *Dicrurus adsimilis* (Dicruridae): holotype δ (Gaud), allotype ♀ (Gaud), 17 δ δ , 9 ♀ ♀ paratypes, Cape Province, Union of South Africa, January, 1954. Paratypes deposited: Gaud, NU.

Remarks. The terminal lamellae of the males range from 19 μ to 26 μ in length, but in every instance, the widest portion is at the origins. The name *anaxiphus* was chosen for the shape of the genital organ. The drawings are of the holotype and allotype.

HOSTS

Dicruridae

Dicrurus adsimilis
(Bechstein), 1794

Un. So. Africa

Present study

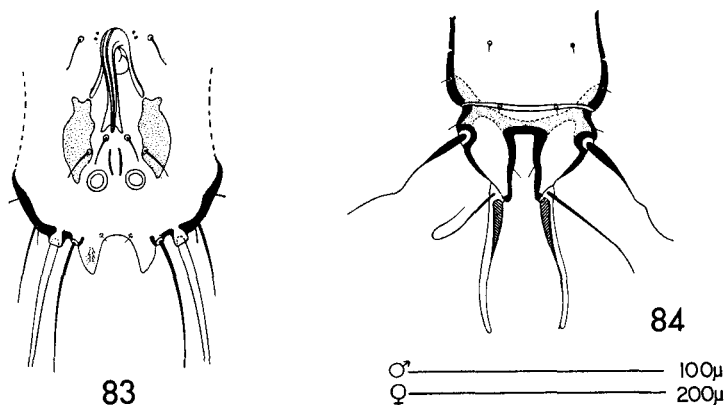
Proctophyllodes rhynchocaulus Gaud and Mouchet

Proctophyllodes rhynchocaulus Gaud and Mouchet, 1957, Ann Parasitol. hum. comp., 32: 512-513, figs. 9B, 10B. Type host: *Platyteira cyanea* (Muscicapidae).

Proctophyllodes rhynchocaulus, Gaud and Till, 1961, Publ. So. Afr. Inst. Med. Res., 11(L): 251.

The edentate adanal discs which apparently have very short cylinders and the small, triangular lamellae with vestigial venation are sufficient to distinguish this species from the closely allied *Proctophyllodes anaxiphus*, new species. The latter species has dentate adanal discs with long cylinders and the lamellae are apically rounded.

The Feather Mite Genus *Proctophyllodes*



FIGS. 83, 84. *Proctophyllodes rhynchocaulus* Gaud and Mouchet: paratype male (83), paratype female (84).

MALE (paratype). Length, excluding lamellae, 220 μ ; width, 98 μ . *Dorsal idiosoma*: Propodosomal shield 64 μ in length, 79 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 54 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 19.3 μ in length. Hysterosomal shield 119 μ in length, 77 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 48 μ in length. Lamellae 11 μ in length, 8 μ in width, triangular, widely separated, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, with small lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level midway between legs III and IV; genital organ extending to anterior row of opisthogastric setae; genital sheath bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing posterior pair of setae. Adanal discs circular, nonmeasurable, shorter than diameter and apparently lacking teeth; accessory glands absent.

FEMALE (paratype). Length, excluding terminal appendages, 561 μ ; width, 130 μ . *Dorsal idiosoma*: Propodosomal shield 84 μ in length, 104 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 71 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7 μ in length, 4.8 μ in width. Hysterosoma with lobes and with terminal

appendages; anterior shield 193μ in length, 93μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 70μ in length; setae d_4 inserted on conjunctiva and separated by 41μ ; lobes wide; cleft parallel-sided, 52μ in length, 14μ in width; setae d_5 approximately equal in length to terminal appendages; setae l_5 slightly longer than terminal appendages. Spermatheca not visible. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Platysteira cyanea* (Muscicapidae): holotype ♂ (Gaud), 1 ♂, 2 ♀ paratypes (Gaud), Yaoundé, Nyong and Sanaga region, French Cameroons, February, 1956, J. Mouchet.

Material examined. Muscicapidae: 1 ♂, 1 ♀ (paratypes), from *Platysteira cyanea*.

Remarks. The illustration of the male genital region by Gaud and Mouchet (1957) has the right and left opisthogastric shields joined from the level of the posterior opisthogastric setae to the tips of the genital arch. The paratype male examined has the right and left sides independent and has only the posterior opisthogastric setae inserted on the shields. The supranal concavity of the male is closed posteriorly and is very broad anteriorly, measuring 48μ in length and 21μ in width at the level of the anterior fourth. The redescription and drawings are of paratypes.

HOSTS

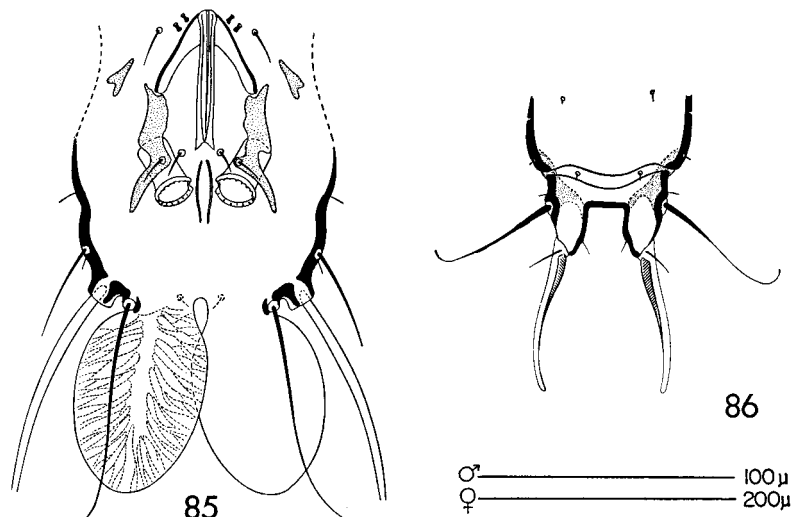
Muscicapidae		
<i>Platysteira cyanea</i> (Müller)	Fr. Cameroons	Gaud and Mouchet, 1957 Present study

Proctophyllodes pari, new species

Proctophyllodes pari, *P. reguli*, and *P. vesca*, new species, have adanal discs with the external ring notched on the medial surface. *P. pari* may be differentiated from *P. reguli* in having the lamellae of the male exceeding 50μ in length; the lamellae of *P. reguli* are less than 35μ in length. The genital organ of *P. pari* extends to a level approximately one-half of the distance between the apex of the genital arch and the origins of the lamellae; conversely, in *P. vesca*, the genital organ extends only about one-third of this distance.

MALE (holotype). Length, excluding lamellae, 304μ ; width,

The Feather Mite Genus *Proctophyllodes*



FIGS. 85, 86. *Proctophyllodes pari*, new species: holotype male (85), allotype female (86).

159 μ . *Dorsal idiosoma*: Propodosomal shield 74 μ in length, 87 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 64 μ . Humeral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 16 μ in length, 4 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 44 μ in length. Lamellae 76 μ in length, 47 μ in width, oblong, with internal margins slightly overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch reflexion extending to posterior articulation of legs III; genital organ extending to anterior opisthogastric setae; genital sheath bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing one pair of setae. Adanal discs circular, each about 27 μ x 17 μ and bearing approximately 18 teeth; accessory glands absent.

FEMALE. (allotype). Length, excluding terminal appendages, 320 μ ; width, 190 μ . *Dorsal idiosoma*: Propodosomal shield 100 μ in length, 108 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 80 μ . Humeral shields moderately developed and not bearing

setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20μ in length, 4μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 224μ in length, 106μ in width, with anterior margin concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 64μ in length; setae d_4 inserted on conjunctiva and separated by 42μ ; lobes normal; cleft parallel-sided, 42μ in length, 24μ in width; setae d_5 $\frac{1}{5}$ length of terminal appendages. Spermatheca as in *pinnatus*. Ventral idiosoma: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Parus bicolor* (Paridae): holotype δ (NU), allotype φ (NU), 2 δ δ , 3 φ φ paratypes, Tarrant County, Texas, November, 1949; paratypes: 13 δ δ , 13 φ φ , Harrison State Forest, Indiana, March 7, 1959; 4 δ δ , 5 φ φ , Smith County, Texas, February 15, 1950; 16 δ δ , 12 φ φ , East Falls Church, Virginia, March 4, 1923, E. A. Chapin. Paratypes deposited: André, BMNH, BAS, CAS, Gaud, MN, NU, Radford, RNH, SAIMR, SEA, USNM, Wilson, ZSBS, ZSZM.

Remarks. The propodosomal shield may be entire or slightly incised at the level of the scapular setae. The anterior opisthogastric setae, which are illustrated as removed from the opisthogastric shields, may be occasionally included on the shields. The name *pari* is chosen to designate the type host. Drawings are of the holotype and allotype.

HOSTS

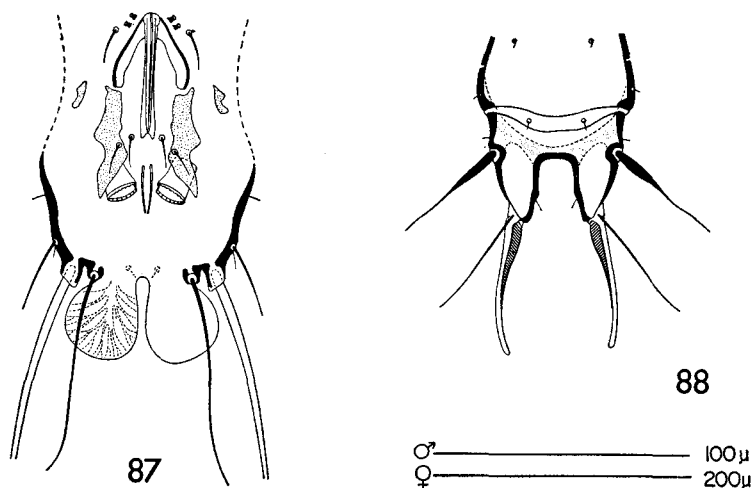
Paridae		
<i>Parus bicolor</i> (L.), 1766	United States	Present study

Proctophyllodes reguli Gaud

Proctophyllodes reguli Gaud, 1957, Soc. Sci. nat. Phys. Maroc, 37: 124, fig. 7F. Type host: *Regulus ignicapillus* (Sylviidae).

Proctophyllodes reguli, *P. pari*, new species, and *P. vesca*, new species, are three species characterized in part by having each adanal disc with the external ring notched on the medial surface. In *P. reguli* and *P. pari* the external ring is in itself symmetrical except for the notch; in *P. vesca*, the anterior portion of the ring becomes heavily sclerotized as the notch is approached. *P. reguli* may be distinguished by the small lamellae of the male; these structures are

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FIGS. 87, 88. *Proctophyllodes reguli* Gaud: male (87) and female (88) from *Regulus* species.

about $33\mu \times 33\mu$, whereas in the two new species, the lamellae are over 50μ in length.

MALE. Length, excluding lamellae, 282μ ; width, 127μ . *Dorsal idiosoma*: Propodosomal shield 68μ in length, 68μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 47μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.9μ in length, 3.5μ in width. Hysterosomal shield 152μ in length, 74μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 33μ in length. Lamellae 33μ in length, 32μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level midway between legs III and IV; genital organ extending to anterior row of opisthogastric setae; genital sheath bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing posterior pair of setae. Adanal discs incomplete circle, medial margins notched, each about $14\mu \times 10\mu$ and bearing approximately 24 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 508μ ; width,

171 μ . *Dorsal idiosoma*: Propodosomal shield 95 μ in length, 102 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 67 μ . Humeral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 20.7 μ in length, 4.8 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 215 μ in length, 95 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 76 μ in length; setae d_4 inserted on conjunctiva and separated by 42 μ ; lobes normal; cleft parallel-sided or slightly divergent, 54 μ in length, 21 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Regulus ignicapillus* (Sylviidae): holotype δ , Oulmes, Rabat region, French Morocco, J. Gaud; location of type unknown.

Material examined. Sylviidae (= Regulidae): 2 δ δ , from *Regulus regulus*, England; 9 δ δ , 7 ♀ ♀ , from *Regulus satrapa*, United States; 3 δ δ , 3 ♀ ♀ , from *Regulus* sp., France.

Remarks. The drawings are of specimens from France.

	HOSTS	
Sylviidae (= Regulidae)		
<i>Regulus ignicapillus</i> (Temminck), 1820	Fr. Morocco	Gaud, 1957
<i>Regulus regulus</i> (L.), 1758	England	Present study
<i>Regulus satrapa</i> (Lichtenstein), 1823	United States	Present study
<i>Regulus</i> species	France	Present study

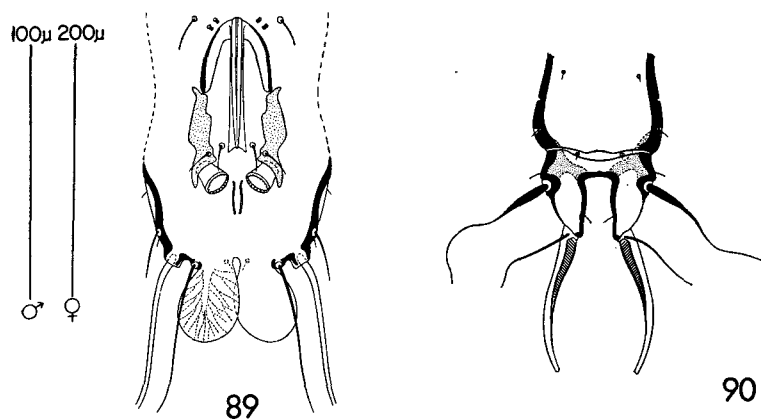
Proctophyllodes ateri Fritsch, new status

Proctophyllodes styliifer ateri Fritsch, 1961, Z. Parasitenk., 21: 27, figs. 19e-f. Type host: *Parus ater* (Paridae).

The species is closely allied to *Proctophyllodes pari*, new species, *P. vesca*, new species, and *P. reguli* and can be differentiated by the complete external ring of the adanal discs. This ring is notched medially in the related species.

MALE. Length, excluding lamellae, 258 μ ; width, 116 μ . *Dorsal idiosoma*: Propodosomal shield 69 μ in length, 70 μ in width; lateral margins entire; without lacunae; without external vertical setae;

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FIGS. 89, 90. *Proctophyllodes ateri* Fritsch: male (89) and female (90) from *Parus atricapillus*.

distance between external scapular setae, 48μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 14μ in length, 3.9μ in width. Hysterosomal shield 152μ in length, 76μ in width; anterior margin concave; without lacunae; without ventrolateral extensions; supranal concavity 31μ in length. Lamellae 29μ in length, 27μ in width, oblong, with inner margins slightly overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch extending to posterior articulations of legs III; genital organ extending slightly beyond anterior opisthogastric setae; genital sheath bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing one pair of setae. Adanal discs circular, each about $12\mu \times 10\mu$ and bearing approximately 18 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 430μ ; width, 159μ . *Dorsal idiosoma*: Propodosomal shield 85μ in length, 92μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 67μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.5μ in length, 5.4μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 212μ in length, 87μ in width, with anterior margin concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 67μ in length; setae d_4

inserted on conjunctiva and separated by 34μ ; lobes normal; cleft parallel-sided, 53μ in length, 18μ in width; setae d_5 $\frac{1}{2}$ the length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Parus ater* (Paridae) at or near Erlangen, Germany; type destroyed (personal communication, H. J. Stammer).

Material examined. Paridae: 5 ♂♂, 7 ♀♀, from *Parus atricapillus*, Massachusetts, Missouri, New Hampshire; 2 ♂♂, 3 ♀♀, from *Parus carolinensis*, Virginia.

Remarks. The redescription and drawings are based on specimens collected in North America from *Parus atricapillus*.

HOSTS

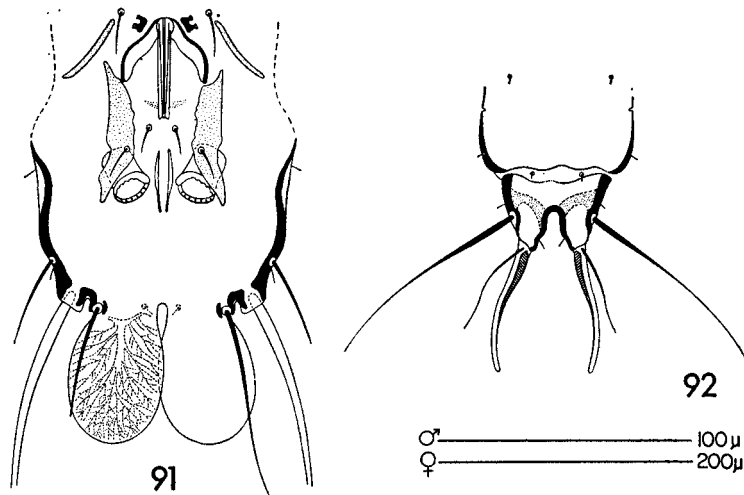
Paridae		
<i>Parus ater</i> (L.), 1758	Europe	Fritsch, 1961
<i>Parus atricapillus</i> (L.), 1766	United States	Present study
<i>Parus carolinensis</i> (Audubon), 1834	United States	Present study

Proctophyllodes vesca, new species

A lightly sclerotized, crescentic band is positioned anteriorly between the divided opisthogastric shields. This unique band may be employed to differentiate *Proctophyllodes vesca*, new species, from the related *P. pari*, new species. The terminal cleft of the female of *P. vesca* is in the form of an irregular arch; in *P. pari*, the terminal cleft is in the form of a rectangle.

MALE (holotype). Length, excluding lamellae, 329μ ; width, 162μ . *Dorsal idiosoma*: Propodosomal shield 81μ in length, 91μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 65μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 17μ in length. Hysterosomal shield 202μ in length, 98μ in width; anterior margin concave; with anteromedial lacunae; without ventrolateral extensions; supranal concavity 48μ in length. Lamellae 52μ in length, 35μ in width, oblong, with inner margins slightly overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent;

The Feather Mite Genus *Proctophyllodes*



FIGS. 91, 92. *Proctophyllodes vesca*, new species: holotype male (91), allotype female (92).

genital discs united; genital arch reflexion to anterior articulations of legs IV; genital organ extending to anterior opisthogastric setae; genital sheath bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing one pair of setae. Adanal discs circular, each about $20\mu \times 16\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 478μ ; width, 207μ . *Dorsal idiosoma*: Propodosomal shield 107μ in length, 125μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 87μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 21μ in length. Hysterosoma with lobes and with terminal appendages; anterior shield 245μ in length, 117μ in width, with anterior margin concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 59μ in length; setae d_4 inserted on conjunctiva and separated by 38μ ; lobes normal; cleft an irregular arch, 36μ in length, 8μ in width at narrowest portion; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields.

Type material. From *Sialia currucoides* (Turdidae): holotype

♂ (NU), allotype ♀ (NU), 15 ♂♂, 15 ♀♀ paratypes, Kent, Culberson County, Texas, March 8, 1942, W. B. Davis. Paratypes deposited: André, BAS, BMNH, CAS, Gaud, MN, NU, RNH, SAIMR.

Additional material. Turdidae: 6 ♂♂, 4 ♀♀, from *Myadestes townsendi*, Texas, Utah; 1 ♂, from *Sialia sialis*, Texas.

Remarks. The weak, crescentic sclerite persists in all males of the study series. Furthermore, the structure is never confluent with the well-defined opisthogastric shields nor with the setal bases of the anterior opisthogastric setae. The name is a derivation of *vescus* and refers to the weak sclerite mentioned above. The drawings are of the holotype and allotype.

HOSTS

Turdidae		
<i>Myadestes townsendi</i> (Audubon), 1838 (1839)	United States	Present study
<i>Sialia currucoides</i> (Bechstein), 1798	United States	Present study
<i>Sialia sialis</i> (L.), 1758	United States	Present study

Proctophyllodes legaci Gaud

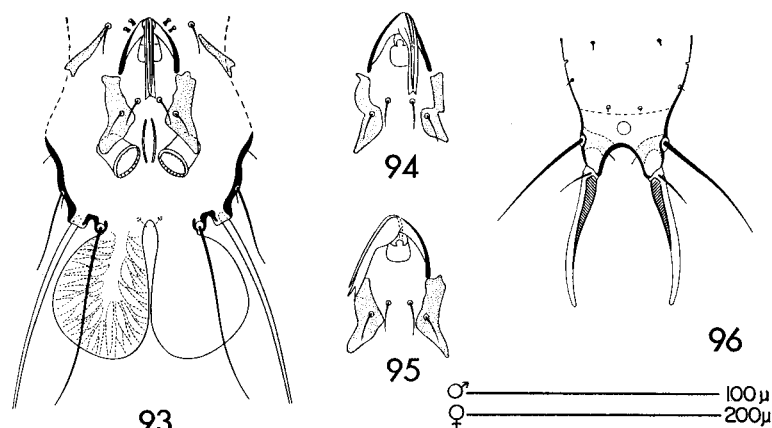
Proctophyllodes legaci Gaud, 1953, Ann. Parasitol. hum. comp., 28: 200, figs. 4(3), 4(4). Type host: *Chalcomitra senegalensis* (Nectariniidae).

Proctophyllodes legaci, Gaud and Till, 1961, Publ. So. Afr. Inst. Med. Res., 11(L): 250.

In the original description of the species, Gaud (1953) was impressed by features of the females, namely, the terminal cleft in the shape of a smooth arch and the fusion of the hysterosomal and lobal shields. Although not unique, the females of *Proctophyllodes legaci* are the only females within the group possessing these features.

MALE. Length, excluding lamellae, 253 μ ; width, 125 μ . *Dorsal idiosoma*: Propodosomal shield 68 μ in length, 78 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 53 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 17.3 μ in length, 2.8 μ in width. Hysterosomal shield 135 μ in length, 77 μ in width; anterior margin shallowly concave, without lacunae; without ventrolateral extensions; supranal concavity 32 μ in length. Lamellae 54 μ in length,

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FIGS. 93-96. *Proctophyllodes legaci* Gaud: males (93-95) and female (96) from *Nectarinia pulchella*.

39 μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch reflexion to level slightly anterior to anterior articulations of legs IV; genital organ extending to anterior pair of opisthogastric setae; genital sheath bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing posterior pair of setae. Adanal discs circular, each about 11 μ x 11 μ and bearing approximately 40 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 420 μ ; width, 159 μ . *Dorsal idiosoma*: Propodosomal shield 86 μ in length, 100 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 69 μ . Humeral shields weakly developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 22.1 μ in length, 4.1 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 193 μ in length, 91 μ in width, with anterior margin shallowly concave, without lacunae; with supranal concavity. Lobar region fused with anterior shield; 52 μ in length; setae d_4 inserted anterolateral of supranal concavity and separated by 22 μ ; lobes short; cleft in the form of an arch, 24 μ in length; setae d_5 $\frac{1}{4}$ length of terminal appendages; setae l_5 slightly longer than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes

well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields.

Type material. From *Chalcomitra senegalensis* (Nectariniidae): holotype ♂ (Gaud), 22 ♂♂, 27 ♀♀ paratypes (Gaud), Bossangoa, Oubangui-Chari, French Equatorial Africa, July, 1951, J. Gaud.

Material examined. Nectariniidae: 4 ♂♂, 5 ♀♀ (paratypes), from *Chalcomitra senegalensis*, French Equatorial Africa; 3 ♂♂, 2 ♀♀, from *Nectarinia pulchella*, Gambia; 1 ♂, 2 ♀♀, from *Nectarinia famosa*, Union of South Africa; 5 ♂♂, 14 ♀♀, from *Chalcomitra amethystina*, Union of South Africa.

Remarks. With the exception of Gaud's record (1953) of *P. legaci* occurring on one species of Sylviidae, it is apparent that the avian family Nectariniidae probably contains the true hosts. Unless future collecting shows that at least some species of Sylviidae harbor this *Proctophyllodes* species, Gaud's record, although valid, may have represented an accidental infestation. The redescription and drawings are of specimens from Gambia.

HOSTS

Nectariniidae		
<i>Chalcomitra amethystina</i> (Shaw), 1811	Un. So. Africa	Present study
<i>Chalcomitra fuliginosa</i> Shaw	Fr. Eq. Africa	Gaud, 1953
<i>Chalcomitra senegalensis</i> (L.), 1766	Fr. Eq. Africa	Gaud, 1953 Present study
<i>Nectarinia famosa</i> (L.), 1766	Un. So. Africa	Present study
<i>Nectarinia pulchella</i> (L.), 1766	Gambia	Present study
Sylviidae		
<i>Cisticola natalensis</i> (A. Smith), 1843	Fr. Eq. Africa	Gaud, 1953

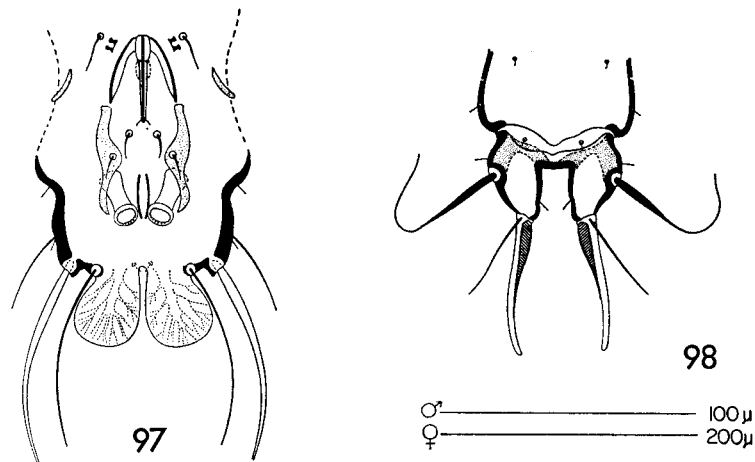
Proctophyllodes acanthicaulus Gaud

Proctophyllodes acanthicaulus Gaud, 1957, Bull. Soc. Sci. nat. Maroc, 37: 116, figs. 5A, 6A, 7A. Type host: *Muscicapa striata* (Muscicapidae).

Proctophyllodes acanthicaulus Gaud and Mouchet, 1957. Ann. Parasitol. hum. comp., 32(5-6): 508-509, figs. 7B, 8A. Type host: *Muscicapa striata* (Muscicapidae). (New synonymy, personal communication, J. Gaud.)

Proctophyllodes acanthicaulus, Gaud and Till, 1961, Publ. So. Afr. Inst. Med. Res., 11(L): 249.

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FIGS. 97, 98. *Proctophyllodes acanthicaulus* Gaud: paratype male (97), paratype female (98).

The tip of the genital sheath has two filiform extensions directed posterolaterally. This character, although difficult to observe, is unique to this species. By other features, *Proctophyllodes acanthicaulus* is shown to be closely related to *P. hylocichlae*, new species. The terminal clefts of the females can be employed to separate these species: in *P. acanthicaulus*, the cleft is rectangular and in *P. hylocichlae*, the cleft is about four times longer than wide.

MALE. Length, excluding lamellae, 282 μ ; width, 133 μ . *Dorsal idiosoma*: Propodosomal shield 73 μ in length, 81 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 56 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae narrow, bluntly rounded, 14.5 μ in length, 2.7 μ in width. Hysterosomal shield 152 μ in length, 83 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 55 μ in length. Lamellae 30 μ in length, 29 μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites IV with small anteromedial surface fields. Pregenital apodeme absent; genital discs separate; genital arch reflexion to level of anterior articulations of legs IV; genital organ extending almost to opisthogastric setae; genital sheath bifid distally. Opisthogastric setae in trapezoidal arrangement; opistho-

gastric shields divided and bearing posterior pair of setae. Adanal discs circular, each about $17\mu \times 8\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 463μ ; width, 171μ . *Dorsal idiosoma*: Propodosomal shield 86μ in length, 104μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 74μ . Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7μ in length, 4.8μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 210μ in length, 98μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 58μ in length; setae d_4 inserted on conjunctiva and separated by 41μ ; lobes normal; cleft parallel-sided, 41μ in length, 22μ in width; setae d_5 slightly shorter than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Muscicapa striata* (Muscicapidae): holotype ♂ (Gaud), French Morocco.

Material examined. Muscicapidae: 4 ♂♂, 9 ♀♀, from *Muscicapa striata*, French Cameroons, Union of South Africa.

Remarks. The female is similar to those of the majority of species of *Proctophyllodes*; the terminal lobes and cleft are moderately developed, setae d_4 are widely separated, and setae d_5 are approximately three-quarters of the length of the terminal appendages. The redescription and drawings are from the French Cameroons material.

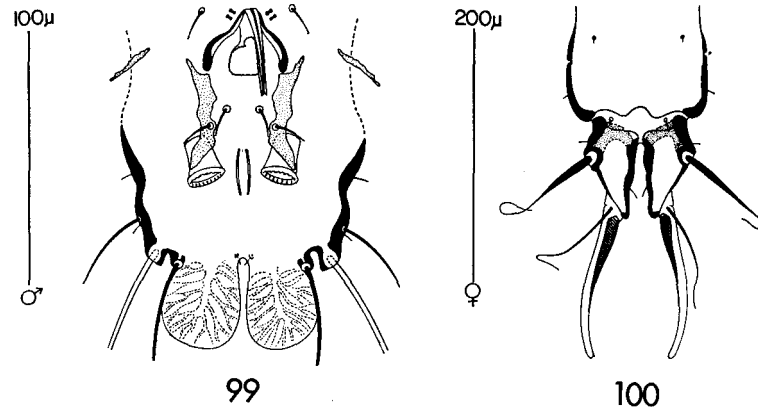
HOSTS

Muscicapidae		
<i>Muscicapa striata</i>	Fr. Morocco	Gaud, 1957
(Pallas), 1764	Fr. Cameroons	Gaud and Mouchet, 1957
		Present study
	Un. So. Africa	Present study

Proctophyllodes hylocichlae, new species

This new species bears close affinity with a species reported only from French Morocco and the French Cameroons—*Proctophyllodes acanthicaulus*. Contrasting the two males, *P. hylocichlae*, new species, lacks the two filiform extensions of the genital sheath and

The Feather Mite Genus *Proctophyllodes*



FIGS. 99, 100. *Proctophyllodes hylocichlae*, new species: holotype male (99), allotype female (100).

bears shorter adanal discs. The female terminal cleft is approximately four times longer than wide as compared to the rectangular cleft of *P. acanthicaulus*.

MALE (holotype). Length, excluding lamellae, 304 μ ; width 154 μ . *Dorsal idiosoma*: Propodosomal shield 75 μ in length, 88 μ in width; lateral margins slightly incised but not totally including the external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 63 μ . Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 16 μ in length, 3 μ in width. Hysterosomal shield 177 μ in length, 92 μ in width; anterior margin concave; without lacunae; without ventrolateral extensions; supranal concavity 43 μ in length. Lamellae 35 μ in length, 32 μ in width, ovoid, with inner margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs united; genital arch reflexion extending to anterior articulations of legs III; genital organ extending to anterior opisthogastric setae; genital sheath bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing one pair of setae. Adanal discs circular, each about 23 μ x 11 μ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 501 μ ; width, 185 μ . *Dorsal idiosoma*: Propodosomal shield 96 μ in length, 130 μ in width; lateral margins entire; without lacunae;

without external vertical setae; distance between external scapular setae, 88 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 23 μ in length, 5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 232 μ in length, 124 μ in width, with anterior margin concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 78 μ in length; setae d_4 inserted on conjunctiva and separated by 43 μ ; lobes elongate; cleft irregular, 65 μ in length, 16 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with moderate connective, without lateral extensions; epimerites without surface fields.

Type material. From *Hylocichla guttata* (Turdidae): holotype δ (NU), allotype ♀ (NU), 14 $\delta\delta$, 21 ♀♀ paratypes, Blue Creek, Chisos Mountains, Brewster County, Texas, April 27, 1944, W. B. Davis; paratypes: 1 δ , 1 ♀ , 20 miles north Dallas, Dallas County, Texas, January 27, 1950; 1 δ , 1 ♀ , Bosque County, Texas, January 10, 1950; 1 ♀ , Milbridge, Washington County, Maine, July 30, 1961, G. Hapgood Parks. Paratypes deposited: BAS, BMNH, CAS, Gaud, MN, NU, RNH, USNM, ZSZM.

Additional material. Turdidae: 2 $\delta\delta$, 1 ♀ , from *Hylocichla ustulata*, Maine, Tennessee.

Remarks. The species name indicates the type host. The drawings are of the holotype and allotype.

HOSTS

Turdidae		
<i>Hylocichla guttata</i> (Pallas), 1814	United States	Present study
<i>Hylocichla ustulata</i> (Nuttall), 1840	United States	Present study

Group III—the *quadratus* group

Although rare in occurrence, the rectangular or near rectangular arrangement of the opisthogastric setae is not unique to this group, e.g., *Proctophyllodes anisogamus* (Group VII). However, five of the six species included in the *quadratus* complex do have a unique combination of features, both morphologically and ecologically, which denotes close species affinities (see discussion, p. 118). The sixth species, *P. trisetosus*, is included because of the arrangement of the opisthogastric setae.

Pertinent characters for species differentiation, males:

The Feather Mite Genus Proctophyllodes

1. Presence or absence of ventrolateral apodeme mesal to setae l_3 .
2. Length of genital organ in microns and in relation to opisthogastric setae.
3. Positions of opisthogastric setae.
4. Size of seminal vesicle in relation to area between genital arch and anterior margin of opisthogastric shield(s).
5. Presence or absence of teeth on the external ring of the adanal disc.

Pertinent characters for species differentiation, females:

1. Size and shape of terminal cleft.
2. Configuration of the posterolateral idiosomal margins.
3. Positions of setae d_4 .

Key to the species of group III

1. Genital organ extending to or beyond posterior opisthogastric setae 2
 Genital organ not extending to posterior opisthogastric setae 4
2. Male with terminal lamellae distant and with edentate adanal discs; female with posterolateral margins of idiosoma straight..... *anisogamus**, p. 223
 Male with terminal lamellae approximate and with dentate adanal discs; female with posterolateral margins of idiosoma constricted 3
3. Genital organ extending beyond midpoint between posterior opisthogastric setae and origins of lamellae.....
 *longiquadratus*, n. sp., p. 118
 Genital organ extending to or slightly beyond posterior opisthogastric setae..... *quadrisetosus*, n. sp., p. 120
4. Opisthogastric shields broadly joined; genital organ robust.... 5
 Opisthogastric shields divided or weakly joined; genital organ delicate 6
5. Genital organ approximately 43μ in length; seminal vesicle almost as large as area delimited by arch and anterior margin of shield..... *quadratus*, n. sp., p. 122
 Genital organ approximately 36μ in length; seminal vesicle about one-half as large as area delimited by arch and anterior margin of shield..... *dendroicae*, n. sp., p. 124
6. Genital organ extending slightly beyond tips of genital

* See Group VII.

- arch; rows of opisthogastric setae separated by distance twice that between anterior pair; terminal cleft of female longer than wide.....*breviquadratus*, n. sp., p. 126
Genital organ extending to anterior opisthogastric setae; rows of opisthogastric setae separated by distance less than between anterior pair; terminal cleft of female wider than long.....*trisetosus*, p. 128

The following five new species form a natural group restricted to the Sylviidae and the closely related New World families Vireonidae and Parulidae. The mite species show singular uniformity in the morphology of the females as illustrated by the figures depicting hysterosomal lobes and terminal appendages. The males have a distinctive combination of characters which include: rectangular arrangement of the opisthogastric setae; strong, triangular, internal apodemes mesal to setae l_3 ; short adanal discs; small leaflike lamellae; disproportionately large seminal vesicles; and similarly constructed genital arches and genital organs.

The posterolateral, triangular apodemes of the males are internal inflexions of the lateral margins of the hysterosomal shield. These are not to be confused with an occasional infolding of the idiosomal wall, an aberration which results from excessive pressure on the microcover glasses during slide preparation.

The lengths of the genital organs are relatively constant within species and thus provide a useful character for species separation. It should be noted that there are positive correlations between lengths of genital organs, sizes of seminal vesicles, and distances between the anterior opisthogastric setae and apices of the genital arches.

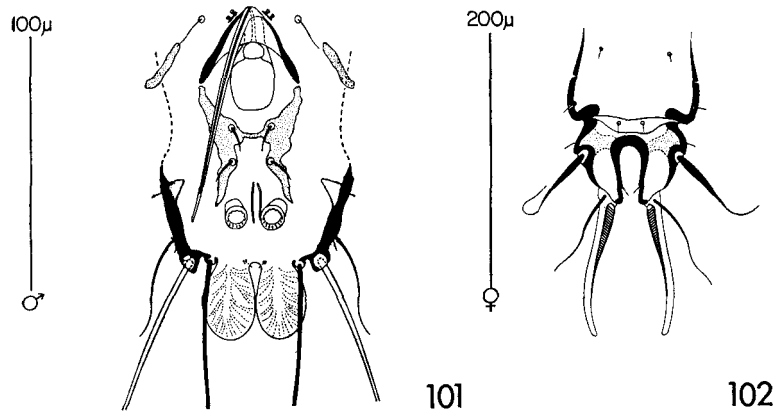
Other proctophyllodid species, for example, *Proctophyllodes trisetosus* Ewing and Stover and *P. anisogamus* Gaud & Mouchet, bear opisthogastric setae arranged in a square or a rectangle. However, these species lack the triangular apodemes, have small seminal vesicles, and have differently constructed genital organs.

Proctophyllodes longiquadratus, new species

The characteristic genital organ extends to the adanal discs and measures 80–85 μ in length. In comparison, this structure in the related species never extends beyond the posterior opisthogastric setae.

MALE (holotype). Length, excluding lamellae, 274 μ ; width, 130 μ . Dorsal idiosoma: Propodosomal shield 72 μ in length, 75 μ in

The Feather Mite Genus *Proctophyllodes*



FIGS. 101, 102. *Proctophyllodes longiquadratus*, new species: holotype male (101), allotype female (102).

width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 51μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15μ in length, 3μ in width. Hysterosomal shield 146μ in length, 73μ in width; anterior margin concave; without lacunae; with ventrolateral extensions; supranal concavity 27μ in length. Lamellae 32μ in length, 18μ in width, ovoid, with inner margins not overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites I with anterolateral surface fields. Pregenital apodeme absent; genital discs united; genital arch reflexion to midpoint between legs III and IV; genital organ extending beyond midpoint between posterior opisthogastric setae and origins of lamellae; genital sheath not bifid distally. Opisthogastric setae in rectangular arrangement; opisthogastric shields joined and bearing two pairs of setae. Adanal discs circular, each about $10\mu \times 10\mu$ and bearing approximately 16 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 405μ ; width, 152μ . *Dorsal idiosoma*: Propodosomal shield 87μ in length, 98μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 66μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 22μ in length, 5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 192μ in length, 84μ in width, anterior

margin concave, with lacunae; without supranal concavity. Lobar region articulated with anterior shield; 65μ in length; setae d_4 inserted on conjunctiva and separated by 17μ ; lobes normal; cleft parallel-sided, 43μ in length, 16μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I with anterolateral surface fields.

Type material. From *Dendroica striata* (Parulidae): holotype δ (NU), allotype ♀ (NU), 3 δ δ , 2 ♀ ♀ paratypes, Witless Bay, Newfoundland, August 9, 1962, K. Hyland, G. West, and A. Moorehouse; paratypes: 2 δ δ , 2 ♀ ♀ , 2 miles south Rosedale, Bolivar County, Mississippi, May 2, 1959, B. L. Monroe, Jr. Paratypes deposited: Gaud, NU, USNM.

Remarks. Care should be exercised in assessing the taxonomic value of the opisthogastric shields. Although the holotype indicates a weak juncture of the shields, the type series includes a range from a broad juncture to a complete separation of the opisthogastric shields. Surface fields on epimerites I may be lacking. The name *longiquadratus* refers to the penis length and arrangement of the opisthogastric setae. The drawings are of the holotype and allotype.

HOSTS

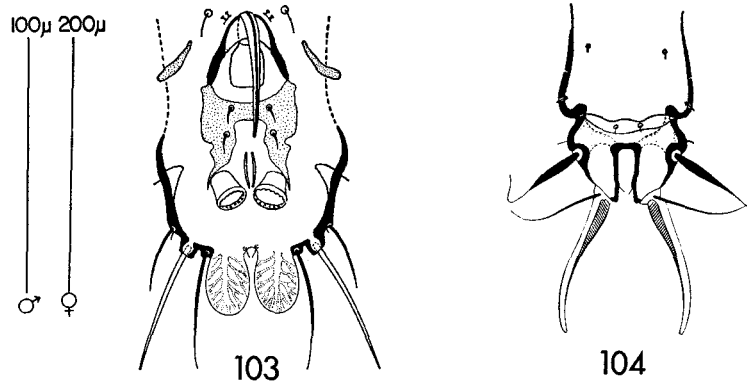
Parulidae		
<i>Dendroica striata</i> (Forster), 1772	United States	Present study

Proctophyllodes quadrisetosus, new species

Proctophyllodes quadrisetosus, new species, bears a genital organ ranging from $49\text{--}52\mu$. This species is easily distinguished from *P. quadratus*, new species, and *P. dendroicae*, new species, in which the genital organs measure respectively $39\text{--}45\mu$ and $34\text{--}37\mu$. An even greater differential in length applies in the case of *P. longiquadratus*, in which the genital organ measures approximately 80μ in length.

MALE (holotype). Length, excluding lamellae, 268μ ; width, 122μ . *Dorsal idiosoma*: Propodosomal shield 71μ in length, 75μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 52μ . Humeral shields weakly developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae 13μ in length, 3μ in width. Hysterosomal shield 149μ in length, 74μ in width; anterior margin concave; without lacunae; with ventrolateral extensions; supranal concavity

The Feather Mite Genus *Proctophyllodes*



FIGS. 103, 104. *Proctophyllodes quadrisetosus*, new species: holotype male (103), allotype female (104).

27 μ in length. Lamellae 22 μ in length, 15 μ in width, ovoid, inner margins not overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch reflexion to midpoint between legs III and IV; genital organ extending to level of posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in rectangular arrangement; opisthogastric shields joined and bearing two pairs of setae. Adanal discs circular, each about 10 μ x 10 μ and bearing approximately 16 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 453 μ ; width 164 μ . *Dorsal idiosoma*: Propodosomal shield 94 μ in length, 99 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 75 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20 μ in length, 5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 207 μ in length, 92 μ in width, with anterior margin concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 65 μ in length; setae d_4 inserted on conjunctiva and separated by 18 μ ; lobes normal; cleft parallel-sided, 43 μ in length, 16 μ in width; setae d_5 exceeding length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites I with anterolateral surface fields.

Type material. From *Dendroica coronata* (Parulidae): holotype ♂ (NU), allotype ♀ (NU), 2 ♂♂, 2 ♀♀ paratypes, Wallingford, New Haven County, Connecticut, April 26, 1961, P. L. Ames; paratypes: 2 ♂♂, 5 ♀♀, 6 miles east Dallas, Dallas County, Texas, April 29, 1939; 6 ♂♂, 2 ♀♀, 50 miles northwest Grand Marais, Cook County, Minnesota, June 12, 1961, W. T. Atyeo. Paratypes deposited: BMNH, Gaud, NU, USNM.

Additional material. Parulidae: 2 ♂♂, 3 ♀♀, from *Dendroica chrysoparia*, Texas; 8 ♂♂, 8 ♀♀, from *Dendroica virens*, Texas, Tennessee, Virginia.

Remarks. The name *quadrisetosus* is selected to call attention to the rectangular arrangement of the opisthogastric setae. Drawings are of the holotype and allotype.

HOSTS

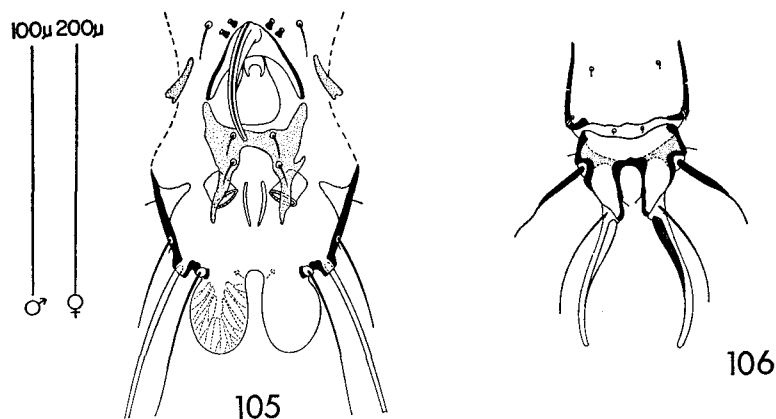
Parulidae		
<i>Dendroica chrysoparia</i>	United States	Present study
Sclater & Salvin, 1860		
<i>Dendroica coronata</i> (L.),	United States	Present study
1766		
<i>Dendroica virens</i>	United States	Present study
(Gmelin), 1789		

Proctophyllodes quadratus, new species

Although the arrangement of the opisthogastric setae and the presence of the ventrolateral extensions of the hysterosoma serve to suggest the close relationship of the five species in this complex, perhaps the greatest affinity can be ascribed to *P. quadratus*, new species, and *P. dendroicae*, new species. These species can be distinguished by the length of the genital organ: 39–45 μ in *P. quadratus*, 34–37 μ in *P. dendroicae*.

MALE (holotype). Length, excluding lamellae, 268 μ ; width, 127 μ . *Dorsal idiosoma*: Propodosomal shield 72 μ in length, 72 μ in width; lateral margins incised just posterior to external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 50 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 11.9 μ in length, 2 μ in width. Hysterosomal shield 152 μ in length, 71 μ in width; anterior margin concave; without lacunae; with ventrolateral extensions; supranal concavity 32 μ in length. Lamellae 29 μ in length, 23 μ in width, oblong, with inner margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad

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FIGS. 105, 106. *Proctophyllodes quadratus*, new species: holotype male (105), allotype female (106).

connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs united; genital arch reflexion to midpoint between legs III and IV; genital organ extending slightly beyond anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in rectangular arrangement; opisthogastric shields joined and bearing two pairs of setae. Adanal discs circular, each about $10\mu \times 10\mu$ and bearing approximately 16 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 318μ ; in width, 157μ . *Dorsal idiosoma*: Propodosomal shield 88μ in length, 99μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 67μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 22.8μ in length, 5.4μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 190μ in length, 88μ in width, with anterior margin deeply concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 70μ in length; setae d_4 inserted on conjunctiva and separated by 18μ ; lobes normal; cleft parallel-sided, 43μ in length, 17μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites I and II with anterolateral surface fields.

Type material. From *Vermivora peregrina* (Parulidae), Louisiana: holotype ♂ (NU), allotype ♀ (NU), 2 ♂♂, 2 ♀♀, Bienville,

Bienville Parish, April 29, 1949, R. E. Tucker; paratypes: 2 ♂♂, 3 ♀♀, Baines, West Feliciana Parish, May 3, 1942, George H. Lowery, Jr. Paratypes deposited: Gaud, NU, USNM.

Additional material. Parulidae: 2 ♂♂, 6 ♀♀, from *Myioborus miniatus*, México; 3 ♂♂, 2 ♀♀, from *Setophaga picta*, México. Vireonidae: 3 ♂♂, 7 ♀♀, from *Vireo flavifrons*, Texas; 1 ♂, 4 ♀♀, from *Vireo gilvus*, Louisiana.

Remarks. The mites collected from *Vireo flavifrons* and *Vireo gilvus* may represent a separate species as the opisthogastric shields are divided and the female cleft is wider than the clefts in the remainder of the study material. However, limited specimens, further marked by a poor condition, preclude a valid separation. The species is named *quadratus* for the arrangement of the opisthogastric setae. The drawings are of the holotype and allotype.

HOSTS

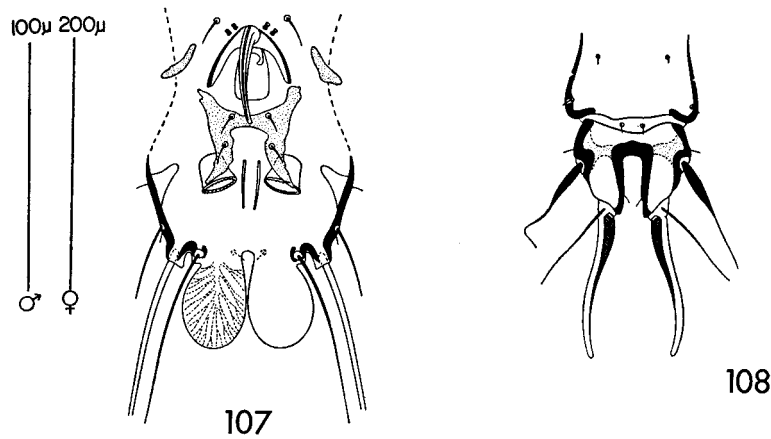
Parulidae		
<i>Myioborus miniatus</i> (Swainson), 1827	México	Present study
<i>Setophaga picta</i> Swainson, 1829	México	Present study
<i>Vermivora peregrina</i> (Wilson), 1811	United States	Present study
Vireonidae (Provisional identification)		
<i>Vireo flavifrons</i> Vieillot, 1807 (1808)	United States	Present study
<i>Vireo gilvus</i> Vieillot, 1807 (1808)	United States	Present study

Proctophyllodes dendroicae, new species

Proctophyllodes dendroicae, new species, conceivably is difficult to distinguish from *P. quadratus*, new species. The comparative lengths of the genital organs are similar, but a differential of at least 5 μ provides a reliable means of separating the two forms. The length of the genital organ in *P. dendroicae* is 34–37 μ , while the comparable measurement in *P. quadratus* is 39–45 μ .

MALE (holotype). Length, excluding lamellae, 265 μ ; width, 126 μ . *Dorsal idiosoma*: Propodosomal shield 74 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 50 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15 μ in length, 3 μ in width. Hysterosomal shield 148 μ in length, 76 μ in width; anterior margin concave; without lacunae; with ventrolateral extensions; supranal concavity 32 μ in length. Lamellae 35 μ in length, 24 μ in width, ovoid,

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FIGS. 107, 108. *Proctophyllodes dendroicae*, new species: holotype male (107), allotype female (108).

with inner margins not overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites I with anterolateral surface fields. Pregenital apodeme absent; genital discs separate; genital arch reflexion to midpoint between legs III and IV; genital organ extending slightly beyond anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in rectangular arrangement; opisthogastric shields joined and bearing two pairs of setae. Adanal discs circular, each about $10\mu \times 10\mu$ and bearing approximately 16 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 420μ ; width, 157μ . *Dorsal idiosoma*: Propodosomal shield 95μ in length, 104μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 72μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 21.7μ in length, 4μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 201μ in length, 97μ in width, with anterior margin concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 74μ in length; setae d_4 inserted on conjunctiva and separated by 14μ ; lobes normal; cleft parallel-sided, 49μ in length, 14μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong

connective, without lateral extensions; epimerites I with antero-lateral surface fields.

Type material. From *Dendroica castanea* (Parulidae): holotype ♂ (NU), allotype ♀ (NU), 5 ♂♂, 4 ♀♀ paratypes (representing two birds), Nashville, Tennessee, October 14, 1961, A. R. Laskey. Paratypes deposited: Gaud, NU, USNM.

Additional material. Parulidae: 2 ♂♂, 8 ♀♀, from *Dendroica pinus*, Texas, Florida; 4 ♂♂, 6 ♀♀, from *Dendroica petechia*, Texas, Trinidad; 2 ♂♂, 2 ♀♀, from *Dendroica tigrina*, Illinois. Vireonidae: 3 ♂♂, 3 ♀♀, from *Vireo flavifrons*, Texas.

Remarks. The specific name of the new species indicates the type host. The drawings are of the holotype and allotype.

HOSTS

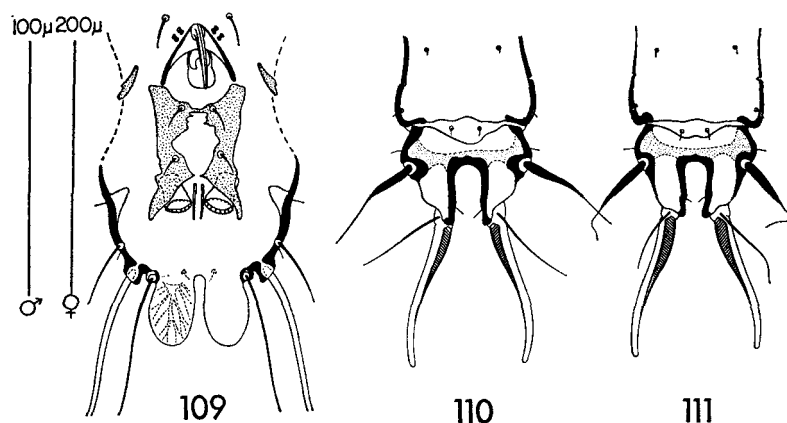
Parulidae		
<i>Dendroica castanea</i> (Wilson), 1810	United States	Present study
<i>Dendroica petechia</i> (L.), 1766	United States	Present study
<i>Dendroica pinus</i> (Wilson), 1811	United States	Present study
<i>Dendroica tigrina</i> (Gmelin), 1789	United States	Present study
Vireonidae		
<i>Vireo flavifrons</i> Vieillot, 1807 (1808)	United States	Present study

Proctophyllodes breviquadratus, new species

In *Proctophyllodes longiquadratus*, new species, the length of the genital organ is 80–85 μ and represents the maximal size; the minimal length of 23–27 μ applies to *Proctophyllodes breviquadratus*, new species. In this new species, the anterior and posterior opistogastric setae are separated by a distance which is two times the distance between the setae of the anterior pair.

MALE (holotype). Length, excluding lamellae, 273 μ ; width, 124 μ . *Dorsal idiosoma*: Propodosomal shield 76 μ in length, 84 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 57 μ . Humeral shields weakly developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 14 μ in length, 3 μ in width. Hysterosomal shield 152 μ in length, 79 μ in width; anterior margin shallowly concave; without lacunae; with ventrolateral extensions; supranal concavity 24 μ in length. Lamellae 27 μ in length, 17 μ in width, oblong, with inner margins not overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed;

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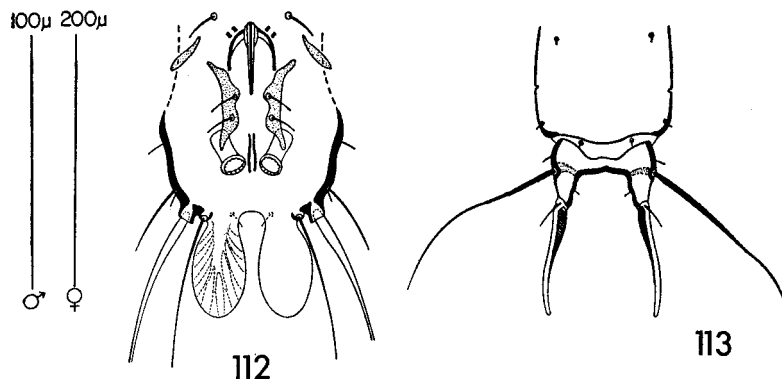
FIGS. 109-111. *Proctophyllodes brevisquadratus*, new species: holotype male (109), allotype female (110), paratype female (111).

epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch reflexion to midpoint between legs III and IV; genital organ extending only slightly beyond the posterior limits of genital arch; genital sheath not bifid distally. Opisthogastric setae in rectangular arrangement; opisthogastric shields narrowly joined and bearing two pairs of setae. Adanal discs circular, each about $16\mu \times 10\mu$ and bearing approximately 16 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 400μ ; width, 175μ . *Dorsal idiosoma*: Propodosomal shield 101μ in length, 101μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 74μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20μ in length, 5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 210μ in length, 89μ in width, with anterior margin concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 76μ in length; setae d_4 inserted on conjunctiva and separated by 20μ ; lobes normal; cleft parallel-sided, 43μ in length, 20μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields.

Type material. From *Vireo solitarius* (Vireonidae), Louisiana:

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FIGS. 112, 113. *Proctophyllodes trisetosus* Ewing and Stover: male (112) and female (113) from *Leistes militaris*.

The arrangement of the opisthogastric setae in a rectangle suggests an affinity with the species complex associated with mites occurring on members of the Sylviidae, Vireonidae, and Parulidae. However, this apparent relationship is negated by the absence of ventrolateral extensions which, without exception, are found as internal extensions of the hysterosomal shields of the five preceding species.

MALE (lectotype). Length, excluding lamellae, 309 μ ; width, 149 μ . *Dorsal idiosoma*: Propodosomal shield 85 μ in length, 90 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 61 μ . Humeral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 16 μ in length, 3 μ in width. Hysterosomal shield 177 μ in length, 88 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 29 μ in length. Lamellae 43 μ in length, 28 μ in width, ovoid, with inner margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch reflexion to anterior articulations of legs IV; genital organ extending to anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in rectangular arrangement; opisthogastric shields separate and bearing two pairs of setae. Adanal discs circular, each about 18 μ x 10 μ and bearing approximately 18 teeth; accessory glands absent.

FEMALE (syntype). Length, excluding terminal appendages,

450 μ ; width, 182 μ . *Dorsal idiosoma*: Propodosomal shield 85 μ in length, 90 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 80 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 22 μ in length, 4.3 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 251 μ in length, 109 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 50 μ in length; setae d_4 inserted on conjunctiva and separated by 38 μ ; lobes normal; cleft slightly divergent, 29 μ in length, 57 μ in width; setae d_5 $\frac{1}{5}$ length of terminal appendages. Spermatheca as in *pinatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields.

Type material. From *Sturnella magna* (Icteridae): lectotype δ (USNM), 3 δ δ , 3 φ φ syntypes (USNM), Ithaca, New York, January 18, 1911, H. E. Ewing.

Material examined. Icteridae: 4 δ δ , 3 φ φ (types), 7 δ δ , 10 φ φ , from *Sturnella magna*, New York, Oklahoma; 3 δ δ , 4 φ φ , from *Sturnella neglecta*, California, Texas; 9 δ δ , 14 φ φ from *Leistes militaris*, French Guinea (Cayenne).

Remarks. The lectotype and six syntypes, mounted on one slide, represent material lent by the U. S. National Museum. In addition to the collection data, the slide bears the following notation: "*Proctophyllodes trisetosus* n. sp., Type. Drawn." The redescription augmenting Ewing's published description, is developed from the type series, but partial deterioration has necessitated drawings based on specimens from *Leistes militaris*.

The specimens from *Leistes militaris* are smaller than those from *Sturnella magna*. The total lengths of these males are 309 μ , representing a differential of about 50 μ . Although there is a marked difference in size, there is no doubt that all the specimens are *P. trisetosus*.

HOSTS

Icteridae		
<i>Leistes militaris</i> (L.), 1758	French Guinea	Present study
<i>Sturnella magna</i> (L.), 1758	United States	Ewing & Stover, 1915 Present study
<i>Sturnella neglecta</i> (Audubon), 1844	United States	Present study

The Feather Mite Genus *Proctophyllodes*

Group IV—the *thraupis* group

Three new species form a unique species complex. The males are characterized by the unusual shape of the opisthogastric shields, adanal accessory glands and similarly constructed genital regions. Both sexes, but especially the males, have disproportionately broad dorsal shields.

Pertinent characters for species differentiation, males:

1. Type of adanal accessory glands.
2. Depth of marginal cleft and shape of opisthogastric shields.
3. Arrangement of opisthogastric setae.
4. Size and shape of lamellae.

Pertinent characters for species differentiation, females:

1. Size of terminal cleft.
2. Presence or absence of a conjunctiva between the anterior hysterosomal shield and the lobar shield.

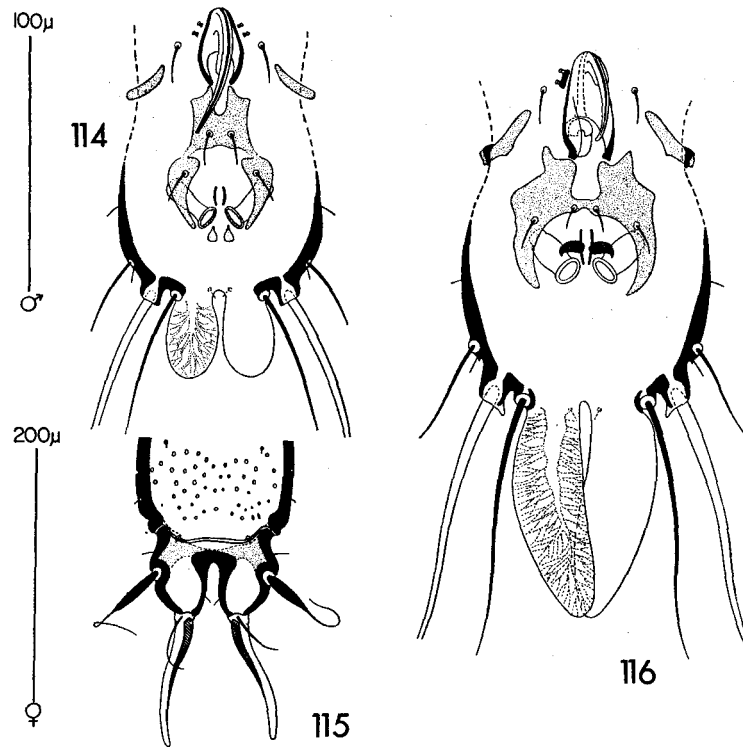
Key to the species of group IV

1. Reniform accessory glands present; anterior margin of opisthogastric shield incised caudally to level of anterior opisthogastric setae; opisthogastric setae form shallow curve 2
Reticulate accessory glands present; anterior margin of opisthogastric shield incised caudally about half the distance to anterior opisthogastric setae; opisthogastric setae in trapezoidal arrangement.....*mcclurei*, n. sp., p. 131
2. Lamellae about 80 μ in length.....*megathraupis*, n. sp., p. 133
Lamellae 35 μ –55 μ in length.....*thraupis*, n. sp., p. 134

Proctophyllodes mcclurei, new species

The new species, although related to *Proctophyllodes thraupis* and *P. megathraupis*, can be distinguished by the unique shape of the opisthogastric shield of the male. In this species, the anterior margin is incised caudally about half the distance to the anterior opisthogastric setae, whereas in the two related species, the anterior margin is incised caudally to the anterior opisthogastric setae. *P. mcclurei* is one of the few *Proctophyllodes* species with V-shaped epimerites I.

MALE (holotype). Length, excluding lamellae, 293 μ ; width, 138 μ . Dorsal idiosoma: Propodosomal shield 83 μ in length, 104 μ in width; lateral margins entire; with small lacunae; with external



FIGS. 114-116. *Proctophyllodes mcclurei*, new species: holotype male (114), allotype female (115); *Proctophyllodes megathraupis*, new species: holotype male (116).

vertical setae; distance between external scapular setae, 51μ . Humeral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 16.6μ in length, 4.1μ in width. Hysterosomal shield 166μ in length, 109μ in width; anterior margin straight; with small lacunae; without ventrolateral extensions; supranal concavity 55μ in length. Lamellae 33μ in length, 21μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I bluntly V-shaped, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch reflexion to level of posterior articulations of legs III; genital organ extending slightly beyond anterior row of opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields forming one unit, however anterior unit bearing anterior pair of setae weakly

The Feather Mite Genus *Proctophyllodes*

connected to the two posterolateral units bearing the posterior pair of setae. Adanal discs circular, each about $21\mu \times 8\mu$, teeth not apparent; triangular accessory glands present.

FEMALE (allotype). Length, excluding terminal appendages, 436μ ; width 166μ . *Dorsal idiosoma*: Propodosomal shield 100μ in length, 145μ in width; lateral margins entire; with small lacunae; with external vertical setae; distance between external scapular setae, 85μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7μ in length, 5.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 221μ in length, 138μ in width, with anterior margin straight, lateral margins heavily sclerotized, with small lacunae; without supranal concavity. Lobar region articulated with anterior shield; 59μ in length; setae d_4 inserted on posterior margin of anterior shield and separated by 52μ ; lobes wide; cleft parallel-sided and divergent caudally, 43μ in length; setae d_5 $\frac{1}{2}$ length of terminal appendages; setae l_5 approximately equal in length to terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I V-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Garrulax erythrocephalus* (Timaliidae), Mt. Brinchang, Panhang, Malaya: holotype δ (USNM), allotype ♀ (USNM), 6 $\delta \delta$, 6 $\text{♀} \text{♀}$ paratypes, March 21, 1962; 2 $\text{♀} \text{♀}$ paratypes, November 23, 1961. Paratypes deposited: BMNH, BAS, Gaud, NU, USNM.

Remarks. This species is named *Proctophyllodes mcclurei* for Dr. Elliott McClure who has been instrumental in supplying many collections of mites from Malayan birds. The drawings are of the holotype and allotype.

HOSTS

Timaliidae		
<i>Garrulax erythrocephalus</i> (Vigors), 1832	Malaya	Present study

Proctophyllodes megathraupis, new species

Proctophyllodes megathraupis and *P. thraupis*, new species, are closely related. The former species is characterized in part by the greater development of the reniform accessory glands and the terminal lamellae of the males. The latter species, which is smaller in overall size, has disproportionally smaller accessory glands and terminal lamellae.

MALE (holotype). Length, excluding lamellae, 340 μ ; width, 153 μ . *Dorsal idiosoma*: Propodosomal shield 93 μ in length, 110 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 65 μ . Humeral shields moderately developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae attenuate, 20.7 μ in length, 4.1 μ in width. Hysterosomal shield 201 μ in length, 119 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 67 μ in length. Lamellae 80 μ in length, 28 μ in width, elongate, triangular, apices overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I elongate, U-shaped with weak connective, with minute lateral extensions; epimerites I and II with narrow surface fields along their lengths, epimerites III and IIIa connected laterally by a narrow surface field. Genital discs united; genital arch reflexion to level of posterior articulations of legs III; genital organ not extending to tips of genital arch in normal position; genital sheath not bifid distally. Opisthogastric setae arranged in shallow arch; opisthogastric shields united and bearing two pairs of setae. Adanal discs circular, each about 21 μ x 10 μ and apparently without teeth; reniform accessory glands present.

FEMALE. Unknown.

Type material. From *Poecilothraupis lunulatus* (Thraupidae): holotype δ (TC), 2 δ δ paratypes (NU, TC), from the equator.

Remarks. One female was associated with the type series, but the spermatheca was quite long, as in females of the *Proctophyllodes glandarinus*. For this reason, the association is doubtful and this single female is not considered as the allotype.

The name *megathraupis* calls attention to the host as well as the large terminal lamellae and large accessory glands. The drawing is of the holotype.

HOSTS

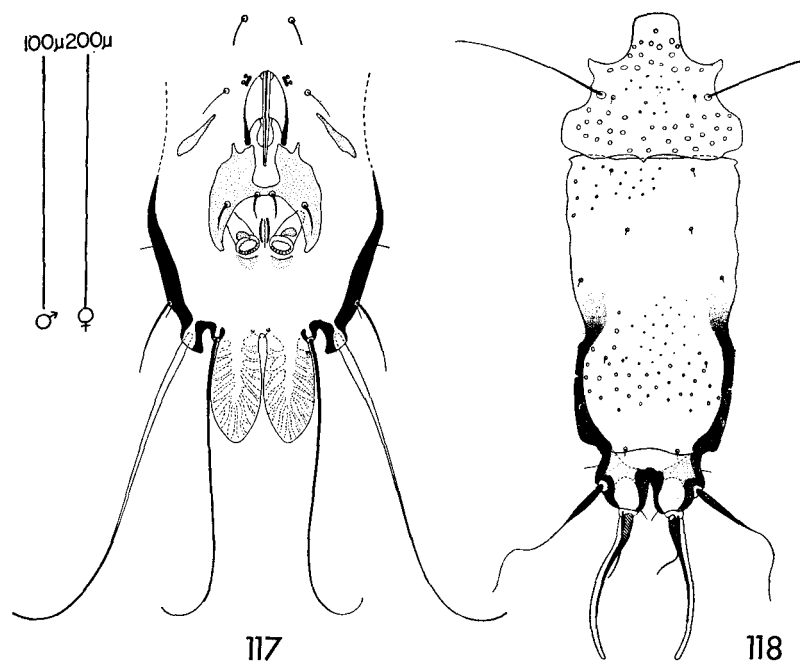
Thraupidae		
<i>Poecilothraupis lunulatus</i>	Equator	Present study
(Du Bus), 1839		

Proctophyllodes thraupis, new species

Lamellar lengths separate two new species, *Proctophyllodes thraupis* and *P. megathraupis*. In the former species these structures are about 40 μ in length, while the lamellae of the latter species are 80 μ in length.

MALE (holotype). Length, excluding lamellae, 268 μ ; width,

The Feather Mite Genus *Proctophyllodes*



FIGS. 117, 118. *Proctophyllodes thraupis*, new species: holotype male (117), allotype female (118).

124 μ . *Dorsal idiosoma*: Propodosomal shield 82 μ in length, 100 μ in width; lateral margins entire; with large and small lacunae; without external vertical setae; distance between external scapular setae, 62 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 13 μ in length, 2.5 μ in width. Hysterosomal shield 161 μ in length, 100 μ in width; anterior margin straight; with small lacunae; without ventrolateral extensions; supranal concavity 47 μ in length. Lamellae 42 μ in length, 22 μ in width, oblong, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites U-shaped with moderate connective, without lateral extensions; epimerites I with narrow surface fields along their lengths. Pregenital apodeme absent; genital discs weakly joined; genital arch reflexion to posterior articulations of legs III; genital organ extending to level midway between tips of genital arch and anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae arranged in a shallow arch; opisthogastric shields narrowly joined at level of anterior opisthogastric setae and bearing two pairs of setae. Adanal discs circular, each

about $10\mu \times 10\mu$ and bearing approximately 20 teeth; reniform accessory glands present.

FEMALE (allotype). Length, excluding terminal appendages, 405μ ; width, 162μ . *Dorsal idiosoma*: Propodosomal shield 103μ in length, 132μ in width; lateral margins entire; with large and small lacunae; without external vertical setae; distance between external scapular setae, 77μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 23μ in length, 5.4μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 218μ in length, 126μ in width, with anterior margin straight, with small lacunae; without supranal concavity. Lobar region articulated with anterior shield; 43μ in length; setae d_4 inserted on posterior margin of anterior hysterosomal shield and separated by 38μ ; lobes normal; cleft divergent; 27μ in length, 7μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with moderate connective, without lateral extensions; epimerites I with narrow surface fields along their lengths.

Type material. From *Thraupis abbas* (Thraupidae): holotype δ (NU), allotype ♀ (NU), 1 δ , 1 ♀ paratypes (NU), Plan del Rio, Veracruz, México, July 28, 1942, M. W. Whisenhunt.

Additional material. Thraupidae: 2 $\delta \delta$, 3 $\text{♀} \text{♀}$, from *Chlorophanes spiza*, British Honduras, México; 1 δ , from *Chlorospingus ophthalmicus*, México; 2 $\text{♀} \text{♀}$, from *Tanagra affinis*, México; 1 δ , from *Tanagra lauta*, British Honduras; 1 δ , 4 $\text{♀} \text{♀}$, from *Tanagra musica*, México.

Remarks. The specific name of this species is derived from the host name. The drawings are of the holotype and allotype.

HOSTS

Thraupidae		
<i>Chlorophanes spiza</i>	Br. Honduras	Present study
(L.), 1758	México	Present study
<i>Chlorospingus ophthalmicus</i>	México	Present study
(Du Bus), 1847		
<i>Tanagra affinis</i>	México	Present study
Lesson, 1842		
<i>Tanagra lauta</i>	Br. Honduras	Present study
Bangs & Penard, 1919		
<i>Tanagra musica</i>	Br. Honduras	Present study
(Gmelin), 1789		
<i>Thraupis abbas</i>	México	Present study
(W. Deppe), 1830		

The Feather Mite Genus *Proctophyllodes*

Group V—the *detruncatus* group

The following five species lack the uniformity of characters necessary to establish a phyletic group, *e.g.*, male genitalia, adanal discs, and arrangement of opisthogastric setae. The *detruncatus* group is arbitrarily characterized by the genital arch not being in contact with the opisthogastric shields, which, with the exception of *Proctophyllodes pachynotus*, reflects reduced sclerotization in the opisthogastric regions of the males. *P. pachynotus*, known only from the distorted types, appears to have small, well-defined opisthogastric shields which are positioned more caudad than usual.

On casual observation of the opisthogastric regions of either *P. scolopacinus* or *P. corvorum*, these species would present an aspect similar to that of *P. detruncatus*. Further observation would present a non-fragmented opisthogastric shield with differential sclerotization.

Pertinent characters for species differentiation, males:

1. Structure of genital organ and genital arch.
2. Arrangement of opisthogastric setae.
3. Development of opisthogastric shields.
4. Size, shape and venation of terminal lamellae.
5. Size and shape of adanal discs.

Pertinent characters for species differentiation, females:

1. Presence or absence of caudal extension of spermatheca.
2. Presence or absence of terminal appendages, lobes and/or supranal concavity.
3. Development of insertions of setae d_4 .
4. Relative lengths of terminal appendages and setae d_5 .

Key to the species of group V

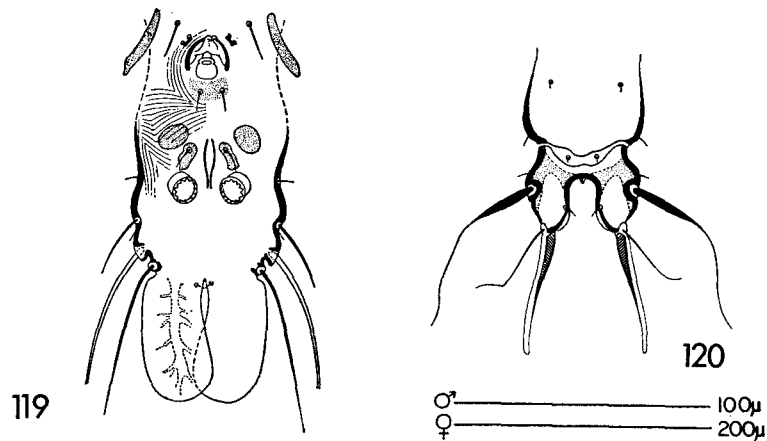
1. Genital organ obvious; opisthogastric setae arranged in trapezoid 2
Genital organ minute; opisthogastric setae in long rectangle *pittae*, n. sp., p. 138
2. Adanal discs two times longer than diameter 3
Adanal discs with length and diameter approximately equal ... 4
3. Terminal lamellae of male leaflike; female without terminal appendages or terminal lobes *detruncatus*, p. 139
Terminal lamellae of male small, triangular; female with terminal appendages and lobes *pachynotus*, p. 142
4. Setae d_4 of female inserted on papillae; male with supranal concavity closed posteriorly *vitzthumi*, p. 143

Setae d_4 of female inserted on conjunctiva; male with supranal concavity open posteriorly.....*paspelevi*, p. 145

Proctophyllodes pittae, new species

This is a unique species. The modifications of the male genital organ as minute claspers and the modification of the opisthogastric region are not found in other species of *Proctophyllodes*. The females of *Proctophyllodes pittae*, new species, are also unique, as the spermatheca extends into the terminal cleft as a small protuberance which is clasped by the modified male genital organ.

MALE (holotype). Length, excluding lamellae, 301μ ; width, 124μ . *Dorsal idiosoma*: Propodosomal shield 79μ in length, 76μ in width; lateral margins incised to internal scapular setae; without lacunae, without external vertical setae; distance between external scapular setae, 52μ . Humeral shields moderately developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.6μ in length, 4.1μ in width. Hysterosomal shield 164μ in length, 73μ in width; anterior margin shallowly concave; with slit-like lacunae on posterior $\frac{1}{4}$; without ventrolateral extensions; supranal concavity 8-shaped, 45μ in length. Lamellae 41μ in length, 24μ in width, oblong, internal margins approximate or overlapping, with incomplete pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernible connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs united; genital



FIGS. 119, 120. *Proctophyllodes pittae*, new species: holotype male (119), allotype female (120).

The Feather Mite Genus Proctophyllodes

arch to level of anterior articulations of legs IV; genital organ as minute, recurved clasping organ. Opisthogastric setae in elongate rectangle; opisthogastric shields fragmented into five units: indistinct shield nearly connecting genital arch and bearing anterior opisthogastric setae, two small shields bearing posterior opisthogastric setae, and two shields approximate. Adanal discs circular, nonmeasurable, length less than diameter and bearing 16 strong teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 439 μ ; width, 155 μ . *Dorsal idiosoma*: Propodosomal shield 102 μ in length, 100 μ in width; lateral margins incised to internal scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 68 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 27.6 μ in length, 5.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 193 μ in length, 59 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 59 μ in length; setae d_4 inserted on conjunctiva and separated by 21 μ ; lobes normal; cleft almost parallel-sided, 41 μ in length, 21 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*, but long vulva and short, external extension. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernible connective, without lateral extensions; epimerites without surface fields.

Type material. From *Pitta brachyura* (Pittidae): holotype δ (NU), allotype ♀ (NU), 6 δ δ , 5 ♀ ♀ paratypes, Rantau Panjang, Selangor, Malaya, April 5, 1962. Paratypes deposited: BAS, Gaud, NU, USNM.

Remarks. To date, this new species is the only *Proctophyllodes* known from the avian family Pittidae. With the modifications of the male genital organ for the reception of the spermatheca, this may represent a new genus. The species is named *pittae* for the host. The drawings are of the holotype and allotype.

HOSTS

Pittidae			
	<i>Pitta brachyura</i> (L.), 1766	Malaya	Present study

Proctophyllodes detruncatus Oudemans

Proctophyllodes detruncatus Oudemans, 1905, Entomol. Ber., 1: 225. Type host: *Corvus corone* (Corvidae).

The Feather Mite Genus *Proctophyllodes*

arch to level of anterior articulations of legs IV; genital organ as minute, recurved clasping organ. Opisthogastric setae in elongate rectangle; opisthogastric shields fragmented into five units: indistinct shield nearly connecting genital arch and bearing anterior opisthogastric setae, two small shields bearing posterior opisthogastric setae, and two shields approximate. Adanal discs circular, nonmeasurable, length less than diameter and bearing 16 strong teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 439 μ ; width, 155 μ . *Dorsal idiosoma*: Propodosomal shield 102 μ in length, 100 μ in width; lateral margins incised to internal scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 68 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 27.6 μ in length, 5.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 193 μ in length, 59 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 59 μ in length; setae d_4 inserted on conjunctiva and separated by 21 μ ; lobes normal; cleft almost parallel-sided, 41 μ in length, 21 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*, but long vulva and short, external extension. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernible connective, without lateral extensions; epimerites without surface fields.

Type material. From *Pitta brachyura* (Pittidae): holotype δ (NU), allotype ♀ (NU), 6 δ δ , 5 ♀ ♀ paratypes, Rantau Panjang, Selangor, Malaya, April 5, 1962. Paratypes deposited: BAS, Gaud, NU, USNM.

Remarks. To date, this new species is the only *Proctophyllodes* known from the avian family Pittidae. With the modifications of the male genital organ for the reception of the spermatheca, this may represent a new genus. The species is named *pittae* for the host. The drawings are of the holotype and allotype.

HOSTS

Pittidae			
	<i>Pitta brachyura</i> (L.), 1766	Malaya	Present study

Proctophyllodes detruncatus Oudemans

Proctophyllodes detruncatus Oudemans, 1905, Entomol. Ber., 1: 225. Type host: *Corvus corone* (Corvidae).

Proctophyllodes separatifolius Oudemans, 1905, Entomol. Ber., 1: 225-226. Type host: *Corvus corone* (Corvidae) (New synonymy).

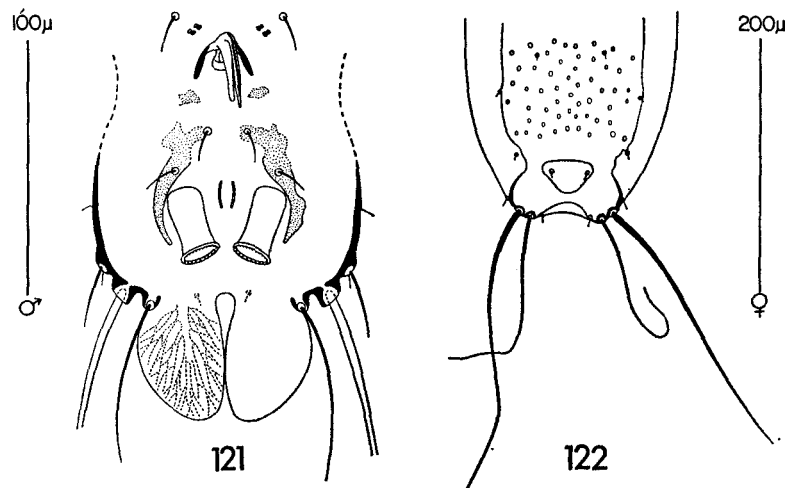
Proctophyllodes detruncatus, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 65-66.

Proctophyllodes separatifolius, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 66-67.

Proctophyllodes detruncatus, Frisch, 1961, Z. Parasitenk., 21: 21-22, fig. 16a-c.

This species is closely related to *Proctophyllodes paspelevi*. The genital organ, the terminal lamellae, the supranal concavity, and the opisthogastric shields of the males are similar; however, in *P. detruncatus* the adanal discs are about two times longer than the diameter, the terminal lamellae have pinnate venation, and the hysterosomal shield has lacunae. In *P. paspelevi*, the adanal discs are shorter than the diameter of these discs, the terminal lamellae have pinnate venation, and the hysterosomal shield lacks lacunae. The females of these two species are quite distinct; in *P. detruncatus*, they lack terminal appendages and lobes, whereas in *P. paspelevi* the hysterosomal lobes and terminal appendages are normally developed.

MALE. Length, excluding lamellae, 338 μ ; width, 148 μ . *Dorsal idiosoma*: Propodosomal shield 76 μ in length, 72 μ in width; lateral margins entire; without lacunae; with external vertical setae; dis-



FIGS. 121, 122. *Proctophyllodes detruncatus* Oudemans: male (121) and female (122) from *Corvus corone cornix*.

The Feather Mite Genus Proctophyllodes

tance between external scapular setae, 53 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 14.5 μ in length, 2.1 μ in width. Hysterosomal shield 180 μ in length, 90 μ in width; anterior margin straight; with lacunae; without ventrolateral extensions; supranal concavity 41 μ in length. Lamellae 48 μ in length, 32 μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level of anterior articulations of legs IV; genital organ not extending to opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields fragmented, two small shields near tips of genital arch, two larger shields bearing two pairs of opisthogastric setae. Adanal discs circular, each about 22 μ x 14 μ and bearing approximately 24 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 477 μ ; width, 187 μ . *Dorsal idiosoma*: Propodosomal shield 104 μ in length, 104 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 77 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform (?); 18.0 μ in length. Hysterosoma without lobes and without terminal appendages; anterior shield 259 μ in length, 121 μ in width, with anterior margin straight, with lacunae; with supranal concavity. Lobar region fused to anterior shield; 36 μ in length; setae d_4 inserted in the supranal concavity and separated by 28 μ ; lobes absent; setae d_5 and l_5 long. Spermatheca not visible. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Corvus corone* (Corvidae), the Netherlands; type lost (Vitzthum, 1922b).

Material examined. Corvidae: 4 ♂♂, 1 ♀, from *Corvus corone cornix*, England.

Remarks. Vitzthum (1922b) suggested that the species *Proctophyllodes detruncatus* and *Proctophyllodes separatifolius* Oudemans were synonymous. According to this author the types of the two species mentioned were lost in the mails. Fortunately, unpublished drawings by Oudemans are available of these two species for males, females, and tritonymphs. These drawings are similar; the most notable differences between *P. detruncatus* and *P. separatifolius* as

visualized by Oudemans are the terminal structures of the female hysterostoma. In *P. detruncatus*, the supranal concavity in the female is not present, whereas in *P. separatifolius* the supranal concavity is present. The males of the two forms in question are the same, except the opisthogastric shields bearing the posterior opisthogastric setae are well developed in *P. detruncatus* and possibly absent in *P. separatifolius*; however, the adanal discs are so positioned that in an uncleaned specimen the opisthogastric plates, even if present, would be difficult to distinguish.

The redescription and drawings of the male and female are from specimens taken from *Corvus corone cornix*, the hooded crow, Cheshire, England. These slides are deposited in the British Museum (Natural History).

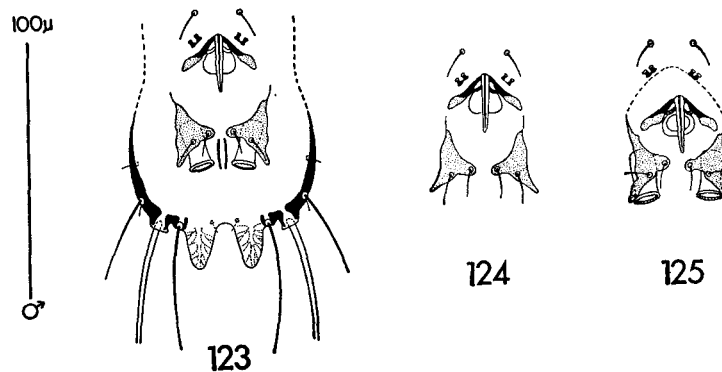
HOSTS

Corvidae		
<i>Corvus corone corone</i> L., 1758	Europe	Oudemans, 1905 Vitzthum, 1922b Fritsch, 1961
<i>Corvus corone cornix</i> L., 1758	England	Present study

Proctophyllodes pachynotus Gaud and Mouchet

Proctophyllodes pachynotus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32: 511-512, fig. 10A. Type host: *Pedilorchynchus comitatus camerunensis* (Muscicapidae).

Proctophyllodes pachynotus, Gaud and Till, 1961, Publ. So. Afr. Inst. Med. Res., 11(L): 251.



Figs. 123-125. *Proctophyllodes pachynotus* Gaud and Mouchet: possible reconstructions of male genital organ (123, 124), paratype male (125).

The Feather Mite Genus *Proctophyllodes*

This species is known from two males. These specimens have short, triangular lamellae and the opisthogastric setae arranged in a shallow trapezoid and inserted on divided opisthogastric shields. The genital organ additionally is supported by two small sclerotized rods connecting the arch and the genital sheath basally.

MALE (paratype). Length, excluding lamellae, 277 μ ; width, 122 μ . *Dorsal idiosoma*: Propodosomal shield 68 μ in length, 68 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 50 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 18.0 μ in length, 4.1 μ in width. Hysterosomal shield 150 μ in length, 73 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 28 μ in length. Lamellae 37 μ in length, 28 μ in width, triangular, distant, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs united; genital arch probably to anterior articulations of legs IV; genital organ reflexed, extending beyond genital arch equivalent to height of arch; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing two pairs of setae. Adanal discs circular, each about 14 μ x 8 μ and bearing approximately 24 teeth; accessory glands absent.

FEMALE. Unknown.

Type material. From *Pedilorrhynchus comitatus* (Muscicapidae): holotype ♂ (Gaud), 1 ♂ paratype (Gaud), Kribi, Kribi region, French Cameroons, February, 1956, J. Mouchet.

Remarks. A tritonymph associated with the paratype male is a typical *Proctophyllodes*. The drawings and redescription are of the paratype. Figure 125 shows the genital organ as it is in the slide preparation. Figures 123 and 124 are probable reconstructions.

HOSTS

Muscicapidae		
<i>Pedilorrhynchus comitatus</i> (Cassin)	Fr. Cameroons	Gaud & Mouchet, 1957 Present study

Proctophyllodes vitzthumi Fritsch

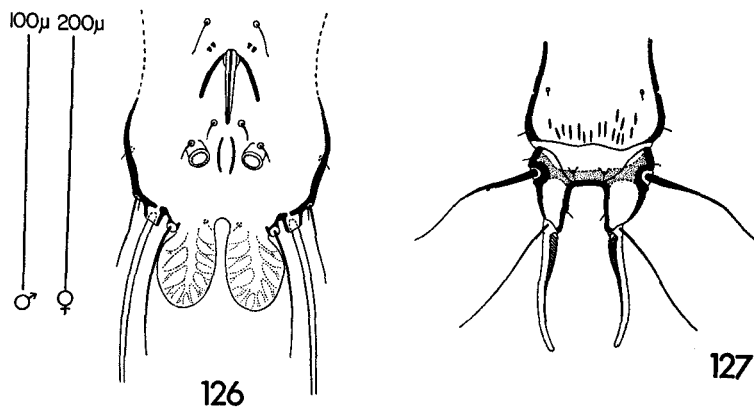
Proctophyllodes vitzthumi Fritsch, 1961, Z. Parasitenk., 21: 27-29, figs. 20a-d. Type host: *Sitta europaea caesia* (Sittidae).

Proctophyllodes macedo, Vassilev, 1960, Bulg. Acad. Sci., Proc. Zool. Inst., 9: 433 (misidentification).

Proctophyllodes sittae Černý, 1961, *Acarologia*, 3(4): 602-603, figs. 2C-D. Type host: *Sitta europaea* (Sittidae). (Synonymized by Černý, personal communication.)

The genital and opisthogastric regions of this species are similar to those of the related *Proctophyllodes paspelevi* and *P. detruncatus*. However, the species being redescribed can be distinguished by the unique insertions of setae d_4 in the females. These setae are inserted on large papillae which in turn arise from the conjunctiva between the anterior hysterosomal shield and the lobar shield.

MALE. Length, excluding lamellae, 269 μ ; width, 122 μ . *Dorsal idiosoma*: Propodosomal shield 80 μ in length, 92 μ in width; lateral margins incised almost completely around external scapular setae; without lacunae, without external vertical setae; distance between external scapular setae, 78 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 19.3 μ in length, 4.1 μ in width. Hysterosomal shield 142 μ in length, 77 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 19 μ in length. Lamellae 36 μ in length, 21 μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level midway between anterior and posterior articulations of legs IV; genital organ extending to anterior row of opisthogastric setae; genital sheath not bifid distally. Opisthogastric



FIGS. 126, 127. *Proctophyllodes vitzthumi* Fritsch: male (126) and female (127) from *Sitta europaea*.

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setae in trapezoidal arrangement; opisthogastric shields consisting of two small plates each bearing one posterior opisthogastric seta. Adanal discs circular, each about $12\mu \times 7\mu$ and bearing approximately 18 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 416μ ; width, 138μ . *Dorsal idiosoma*: Propodosomal shield 79μ in length, 95μ in width; lateral margins incised behind external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 71μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 19.3μ in length, 5.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 200μ in length, 93μ in width, with anterior margin strongly concave, with lacunae on posterior portion; without supranal concavity. Lobar region articulated with anterior shield; 70μ in length; setae d_4 inserted on tubercles on conjunctiva and separated by 21μ ; lobes normal; cleft parallel-sided or slightly divergent, 32μ in length, 26μ in width; setae d_5 approximately equal length to terminal appendages. Spermatheca with elongate vulva and long secondary ducts. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernable connective, without lateral extensions; epimerites without surface fields.

Type material. From *Sitta europaea caesia* (Sittidae) at or near Erlangen, Germany; type destroyed (personal communication, H. J. Stammer).

Material examined. Sittidae: 15 ♂♂, 9 ♀♀, from *Sitta europaea*, Czechoslovakia, France.

Remarks. The drawings and redescriptions are based on the material from France.

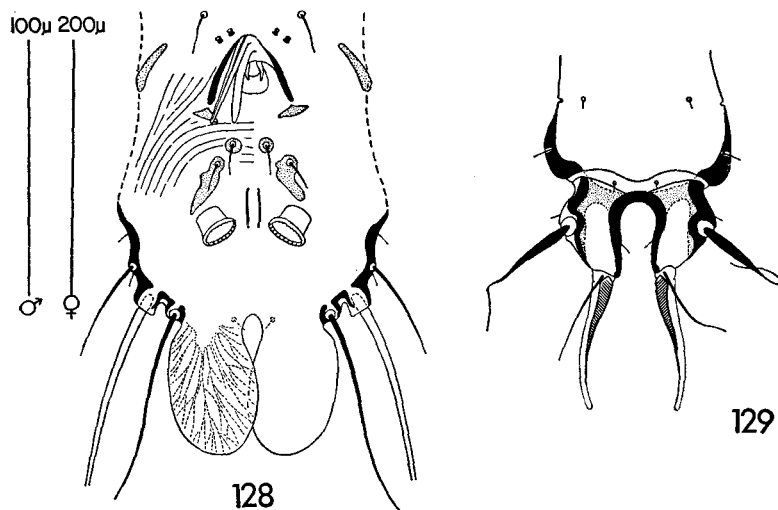
HOSTS

Sittidae		
<i>Sitta europaea</i> L., 1758	Europe	Fritsch, 1961 Černý, 1961 Present study

Proctophyllodes paspalevi Vassilev

Proctophyllodes paspalevi Vassilev, 1959c, Proc. Bulgarian Acad. Sci., Sect. Biol. Med. Sci., 3(2): 8–10, figs. 1, 2. Type host: *Cinclus cinclus aquaticus* Bech. (= *Cinclus cinclus orientalis* Stresemann) (Cinclidae).

Currently this species is not allied with any species occurring



FIGS. 128, 129. *Proctophyllodes paspalevi* Vassilev: male (128) and female (129) from *Cinclus cinclus*.

in North America, however it is closely related to *Proctophyllodes detruncatus*, which has been reported from Europe. *P. paspalevi* is distinguished by the males having the terminal lamellae with palmate venation, short adanal discs, hysterosomal shield without lacunae, and the opisthogastric setae inserted each on a separate shield. Conversely, *P. detruncatus* has males with pinnate venation, long adanal discs, hysterosomal shield with lacunae, and the opisthogastric setae arranged on weakly developed right and left opisthogastric shields. The females of *P. paspalevi* have well-developed terminal lobes and terminal appendages which are lacking in *P. detruncatus*.

MALE. Length, excluding lamellae, 345µ; width, 170µ. *Dorsal idiosoma*: Propodosomal shield 87µ in length, 106µ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 68µ. Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae attenuate, 20.7µ in length. Hysterosomal shield 195µ in length, 110µ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 39µ in length. Lamellae 52µ in length, 38µ in width, ovoid, usually overlapping, with palmate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pre-

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genital apodeme absent; genital discs separate; genital arch reflexion to level of anterior articulations of legs IV; genital organ extending beyond posterior limits of genital arch, but not attaining level of anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields fragmented, each unit bearing one seta. Adanal discs circular, unmeasureable, length less than diameter and bearing approximately 36 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 530 μ ; width, 195 μ . *Dorsal idiosoma*: Propodosomal shield 112 μ in length, 131 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 82 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 24.9 μ in length, 3.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 255 μ in length, 128 μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 70 μ in length; setae d_4 inserted on conjunctiva and separated by 30 μ ; lobes wide, cleft slightly convergent, 58 μ in length, 23 μ in width, setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_5 approximately equal in length to terminal appendages. Spermatheca with secondary ducts elongate, anterior portion of primary duct widened. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Cinclus cinclus aquaticus* (= *C. cinclus orientalis* Streseman) (Cinclidae): holotype δ (BAS), Zheleznitsa, Bulgaria, July 23, 1958, I. D. Vassilev.

Material examined. Cinclidae: 2 δ δ , 3 φ φ , from *Cinclus cinclus*, Bulgaria, England; 2 δ δ , 3 φ φ , from *Cinclus mexicanus*, Utah, México.

Remarks. Based on the material examined, all measurements of the lamellae approximate that of the redescription with the exception of one male from Utah; the lamellae, in this form measure 92 μ in length and 52 μ in width. It is suggested that a considerable range in lamellar measurements may exist in this species. The redescription and drawings are of the Bulgarian specimens.

HOSTS

Cinclidae		
<i>Cinclus cinclus</i> (L.), 1758	Europe	Vassilev, 1959c Present study
<i>Cinclus mexicanus</i> (Swainson), 1827	México United States	Present study

Group VI—the *pinnatus* group

The assemblage of twenty-four species comprises the largest and most homogeneous group to be encountered in the genus *Proctophylodes*. One or two of the more variable species probably represent species complexes rather than species, but at this time the variation attributable to the interactions of the genotypes and their inherent physiological responses to different host species is unknown.

The descriptive format is changed slightly for Group VI as the species are similar in many of the major characters. In all of the species, the male pregenital apodeme is absent, the genital sheath is supported basally by a heavily sclerotized ring, adanal discs are circular; adanal accessory glands are wanting, and the opisthogastric setae are in trapezoidal arrangement and are inserted on connected shields. A series of measurements dealing with the genital region are given in the appropriate section in each of the descriptions. These measurements are:

- a. the distance between the anterior opisthogastric setae, measured center-to-center;
- b. the vertical distance between the anterior and posterior rows of opisthogastric setae;
- c. the distance between the posterior opisthogastric setae;
- d. the distance from the top or apex of the genital arch to the internal postanal setae; and
- e. the length of the genital organ measured from the top of the genital arch to the tip of the genital sheath.

Pertinent characters for species differentiation, males:

1. The five measurements given above.
2. Size, shape, and venation of the terminal lamellae.
3. Shape of the genital sheath.
4. Length-width ratio of the adanal discs.
5. Development of the opisthogastric shield.

Pertinent characters for species differentiation, females:

1. Size and shape of terminal cleft.
2. Presence or absence of terminal appendages, lobes, and/or supranal concavity.
3. Positions of setae d_4 .

Key to the species of group VI

1. Opisthogastric shield with posterior margin incised between anterior pair of opisthogastric setae..... 2
Opisthogastric shield differently formed, without posterior margin incised between anterior pair of opisthogastric setae....20

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2. Genital organ with sheath diameter decreasing from supporting ring to tip; terminal lamellae usually less than 75 μ in length..... 3
 Genital organ with sheath diameter equal to or greater than ring diameter for at least first one-third length (flask-shaped); lamellae usually more than 75 μ in length.....15
3. Genital organ less than 50 μ in length *and* distance between apex of genital arch and insertions of internal postanal setae less than 110 μ 4
 Genital organ more than 50 μ in length *or* distance between apex of genital arch and insertions of internal postanal setae more than 110 μ12
4. Lamellae less than 65 μ in length..... 5
 Lamellae more than 65 μ in length..... 6
5. Lamellae about 40 μ x 20 μ *pheuctici*, n. sp., p. 151
 Lamellae about 60 μ x 35 μ *ludovicianus*, n. sp., p. 152
6. Lamellae 65 μ to 95 μ in length..... 8
 Lamellae more than 95 μ in length..... 7
7. Terminal cleft of female about 46 μ in length. Hosts:
 Junco species *paramegaphyllus*, n. sp., p. 154
 Terminal cleft of female about 33 μ in length. Hosts:
 Prunella, *Calcarius*, and *Plectrophenax* species.....
 *megaphyllus*, p. 156
8. Adanal discs with length to diameter ratio of 2.5:1..... 9
 Adanal discs with length to diameter ratio of 3:1.....10
9. Lamellae about 90 μ x 50 μ ; all females with normal lobes and appendages *spini*, n. sp., p. 159
 Lamellae about 80 μ x 45 μ ; females usually with abnormal lobes and without terminal appendages *truncatus*, p. 161
10. Terminal cleft of female 22 μ or less in width at narrowest portion11
 Terminal cleft of female about 30 μ in width at narrowest portion..... *canadensis*, n. sp., p. 165
11. Distance between anterior pair of opisthogastric setae about 14 μ *chlorurae*, n. sp., p. 166
 Distance between anterior opisthogastric setae 14 μ or less *neopinnatus*, n. sp., p. 168
12. Genital organ 54 μ or longer.....13
 Genital organ 51 μ or shorter.....14
13. Opisthogastric shield widened, *i.e.*, lateral margins convex *miliariae*, p. 170

Opisthogastric shield with lateral margins approximately parallel.....	<i>serini</i> , n. sp., p. 173
14. Terminal lamellae more than 100 μ in length.....	<i>vegetans</i> , p. 174
Terminal lamellae less than 90 μ in length.....	<i>pinnatus</i> , p. 177
15. Lamellae 85 μ or longer in length.....	16
Lamellae 70 μ or less in length.....	17
16. Lamellae about 110 μ x 50 μ ; width of female cleft at narrowest portion, 16 μ	<i>paramegaphyllus</i> , n. sp., p. 154
Lamellae about 85 μ x 50 μ ; width of female cleft at narrowest portion, 9 μ	<i>sylviae</i> , p. 180
17. Width of genital sheath 16 μ ; distance between anterior opisthogastric setae, 11 μ ; distance "d", 80 μ	<i>pachycaulus</i> , p. 182
Width of genital sheath less than 14 μ and sheath narrower than corresponding distance between anterior opisthogastric setae.....	18
18. Length to width ratio of terminal cleft of female about 3:1.....	<i>clavatus</i> , p. 184
Length to width ratio 2:1 or less.....	19
19. Terminal cleft of female about 38 μ in width. Hosts: Corvidae.....	<i>occidentalis</i> , n. sp., p. 186
Terminal cleft of female about 21 μ in width. Hosts: Fringillidae.....	<i>calamospizae</i> , n. sp., p. 188
20. Lamellae 85 μ or more.....	<i>orientalis</i> , p. 190
Lamellae 65 μ or less.....	21
21. Opisthogastric shield with three areas of stronger sclerotization: anteromedially, connecting tips of genital arch and bearing pair of setae and two posterolateral units each bearing one posterior opisthogastric setae; units with weak lateral connections.....	22
Opisthogastric shield differently formed.....	23
22. Genital arch and genital organ delicate; terminal cleft of females about 10 μ in width at midlength.....	<i>schoenicli</i> , n. sp., p. 192
Genital arch and genital organ robust; terminal cleft of females about 25 μ in width.....	<i>poublani</i> , p. 194
23. Distance between rows of opisthogastric setae greater than distance between anterior pair of setae.....	24
Distance between rows of opisthogastric setae less than distance between anterior pair of setae.....	26
24. Posterolateral extensions of opisthogastric shield narrow; distance "d", 95 μ ; length to width ratio of discs less than 2:1.....	<i>africanus</i> , p. 196

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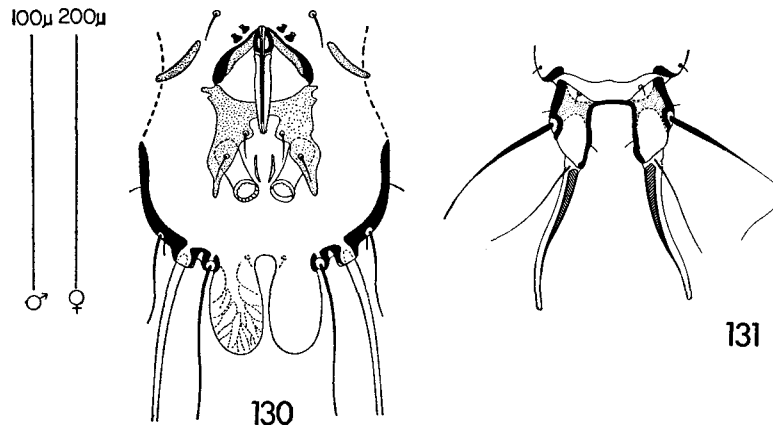
- Posterolateral extensions broad; distance "d" over 105 μ ;
length to width ratio of discs about 2.5:1..... 25
25. Origins of lamellae and setae *pai* widely separated.....
.....*eururus*, n. sp., p. 198
- Origins of lamellae and *pai* approximate...*polyandrius*, p. 200
26. Females with dark lateral hysterosomal bands.....
.....*egglestoni**, p. 308
- Females without dark lateral hysterosomal bands.....
.....*polyxenus**, n. sp., p. 304

* Group X.

Proctophyllodes pheuctici, new species

Proctophyllodes pheuctici, new species, is readily distinguished by the lamellae, which never exceed 50 μ in length; rather, the lamellae approximate a length of 40 μ . In addition, the genital sheath is expanded near midlength; this expansion is somewhat abrupt, giving the appearance of a moderate constriction.

MALE (holotype). Length, excluding lamellae, 284 μ ; width, 144 μ . *Dorsal idiosoma*: Propodosomal shield 79 μ in length, 86 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 62 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15 μ in length, 2.5 μ in width. Hysterosomal shield 174 μ in length, 92 μ in width; anterior margin concave; with anteromedial lacunae; without ventrolateral extensions; supranal concavity 33 μ in length. Lamellae



FIGS. 130, 131. *Proctophyllodes pheuctici*, new species: holotype male (130), allotype female (131).

39 μ in length, 18 μ in width, oblong, inner margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Genital discs separate; genital arch to level of anterior articulations of legs IV; genital sheath expanded near midlength and extending to anterior opisthogastric setae; measurements: *a*, 13 μ ; *b*, 9.8 μ ; *c*, 28 μ ; *d*, 87 μ ; *e*, 40 μ x 8.7 μ at base. Adanal discs each about 24 μ x 7 μ and bearing 20 teeth.

FEMALE (allotype). Length, excluding terminal appendages, 463 μ ; width, 177 μ . *Dorsal idiosoma*: Propodosomal shield 98 μ in length, 109 μ in width; lateral margins entire; with lacunae; without external vertical setae; distance between external scapular setae, 78 μ . Humeral shields well developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.5 μ in length, 4 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 235 μ in length, 101 μ in width, with anterior margin concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 65 μ in length; setae d_4 inserted on anterior margin of lobar shield and separated by 45 μ ; lobes normal; cleft parallel-sided, 52 μ in length, 27 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Pheucticus melanocephalus* (Fringillidae): holotype δ (NU), allotype ♀ (NU), 1 δ , 1 ♀ paratypes (NU), 3 miles north Valentine, Cherry County, Nebraska, June 12, 1960, N. R. Whitney.

Additional material. Icteridae: 2 $\delta\delta$, from *Icterus galbula*, Nebraska.

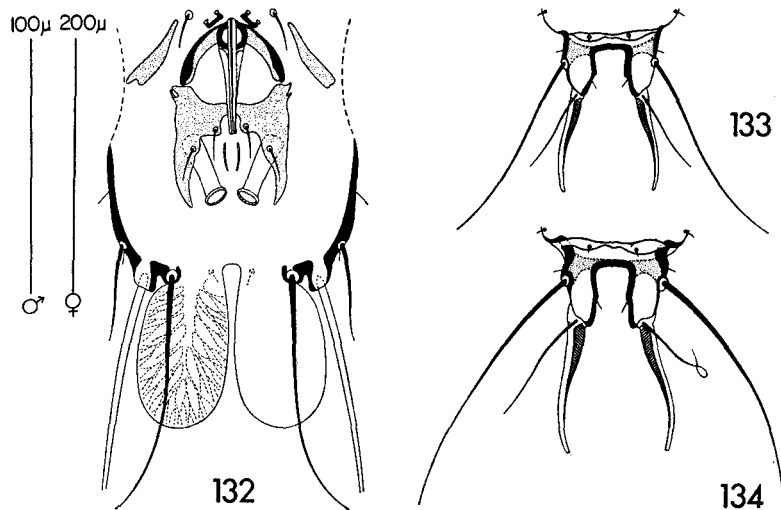
Remarks. The name *pheuctici* is derived from the type host. The drawings are of the holotype and allotype.

HOSTS		
Fringillidae		
<i>Pheucticus melanocephalus</i>	United States	Present study
(Swainson), 1827		
Icteridae		
<i>Icterus galbula</i> (L.),	United States	Present study
1758		

Proctophyllodes ludovicianus, new species

Closely related to *Proctophyllodes spini*, new species, differentiation of *P. ludovicianus*, new species, is achieved by comparisons

The Feather Mite Genus *Proctophyllodes*



FIGS. 132-134. *Proctophyllodes ludovicianus*, new species: holotype male (132), paratype female (133), allotype female (134).

of the male lamellae and adanal discs. In *P. ludovicianus* the lamellae are less than 65μ in length and the adanal disc length to diameter ratio is 3:1; in *P. spini* the lamellae are approximately 90μ in length, while the adanal disc ratio is approximately 2.5:1.

MALE (holotype). Length, excluding lamellae, 309μ ; width, 128μ . *Dorsal idiosoma*: Propodosomal shield 83μ in length, 90μ in width; lateral margins entire; with few small lacunae on anterior portion; without external vertical setae; distance between external scapular setae, 62μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.9μ in length, 2.8μ in width. Hysterosomal shield 179μ in length, 93μ in width; anterior margin straight; with small lacunae; without ventrolateral extensions; supranal concavity 44μ in length. Lamellae 62μ in length, 35μ in width, oblong, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level of anterior articulations of legs IV; genital sheath tapering and extending to anterior opisthogastric setae; measurements: a , 11.7μ ; b , 6.9μ ; c , 29μ ; d , 95μ ; e , $44\mu \times 9.7\mu$ at base. Adanal discs each about $24\mu \times 8\mu$ and bearing 22 teeth.

FEMALE (allotype). Length, excluding terminal appendages,

415 μ ; width, 133 μ . *Dorsal idiosoma*: Propodosomal shield 94 μ in length, 108 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 76 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7 μ in length, 3.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 227 μ in length, 98 μ in width, with anterior margin straight, with small lacunae; without supranal concavity. Lobar region articulated with anterior shield; 44 μ in length; setae d_4 inserted on conjunctiva and separated by 28 μ ; lobes normal; cleft doubly-concave, 36 μ in length, 19 μ in width; setae d_5 approximately equal length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Lanius ludovicianus* (Laniidae): holotype δ (NU), allotype ♀ (NU), 20 miles north Dallas, Dallas County, Texas, January 18, 1947; paratypes: 45 $\delta\delta$, 37 ♀♀ , 25 miles north Dallas, Dallas County, Texas, March 24, 1945; 2 $\delta\delta$, 2 ♀♀ , 1 mile south Kyle, Hays County, Texas, March 16, 1947, W. F. Blair; 6 $\delta\delta$, 5 ♀♀ , Cedar Hill, Dallas County, Texas, September 29, 1920; 2 $\delta\delta$, 2 ♀♀ , 28 miles southeast Perry, Taylor County, Florida, July 14, 1960, Atyeo, Braasch, Orwig. Paratypes deposited: André, BMNH, BAS, CAS, Gaud, MN, NU, Radford, RNH, SAIMR, SEA, USNM, ZSBS, ZSZM.

Remarks. The terminal clefts of females vary in length but not width as depicted in the figures. The specific name *ludovicianus* is derived from the specific name of the host. Drawings are of the holotype, allotype, and a female paratype.

HOSTS

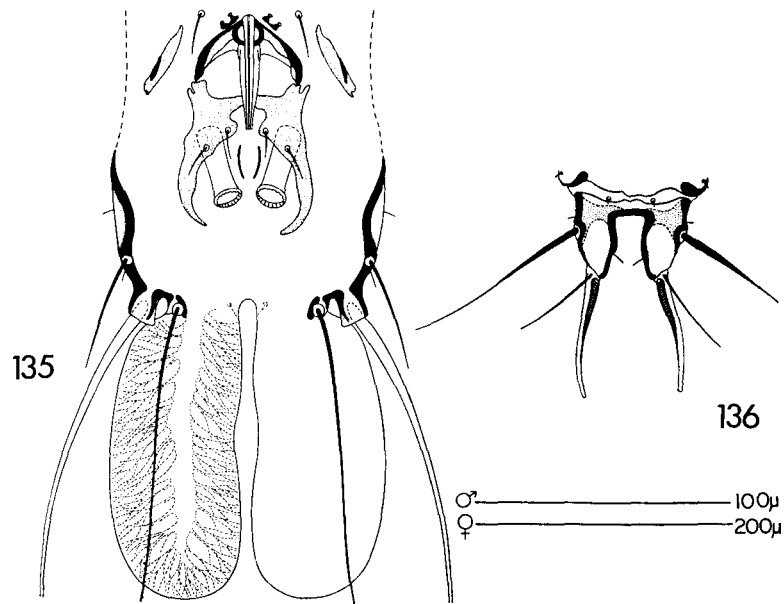
Laniidae		
<i>Lanius ludovicianus</i> L., 1758	United States	Present study

Proctophyllodes paramegaphyllus, new species

The opisthogastric shield and lamellae are larger in *Proctophyllodes paramegaphyllus*, new species, than in the related *P. megaphyllus*. Also, the terminal cleft of the females is 46 μ in length in the species being described and about 33 μ in *P. megaphyllus*.

The interpretation of the shape of the genital sheath is critical in this new species. When this structure is not distorted, it has the

The Feather Mite Genus *Proctophyllodes*



FIGS. 135, 136. *Proctophyllodes paramegaphyllus*, new species: holotype male (135), allotype female (136).

shape of a flask; when the structure is distorted because of preparation, it is possible that the typical shape will not be evident. In the latter instance, the species would appear to be related to *Proctophyllodes ludovicianus*, new species; however, in reality, *P. paramegaphyllus*, as the name would indicate, is very similar to *P. megaphyllus*.

MALE (holotype). Length, excluding lamellae, 327 μ ; width, 146 μ . *Dorsal idiosoma*: Propodosomal shield 81 μ in length, 92 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 61 μ . Humeral shields moderately developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.0 μ in length, 2.8 μ in width. Hysterosomal shield 186 μ in length, 97 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 49 μ in length. Lamellae 110 μ in length, 49 μ in width, oblong, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level of anterior articulations of legs IV;

genital sheath tapering and extending to anterior opisthogastric setae; measurements: *a*, 13.8 μ ; *b*, 6.9 μ ; *c*, 29.7 μ ; *d*, 106 μ ; *e*, 43 μ x 9.7 μ at base. Adanal discs each about 25 μ x 10 μ and bearing 28 teeth.

FEMALE (allotype). Length, excluding terminal appendages, 447 μ ; width, 171 μ . *Dorsal idiosoma*: Propodosomal shield 95 μ in length, 108 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 76 μ . Humeral shields moderately developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.6 μ in length, 4.1 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 224 μ in length, 101 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 60 μ in length; setae d_4 inserted on conjunctiva or anterior margin of lobar shield and separated by 33 μ ; lobes normal; cleft doubly-concave, 46 μ in length, 16 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Junco phaeonotus* (Fringillidae): holotype δ (NU), allotype ♀ (NU), 2 $\delta\delta$, 5 ♀♀ paratypes, 45 kilometers ESE México, D. F., México, June 27, 1941, W. B. Davis; paratypes: 3 $\delta\delta$, 10 ♀♀ , Guadalupe Mountains, Culberson County, Texas, March 12, 1942, W. B. Davis. Paratypes deposited: Gaud, NU, USNM.

Remarks. The validity of this new species is questionable; it may represent an extremely well-developed form of *Proctophyllodes megaphyllus*. However, the two species have been compared from North American specimens and the size differential appears to be constant. The close affinity of the new species to *P. megaphyllus* is the basis for the name *paramegaphyllus*. The drawings are of the holotype and allotype.

HOSTS

Fringillidae		
<i>Junco phaeonotus</i>	México	Present study
Wagler, 1831	United States	Present study

Proctophyllodes megaphyllus Trouessart

Proctophyllodes megaphyllus Trouessart, 1885, Bull. Soc. Etud. Sci. Angers, 14: 77. Type host: *Prunella* (= *Accentor*) *modularis* (Prunellidae).

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Proctophyllodes megaphyllus, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 55–59, figs. 45–50.

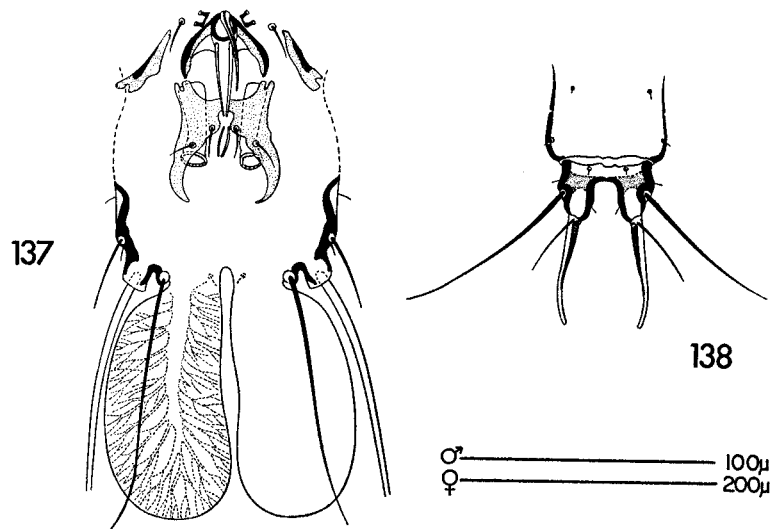
Proctophyllodes megaphyllus, Vitzthum, 1929, Tierwelt Mitteleuropas, 3(3): 100.

Proctophyllodes megaphyllus, Dubinin, 1952, Trav. Inst. Zool. Acad. Sci. U.S.S.R., 12: 260–261.

Proctophyllodes megaphyllus, Vassilev, 1960, Bulgarian Acad. Sci., Bull. Dept. Biol. Sci., p. 432.

Proctophyllodes megaphyllus (*s. l.*) has been envisioned by various authors as being a species of the *pinnatus* complex characterized by large lamellae (about 100–130 μ in length). In the present study, three forms fulfill this partial characterization: *P. megaphyllus*, *P. paramegaphyllus*, new species, and *P. vegetans*. The two former species have adanal discs with a length to diameter ratio of about 3:1; in *P. vegetans* this ratio is 2:1. The differentiation of *P. megaphyllus* and *P. paramegaphyllus* is accomplished by the comparison of measurements; generally, *P. megaphyllus* is smaller than *P. paramegaphyllus*.

MALE. Length, excluding lamellae, 318 μ ; width, 146 μ . *Dorsal idiosoma*: Propodosomal shield 83 μ in length, 88 μ in width; lateral margins entire; without lacunae; with external vertical setae; dis-



FIGS. 137, 138. *Proctophyllodes megaphyllus* Trouessart: male (137) and female (138) from *Calcaricus lapponicus*.

tance between external scapular setae, 62 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 24.9 μ in length, 2.1 μ in width. Hysterosomal shield 179 μ in length, 98 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 39 μ in length. Lamellae 97 μ in length, 47 μ in width, oblong, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level slightly anterior to anterior articulations of legs IV; genital sheath tapering and extending almost to anterior opisthogastric setae; measurements: *a*, 9.7 μ ; *b*, 6.9 μ ; *c*, 23.5 μ ; *d*, 103 μ ; *e*, 41 μ x 9 μ at base. Adanal discs each about 28 μ x 8 μ and bearing 24 teeth.

FEMALE. Length, excluding terminal appendages, 419 μ ; width, 163 μ . *Dorsal idiosoma*: Propodosomal shield 97 μ in length, 90 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 71 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7 μ in length, 3.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 210 μ in length, 94 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 48 μ in length; setae d_4 inserted on anterior edge of lobar shield and separated by 26 μ ; lobes short; cleft parallel-sided to a deep arch, 33 μ in length, 16 μ in width; setae d_5 $\frac{2}{3}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Prunella modularis* (Prunellidae), Europe; location of type unknown.

Material examined. Fringillidae: 4 ♂♂, 5 ♀♀, from *Plectrophenax nivalis*, Alaska, New York; 10 ♂♂, 16 ♀♀, from *Calcarius lapponicus*, Louisiana, South Dakota, Texas, Utah.

Remarks. Vitzthum (1922*b*) states that this species is also from *Calidris canutus*, but from the discussion presented, it is probable that only females were available to him.

Dubin (1952) records *Proctophyllodes pinnatus* from *Prunella montanella badia* Portenko; as he includes *P. megaphyllus* in the same paper, it is probable that there is a species of *Proctophyllodes*

The Feather Mite Genus *Proctophyllodes*

with short terminal lamellae which occurs on *Prunellidae*; whether it is *pinnatus* is doubtful.

The present authors, because of the unavailability of material from *Prunellidae*, follow Vitzthum (1922*b*) and Dubinin (1952) in placing the species of mites from *prunellid* and *fringillid* hosts in Trouessart's species. The drawings and redescriptions are based on specimens collected from *Calcarius lapponicus* in Texas.

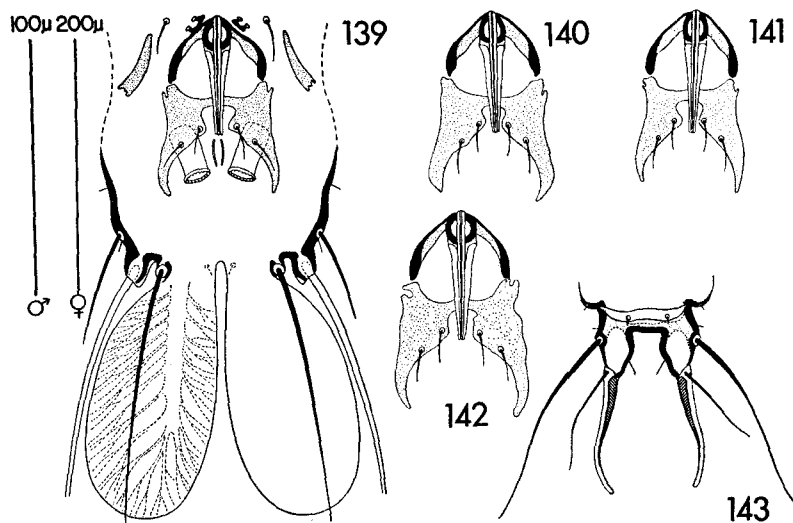
HOSTS

Fringillidae		
<i>Calcarius lapponicus</i> (L.), 1758	U.S.S.R. United States	Dubinin, 1952 Present study
<i>Plectrophenax nivalis</i> (L.), 1758	Europe U.S.S.R. United States	Vitzthum, 1922 <i>b</i> Dubinin, 1952 Present study
Prunellidae		
<i>Prunella collaris</i> (Scopoli), 1769	Europe	Vassilev, 1960
<i>Prunella modularis</i> (L.), 1758	Europe	Trouessart, 1885 Vitzthum, 1922 <i>b</i>
Scolopacidae (Questionable record)		
<i>Calidris</i> (= <i>Tringa</i>) <i>canutus</i> (L.), 1758	Europe	Vitzthum, 1922 <i>b</i>

Proctophyllodes spini, new species

Males of *Proctophyllodes spini*, new species, may be easily confused with *P. truncatus*. Careful measurements of the lamellae separate these species. In *P. spini* the lamellae measure about 90 μ in length and 50 μ in width, while the comparable measurement of 80 μ x 45 μ applies in the case of *P. truncatus*. Females lacking fully developed terminal appendages have not been discovered for *P. spini*, whereas females of *P. truncatus* rarely have fully developed terminal appendages.

MALE (holotype). Length, excluding lamellae, 285 μ ; width, 137 μ . *Dorsal idiosoma*: Propodosomal shield 73 μ in length, 90 μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 65 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.9 μ in length, 2.8 μ in width. Hysterosomal shield 155 μ in length, 96 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 46 μ in length. Lamellae 90 μ in length, 50 μ in width, oblong, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without



FIGS. 139-143. *Proctophyllodes spini*, new species: holotype male (139), paratype males (140-142), allotype female (143).

lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level midway between legs III and IV; genital sheath tapering and extending to level midway between anterior and posterior opisthogastric setae; measurements: *a*, 13.1 μ ; *b*, 6.2 μ ; *c*, 25.5 μ ; *d*, 94 μ ; *e*, 44 μ x 10.4 μ at base. Adanal discs each about 19 μ x 11 μ and bearing 24 teeth.

FEMALE (allotype). Length, excluding terminal appendages, 398 μ ; width, 148 μ . *Dorsal idiosoma*: Propodosomal shield 86 μ in length, 108 μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 79 μ . Humeral shields well developed and bearing setae *l*₁ at extreme anteromedial angles; subhumeral setae lanceolate, 18.0 μ in length, 4.1 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 217 μ in length, 98 μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 45 μ in length; setae *d*₄ inserted on conjunctiva and separated by 30 μ ; lobes normal; cleft doubly-concave, 33 μ in length, 19 μ in width; setae *d*₅ $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Spinus tristis* (Fringillidae): holotype δ

The Feather Mite Genus Proctophyllodes

(NU), allotype ♀ (NU), 1 ♂, 1 ♀ paratypes, 1/2 mile north College Station, Brazos County, Texas, February 26, 1938, W. B. Davis; paratypes: 2 ♂♂, 3 ♀♀, White Rock Lake, Dallas, Dallas County, Texas, May 12, 1949; 1 ♂, 2 ♀♀, Coon Creek, Texas, May 25, 1950; 1 ♂, 3 ♀♀, Austin, Travis County, Texas, February 10, 1905, E. Perry, Jr.; 4 ♂♂, 3 ♀♀, Grand Island, Hall County, Nebraska, June 11, 1959, Atyeo, Braasch; 2 ♂♂, 4 ♀♀, Kalamazoo County, Michigan, July 31, 1960, D. Clark; 1 ♂, 5 ♀♀, Lawrence Lake, Barry County, Michigan, July 27, 1960, D. Clark; 1 ♂, 1 ♀, Lawrence Lake, Barry County, Michigan, July 25, 1960, D. Clark; 1 ♂, 2 ♀♀, Busy Corners, Posey County, Indiana, October 3, 1958, N. Wilson; 1 ♂, 1 ♀, 10 miles west of Oak Ridge, Roane County, Tennessee, August 7, 1960, Atyeo, Braasch, Orwig; 5 ♂♂, 3 ♀♀, Ames, Story County, Iowa, June 4, 1910, H. E. Ewing; 1 ♂, 1 ♀, Crooked Lake, Emmet County, Michigan, July 8, 1960, D. Clark; 1 ♂, 1 ♀, Kalamazoo County, Michigan, August 17, 1960, D. Clark. Paratypes deposited: BAS, BMNH, CAS, Gaud, MN, NU, Radford, SAIMR, USNM, Wilson.

Additional material. Fringillidae: 9 ♂♂, 14 ♀♀, from *Spinus tristis*, Utah, Nebraska, Massachusetts; 10 ♂♂, 8 ♀♀, from *Spinus pinus*, Utah, Texas, México; 4 ♂♂, 4 ♀♀, from *Spinus psaltria*, Texas; 2 ♂♂, 2 ♀♀, from *Spinus notatus*, México.

Remarks. The various illustrations of the genital and opisthogastric regions depict variations in sizes and shapes for the species, but could well be used for any species having the posterior margin of the opisthogastric shields incised. The name *spini* is derived from the generic name of the host. The drawings are of the holotype, allotype, and three male paratypes.

HOSTS

Fringillidae		
<i>Spinus notatus</i> (Du Bus), 1847	México	Present study
<i>Spinus pinus</i> (Wilson), 1810	United States	Present study
<i>Spinis psaltria</i> (Say), 1823	United States	Present study
<i>Spinus tristis</i> (L.), 1758	United States	Present study

Proctophyllodes truncatus Robin

Proctophyllodes truncatus Robin (& Mégnin), 1877, J. Anat. Physiol., 13: 637-638. Type host: *Passer domesticus* (Ploceidae).

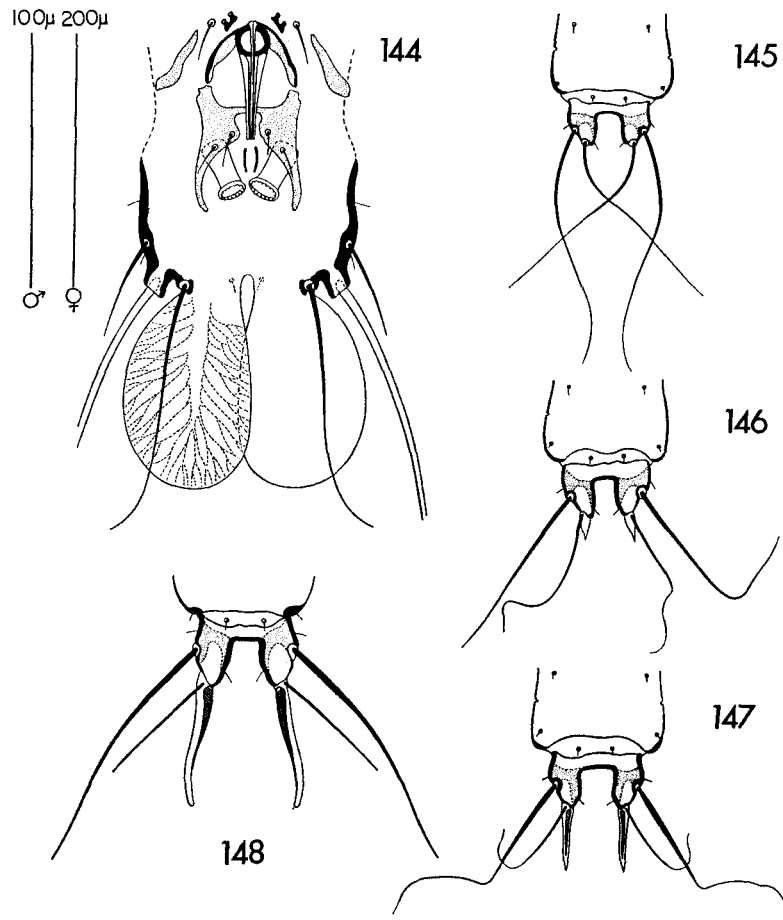
- ?*Proctophyllodes acanthurus* Giebel, 1871, Z. ges. Naturwiss., 37: 498. Type host: unknown. (Synonymized by Haller, 1877, Z. ges. Wiss Zool., 30: 537).
- Proctophyllodes truncatus*, Canestrini & Kramer, 1899, Tierreich, 7: 118.
- Proctophyllodes passeris* Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 75-76, figs. 64-66. Type host: *Passer domesticus* (Ploceidae). (New synonymy).
- Proctophyllodes truncatus* (in part), Vitzthum, 1929, Tierwelt Mitteleuropas, 3(3): 99.
- Proctophyllodes pinnatus* (in part), Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37(2): 123.
- Proctophyllodes pinnatus passeris*, Fritsch, 1961, Z. Parasitenk., 21: 14-15, figs. 10a-e. (New status).
- Proctophyllodes pinnatus* (in part), Lichard, 1962, Biología, 17(7): 533-534.
- Proctophyllodes passeris*, Lichard, 1962, Biología, 17(7): 535.

This is the only species within this group in which the terminal appendages of the female may be drastically reduced or absent. It is uncommon to find within a study series only females with normally developed terminal appendages.

MALE. Length, excluding lamellae, 298 μ ; width, 140 μ . *Dorsal idiosoma*: Propodosomal shield 73 μ in length, 90 μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 61 μ . Humeral shields moderately developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae spiculiform, 19.3 μ in length. Hysterosomal shield 175 μ in length, 92 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 41 μ in length. Lamellae 79 μ in length, 45 μ in width, oblong, internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level midway between legs III and IV; genital sheath tapering and extending slightly beyond anterior opisthogastric setae; measurements: *a*, 13.1 μ ; *b*, 6.9 μ ; *c*, 25.5 μ ; *d*, 101 μ ; *e*, 43 μ x 10.4 μ at base. Adanal discs each about 21 μ x 10 μ and bearing 22 teeth.

FEMALE. Length, excluding terminal appendages, 447 μ ; width, 176 μ . *Dorsal idiosoma*: Propodosomal shield 95 μ in length, 110 μ in width; lateral margins entire; without lacunae; with external

The Feather Mite Genus *Proctophyllodes*



Figs. 144–148. *Proctophyllodes truncatus* Robin: male (144) and females illustrating conditions of the hysterosomal lobes (145–148) from *Passer domesticus*.

vertical setae (?); distance between external scapular setae, 78µ. Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7µ in length, 3.5µ in width. Hysterosoma with lobes or without lobes and with or without terminal appendages; anterior shield 224µ in length, 105µ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 30µ or less in length; setae d_4 inserted on conjunctiva and separated by 30µ; lobes short; cleft doubly-concave, 37µ or less in length, 19µ in width; setae d_5 $\frac{2}{3}$ length of terminal appendages

if appendages are normally developed. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Passer domesticus* (Ploceidae), Europe; location of type unknown.

Material examined. Ploceidae: 27 ♂♂, 40 ♀♀, from *Passer domesticus*, Europe, United States; 13 ♂♂, 16 ♀♀, from *Passer montanus*, Bulgaria; 1 ♂, 3 ♀♀, from *Passer hispaniolensis*, Bulgaria.

Remarks. Robin (1877) described a female of *Proctophyllodes truncatus* with setae d_5 and l_5 extremely long, with short hysterosomal lobes, and without terminal appendages. He attributed females with terminal appendages as belonging to *P. profusus*, not recognizing that the females of *P. truncatus* are polymorphic. Furthermore, Robin (1877), in his description of *P. profusus*, states that on sparrows, they are found either singly or more often with a large number of *P. truncatus*.

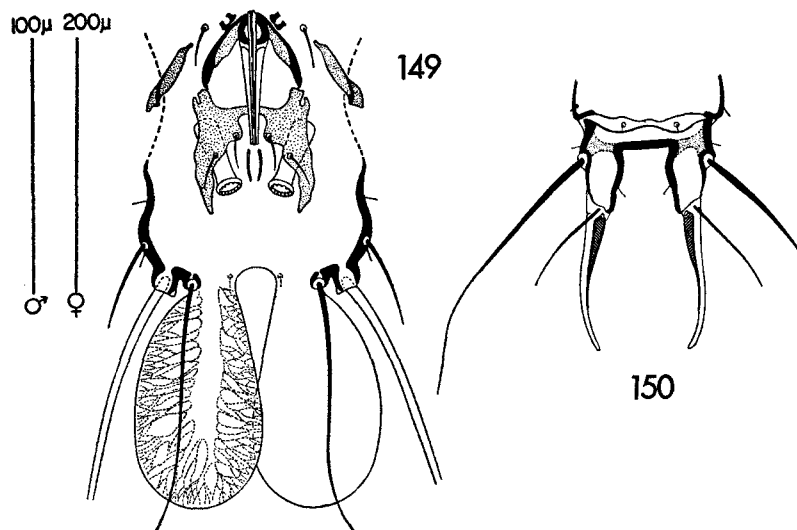
Vitzthum (1922*b*) erroneously redescribed *Proctophyllodes truncatus* from specimens collected on *Eremophila alpestris*; in reality, this was a new species which was described by Gaud (1957) as *P. microcaulus*. Continuing his line of reasoning, Vitzthum described *P. passeris* from *Passer domesticus* and *Passer montanus*, the exact hosts given by Robin (1877) for *P. truncatus*.

The drawings of the male and normal female and the redescrptions are based on specimens from *Passer domesticus*, Bulgaria. The series of drawings illustrating various conditions of the terminal portions of the female are from specimens taken from *Passer domesticus* in Missouri.

HOSTS

Ploceidae		
<i>Passer domesticus</i> (L.), 1758	Europe	Robin, 1877 Vitzthum, 1922 <i>b</i> Fritsch, 1961 Lichard, 1962 Present study
	Fr. Morocco	Gaud, 1957
	United States	Present study
<i>Passer hispaniolensis</i> (Temminck), 1820	Fr. Morocco	Gaud, 1957
<i>Passer montanus</i> (L.), 1758	Europe	Present study Robin, 1877 Lichard, 1962 Present study

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FIGS. 149, 150. *Proctophyllodes canadensis*, new species: holotype male (149), allotype female (150).

Proctophyllodes canadensis, new species

Within the species characterized by gradual tapering of the male genital sheath, *Proctophyllodes canadensis*, new species, is the only species in which females have the terminal cleft measuring approximately 30μ in width. Furthermore, the ventral sclerites of the hysterosomal lobes are weakly developed. These characteristics distinguish this species from the closely related *P. neopinnatus* in which the terminal cleft is narrower.

MALE (holotype). Length, excluding lamellae, 291μ ; width, 128μ . *Dorsal idiosoma*: Propodosomal shield 76μ in length, 90μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 62μ . Humeral shields weakly developed and not bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 18.6μ in length, 4.1μ in width. Hysterosomal shield 166μ in length, 87μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 35μ in length. Lamellae 88μ in length, 51μ in width, oblong, distant at origins, overlapping at apices, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level midway between legs III and IV; genital sheath tapering and extending slightly beyond anterior opistogastric

setae; measurements: *a*, 12.4 μ ; *b*, 6.9 μ ; *c*, 28.3 μ ; *d*, 97 μ ; *e*, 49 μ x 9.7 μ at base. Adanal discs each about 24 μ x 8 μ and bearing 22 teeth.

FEMALE (allotype). Length, excluding terminal appendages, 445 μ ; width, 151 μ . *Dorsal idiosoma*: Propodosomal shield 97 μ in length, 117 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 84 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7 μ in length, 4.1 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 228 μ in length, 104 μ in width, with anterior margin shallowly concave, with minute lacunae; without supranal concavity. Lobar region articulated with anterior shield; 62 μ in length; setae d_4 inserted on conjunctiva and separated by 38 μ ; lobes normal; cleft doubly-concave, 45 μ in length, 29 μ in width; setae d_5 $\frac{2}{3}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields.

Type material. From *Sitta canadensis* (Sittidae): holotype δ (BYU), allotype φ (BYU), 2 $\delta\delta$, 5 $\varphi\varphi$ paratypes, Cane Springs, Cedar Mountains, Tooele County, Utah, October 8, 1953, E. J. Ekker and W. Denzer; paratypes: 3 $\delta\delta$, 7 $\varphi\varphi$, Orr's Ranch, Skull Valley, Tooele County, Utah, October 14, 1953, R. B. Holliman, W. Denzer; 1 δ , 1 φ , Granite Mountain, Tooele County, Utah, November 2, 1953, M. Allen; 2 $\delta\delta$, Dallas, Dallas County, Texas, February 7, 1950. Paratypes deposited: BYU, Gaud, NU, USNM.

Remarks. *Proctophyllodes canadensis* is the only species of this group known to occur on members of Sittidae and is apparently restricted to the New World. This species, if reported from the Old World, probably would have been considered as *Proctophyllodes pinnatus* (*s. l.*). The specific name *canadensis* is taken from the host name. The drawings are of the holotype and allotype.

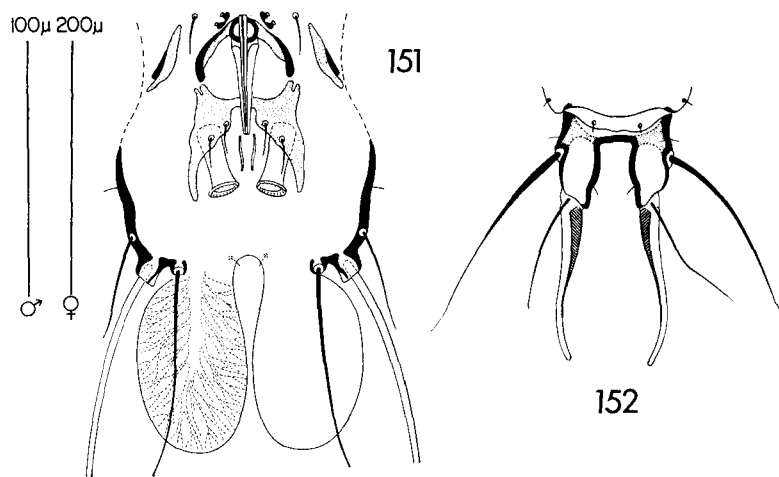
HOSTS

Sittidae		
<i>Sitta canadensis</i> L., 1766	United States	Present study

Proctophyllodes chlorurae, new species

The short genital organ (46 μ), the moderately developed lamellae (75 μ x 45 μ), and the widely separated anterior opisthogastric setae (14 μ) are characteristics of this new species. The related forms have

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FIGS. 151, 152. *Proctophyllodes chlorurae*, new species: holotype male (151), allotype female (152).

larger lamellae and/or the distance between the anterior opisthogastric setae is less than 12μ , e.g., *Proctophyllodes megaphyllus* and *P. neopinnatus*, new species.

MALE (holotype). Length, excluding lamellae, 311μ ; width, 143μ . *Dorsal idiosoma*: Propodosomal shield 79μ in length, 89μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 59μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 20μ in length. Hysterosomal shield 172μ in length, 90μ in width at level of setae d_2 ; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 36μ in length. Lamellae 73μ in length, 43μ in width, oblong, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level of anterior articulations of legs IV; genital sheath tapering and extending almost to posterior opisthogastric setae; measurements: a , 13.8μ ; b , 6.2μ ; c , 26.9μ ; d , 95μ ; e , $46\mu \times 10.4\mu$ at base. Adanal discs each about $24\mu \times 9\mu$ and bearing 20 teeth.

FEMALE (allotype). Length, excluding terminal appendages, 480μ ; width, 170μ . *Dorsal idiosoma*: Propodosomal shield 102μ in length, 108μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 76μ . Humeral shields moderately developed and bearing setae

l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 21.4μ in length, 4.1μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 233μ in length, 108μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 62μ in length; setae d_4 inserted on conjunctiva and separated by 35μ ; lobes normal; cleft doubly-concave, 48μ in length, 21μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields.

Type material. From *Chlorura chlorura* (Fringillidae): holotype δ (NU), allotype ♀ (NU), 1 δ paratype, 10 miles north Sanderson, Terrell County, Texas, March 14, 1942, W. B. Davis; 43 δ δ , 31 ♀ ♀ paratypes, Truckee, Nevada County, California, May 31, 1961, H. H. Kimball. Paratypes deposited: André, BAS, BMNH, CAS, Gaud, MN, NU, Radford, RNH, SAIMR, SEA, USNM, ZSBS, ZSZM.

Remarks. This North American species is named for its type host. The drawings are of the holotype and allotype.

HOSTS

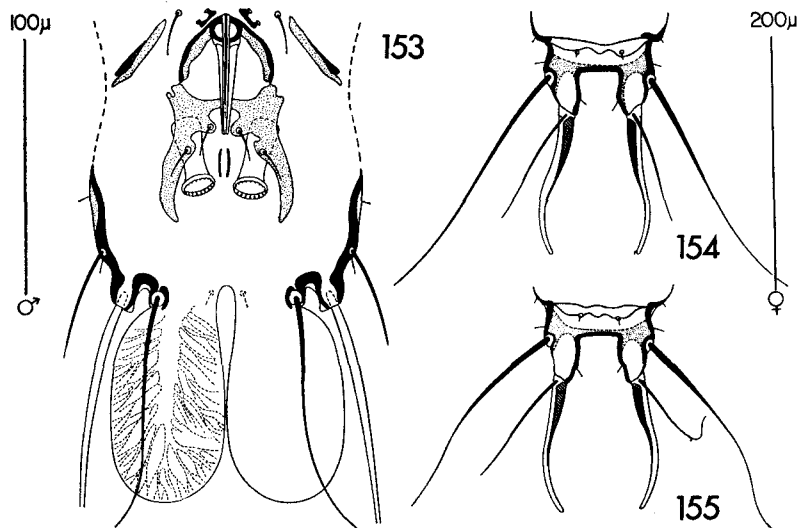
Fringillidae		
<i>Chlorura chlorura</i> (Audubon), 1839	United States	Present study

Proctophyllodes neopinnatus, new species

Not only the differences in the length of genital organs differentiate *Proctophyllodes neopinnatus*, new species, from the related *P. megaphyllus*, but also differences in the opisthogastric regions. Contrasting measurements are: *P. neopinnatus*: a , 11.0μ ; b , 7.6μ ; c , 27.6μ ; *P. megaphyllus* a , 9.7μ ; b , 6.9μ ; c , 23.5μ .

MALE (holotype). Length, excluding lamellae, 328μ ; width, 166μ . *Dorsal idiosoma*: Propodosomal shield 84μ in length, 101μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 70μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 18.6μ in length. Hysterosomal shield 186μ in length, 104μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 46μ in length. Lamellae 81μ in length, 41μ in width, oblong, internal margins approximate, with pinnate

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FIGS. 153-155. *Proctophyllodes neopinnatus*, new species: holotype male (153), allotype female (154), paratype female (155).

venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level of anterior articulations of legs IV; genital sheath tapering and extending slightly beyond anterior opisthogastric setae; measurements: *a*, 11.0 μ ; *b*, 7.6 μ ; *c*, 27.6 μ ; *d*, 106 μ ; *e*, 44 μ x 9.0 μ at base. Adanal discs each about 26 μ x 10 μ and bearing 24 teeth.

FEMALE (allotype). Length, excluding terminal appendages, 439 μ ; width, 176 μ . *Dorsal idiosoma*: Propodosomal shield 95 μ in length, 120 μ in width; lateral margins entire; without lacunae; apparently without external vertical setae; distance between external scapular setae, 84 μ . Humeral shields moderately developed and bearing setae *l*₁ at extreme anteromedial angles; subhumeral setae lanceolate, 20.7 μ in length, 3.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 237 μ in length, 109 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 48 μ in length; setae *d*₄ inserted on anterior margin of lobar shield and separated by 27 μ ; lobes normal; cleft doubly-concave, 35 μ in length, 17 μ in width; setae *d*₅ $\frac{2}{3}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Loxia curvirostra* (Fringillidae): holotype ♂ (NU), allotype ♀ (NU), 11 ♂♂, 12 ♀♀ paratypes, 5 kilometers north Tres Mariás, Morelos, México, December 20, 1948, W. B. Davis. Paratypes deposited: BAS, BMNH, Gaud, NU, USNM.

Additional material. Fringillidae: 6 ♂♂, 6 ♀♀, from *Loxia leucoptera*, Maine; 23 ♂♂, 23 ♀♀, from *Leucosticte tephrocotis*, Colorado, Idaho, Utah; 1 ♀, from *Leucosticte atrata*, Utah; 3 ♂♂, 5 ♀♀, from *Junco caniceps*, Colorado; 4 ♂♂, 4 ♀♀, from *Junco aikenii*, Colorado. Vireonidae: 4 ♂♂, 3 ♀♀, from *Vireo huttoni*, México (same data as holotype).

Remarks. The record from *Vireo huttoni* is questioned, as the collecting data coincide with that of the holotype. Thus, there is a possibility of close contact of birds prior to preparation as study skins, *i.e.*, accidental contact in nature or close proximity of study skins.

The affinity of this new species with *Proctophyllodes pinnatus* provides the basis for the name *neopinnatus*. The drawings are of the holotype, allotype and a female paratype.

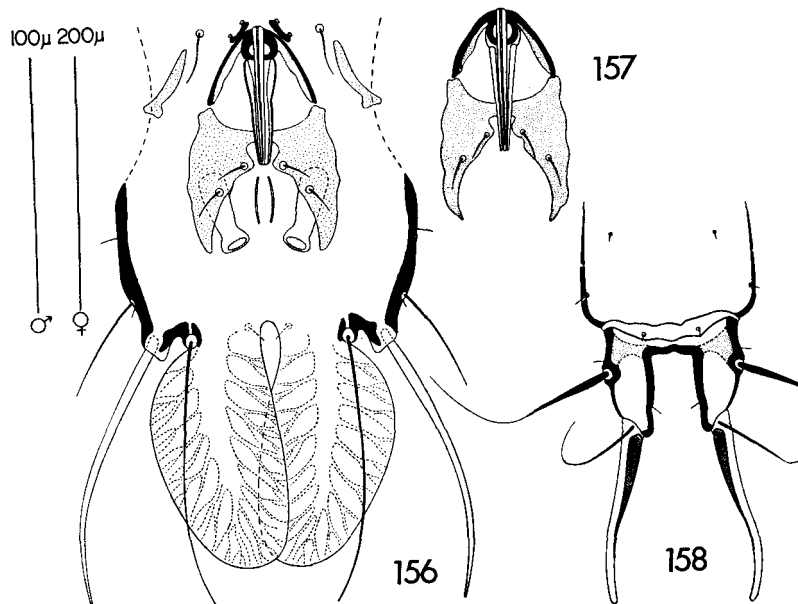
	HOSTS	
Fringillidae		
<i>Junco aikenii</i>	United States	Present study
Ridgway, 1873		
<i>Junco caniceps</i>	United States	Present study
(Woodhouse), 1852		
<i>Leucosticte atrata</i>	United States	Present study
Ridgway, 1874		
<i>Leucosticte tephrocotis</i>	United States	Present study
(Swainson), 1831 (1832)		
<i>Loxia curvirostra</i> L.,	México	Present study
1758		
<i>Loxia leucoptera</i>	United States	Present study
Gmelin, 1789		
Vireonidae (Questionable record)		
<i>Vireo huttoni</i>	México	Present study
Cassin, 1851		

Proctophyllodes miliariae Gaud

Proctophyllodes miliariae Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37: 121–122, fig. 7D. Type host: *Emberiza calandra* (Fringillidae).

The well-developed opisthogastric shield is characteristic of *Proctophyllodes miliariae*. This character, in combination with the robust genital organ, large lamellae, and long adanal discs are sufficient to distinguish *P. miliariae* from the related species.

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FIGS. 156-158. *Proctophyllodes miliariae* Gaud: paratype male (156), male from *Emberiza calandra* (157), paratype female (158).

MALE (paratype). Length, excluding lamellae, 362 μ ; width, 167 μ . *Dorsal idiosoma*: Propodosomal shield 91 μ in length, 100 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 66 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.2 μ in length, 2.8 μ in width. Hysterosomal shield 201 μ in length, 104 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 48 μ in length. Lamellae 93 μ in length, 48 μ in width, oblong, apices overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level slightly anterior to anterior articulations of legs IV; genital sheath tapering and extending to or slightly beyond anterior opisthogastric setae; measurements: *a*, 12.4 μ ; *b*, 9.0 μ ; *c*, 31.8 μ ; *d*, 114 μ ; *e*, 55 μ x 11.0 μ at base. Adanal discs each about 30 μ x 10 μ and bearing 18 teeth.

FEMALE (paratype). Length, excluding terminal appendages, 540 μ ; width, 204 μ . *Dorsal idiosoma*: Propodosomal shield 104 μ in length, 128 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular

setae, 87 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 22.8 μ in length, 4.1 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 248 μ in length, 119 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 76 μ in length; setae d_4 inserted on conjunctiva and separated by 40 μ ; lobes elongate; cleft parallel-sided, 59 μ in length, 31 μ in width; setae d_5 $\frac{1}{2}$ length of terminal appendages. Spermatheca as in *pin-natus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Emberiza calandra* (Fringillidae), French Morocco: holotype δ (Gaud), allotype φ (Gaud), 13 $\delta\delta$, 16 $\varphi\varphi$ paratypes, Rabat, Rabat region, March, 1948, J. Gaud; paratypes: 11 $\delta\delta$, 8 $\varphi\varphi$, Kenitra, Rabat region, May, 1948, J. Gaud; 7 $\delta\delta$, 6 $\varphi\varphi$, Camp Bataille, Meknès region, March, 1953, J. Gaud. Paratypes deposited: Gaud, NU.

Material examined. Fringillidae: 3 $\delta\delta$, 2 $\varphi\varphi$ (paratypes), 1 δ , 4 $\varphi\varphi$, from *Emberiza calandra*, French Morocco, Bulgaria; 14 $\delta\delta$, 38 $\varphi\varphi$, from *Emberiza citrinella*, Bulgaria, Czechoslovakia; 6 $\delta\delta$, 2 $\varphi\varphi$, from *Emberiza hortulana*, Bulgaria; 19 $\delta\delta$, 8 $\varphi\varphi$, from *Emberiza cirrus*, Bulgaria.

Remarks. It is possible that *Proctophyllodes miliariae* or *P. emberize* are synonymous with *P. profusus*, as the type hosts of the three forms belong to the genus *Emberiza*. The description of *P. profusus* is such that the identity of Robin's species is in doubt.

The shape of the genital sheath illustrated in fig. 156 may be an aberration due to the mounting procedure. Many specimens exhibit this form while the remainder have the form shown in fig. 157. The rather large diameter coupled with unequal sclerotization of supporting structures might cause the shallow depressions of the lateral margins. The large drawings and the redescrptions are of paratypes from the Meknès region, French Morocco. The small drawing of the genital region of the male is a specimen from *Emberiza calandra* collected in Bulgaria.

HOSTS

Fringillidae		
<i>Emberiza calandra</i> L.,	Fr. Morocco	Gaud, 1957
1758		Present study
<i>Emberiza cirrus</i> L.,	Europe	Present study
1766		

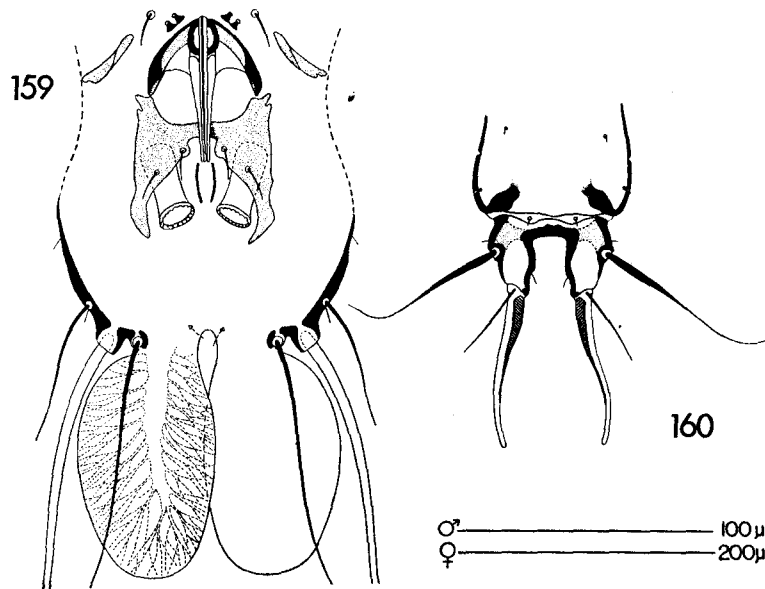
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<i>Emberiza citrinella</i> L., 1758	Europe	Present study
<i>Emberiza hortulana</i> (L.), 1758	Europe	Present study

Proctophyllodes serini, new species

Females of *Proctophyllodes miliariae* have a terminal cleft which measures approximately $48\mu \times 25\mu$; females of the related *P. serini*, new species, have a longer and wider cleft, which measures approximately $59\mu \times 31\mu$.

MALE (holotype). Length, excluding lamellae, 352μ ; width, 170μ . *Dorsal idiosoma*: Propodosomal shield 86μ in length, 99μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 68μ . Humeral shields moderately developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 21.4μ in length, 2.8μ in width. Hysterosomal shield 200μ in length, 101μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 55μ in length. Lamellae 90μ in length, 50μ in width, oblong, internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes moderately



FIGS. 159, 160. *Proctophyllodes serini*, new species: holotype male (159), allotype female (160).

developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level of anterior articulations of legs IV; genital sheath tapering and extending slightly beyond anterior opisthogastric setae; measurements: *a*, 15.2 μ ; *b*, 8.3 μ ; *c*, 32.4 μ ; *d*, 121 μ ; *e*, 55 μ x 11.0 μ at base. Adanal discs each about 27 μ x 13 μ and bearing 22 teeth.

FEMALE (allotype). Length, excluding terminal appendages, 484 μ ; width 176 μ . *Dorsal idiosoma*: Propodosomal shield 97 μ in length, 113 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 84 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.0 μ in length, 3.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 238 μ in length, 109 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 62 μ in length; setae d_4 inserted on conjunctiva and separated by 35 μ ; lobes normal; cleft doubly-concave, 48 μ in length, 25 μ in width; setae d_5 $\frac{1}{2}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Serinus canicollis* (Fringillidae): holotype δ (SAIMR), allotype ♀ (SAIMR), 8 $\delta\delta$, 1 ♀ paratypes (NU, SAIMR), Robinson Pass, Cape Colony, Union of South Africa, December 16, 1953, F. Zumpt.

Additional material. Fringillidae: 1 δ , 5 ♀♀ , from *Serinus serinus*, Germany.

Remarks. The name *serini* denotes the avian genus on which these mites occur. The drawings are of the holotype and allotype.

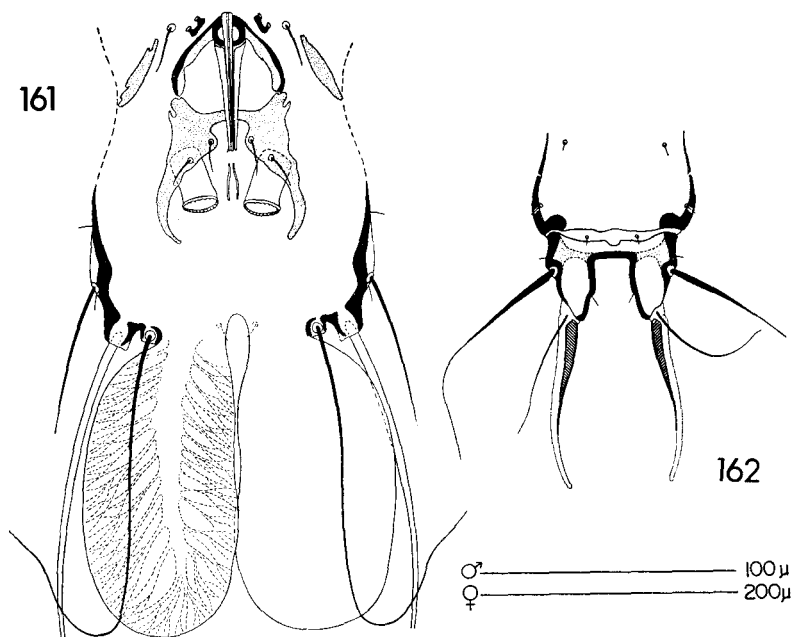
HOSTS

Fringillidae		
<i>Serinus canicollis</i>	Un. So. Africa	Present study
(Swainson), 1838		
<i>Serinus serinus</i> (L.),	Europe	Present study
1766		

Proctophyllodes vegetans Trouessart

Proctophyllodes vegetans Trouessart, 1899, Bull. Soc. Etud. Sci. Angers, 28: 199. Type host: *Carpodacus erythrinus* (Fringillidae).

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FIGS. 161, 162. *Proctophyllodes vegetans* Trouessart: male (161) and female (162) from *Carpodacus cassini*.

Proctophyllodes vegetans, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 64-65.

Proctophyllodes vegetans may be separated from the related *P. megaphyllus* and *P. paramegaphyllus* on the basis of the adanal disc length to diameter ratio; *P. vegetans* has a ratio of 2:1, while the other two species have a ratio of 3:1.

MALE. Length, excluding lamellae, 325 μ ; width, 163 μ . *Dorsal idiosoma*: Propodosomal shield 83 μ in length, 98 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 69 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 18.6 μ in length. Hysterosomal shield 186 μ in length, 106 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 45 μ in length. Lamellae 117 μ in length, 55 μ in width, oblong, internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level midway between legs III and IV; genital sheath tapering and extending slightly

beyond anterior opisthogastric setae; measurements: *a*, 13.8 μ ; *b*, 6.9 μ ; *c*, 29.7 μ ; *d*, 113 μ ; *e*, 50 μ x 10.4 μ at base. Adanal discs each about 22 μ x 12 μ and bearing 24 teeth.

FEMALE (allotype). Length, excluding terminal appendages, 518 μ ; width, 196 μ . *Dorsal idiosoma*: Propodosomal shield 107 μ in length, 131 μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 91 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 23.8 μ in length. Hysterosoma with lobes and with terminal appendages; anterior shield 255 μ in length, 112 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 65 μ in length; setae d_4 inserted on conjunctiva and separated by 35 μ ; lobes normal; cleft parallel-sided to doubly-concave, 46 μ in length, 26 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields.

Type material. From *Carpodacus erythrinus* (Fringillidae), China; location of type unknown.

Material examined. Fringillidae: 15 δ δ , 27 ♀ ♀ , from *Carpodacus cassinii*, Colorado, Washington; 19 δ δ , 1 ♀ , from *Carpodacus mexicanus*, Hawaii.

Remarks. Trouessart (1899) stated that this species might be a subspecies of *Proctophyllodes ampelidis*. Accordingly, Vitzthum (1922*b*) suggested that Trouessart's species should be synonymized with *P. ampelidis*. However, Trouessart's concept of *P. ampelidis* was equivalent to the present concept of *P. pinnatus* (personal communication, J. Gaud).

Although the present authors have been unable to recollect *Proctophyllodes* species from *Carpodacus erythrinus*, a form with large lamellae from species of *Carpodacus* has been collected. The redescription and drawings are based on specimens from *Carpodacus cassinii* collected in Washington.

HOSTS

Fringillidae		
<i>Carpodacus cassinii</i> Baird, 1854	United States	Present study
<i>Carpodacus erythrinus</i> (Pallas), 1770	China	Trouessart, 1899
<i>Carpodacus mexicanus</i> (Müller), 1766	United States	Present study

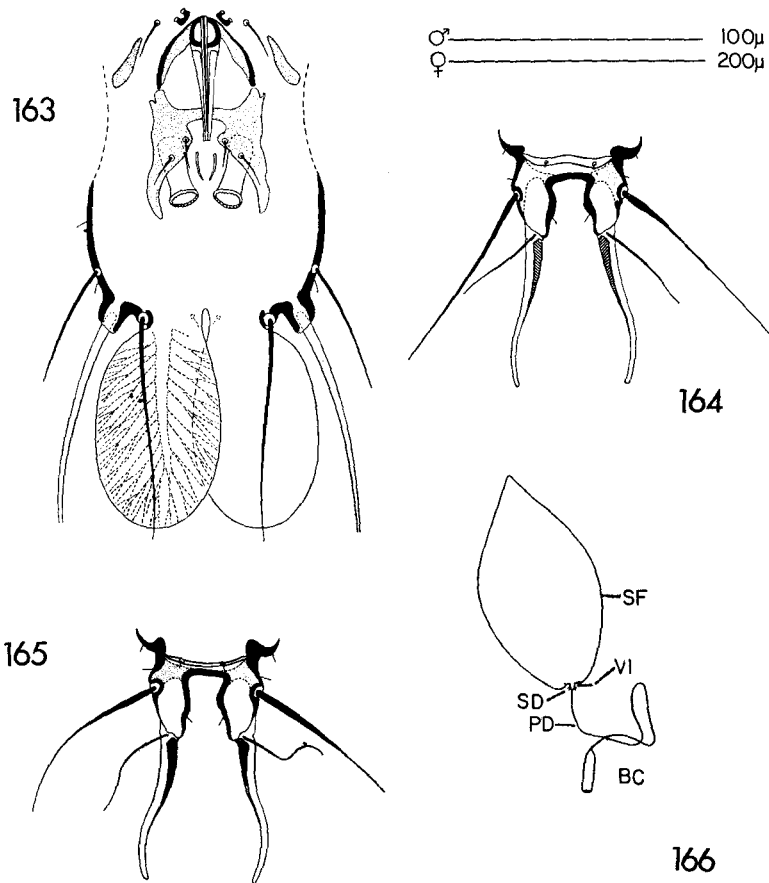
The Feather Mite Genus *Proctophyllodes*

Proctophyllodes pinnatus (Nitzsch)

- Analges pinnatus* Nitzsch, 1818, In Ersch & Gruber's Allgemeiner Encyclopädie der Wissenschaften und Künste, 1: 252. Type host: *Carduelis carduelis* (Fringillidae).
- ?*Proctophyllodes profusus* Robin, 1868, Compt. rend. Acad. Sci. Paris, 66(16): 786. (*Nomen nudum*)
- Analges pinnatus*, Giebel, 1871, Z. ges. Naturwiss., 37: 497.
- ?*Proctophyllodes profusus* Robin (& Mégnin), 1877, J. Anat. Physiol., 13: 635-637. Type host: *Emberiza citrinella*. (Doubtful synonymy)
- Proctophyllodes pinnatus*, Oudemans, 1897, Tijdschr. Entomol., 40: 255.
- Proctophyllodes pinnatus*, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 20-255, figs. 12-15.
- Proctophyllodes pinnatus*, Dubinin, 1952, Trav. Inst. Zool. Acad. Sci. U.S.S.R., 12: 261.
- Proctophyllodes pinnatus*, Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37(2): 122-123; fig. 7C.
- Proctophyllodes pinnatus*, Vassilev, 1960, Bulgarian Acad. Sci., Proc. Zool. Inst., 9: 433-434.
- Proctophyllodes pinnatus pinnatus*, Fritsch, 1961, Z. Parasitenk., 21: 12-14, figs. 9a-d.
- Proctophyllodes pinnatus*, Lichard, 1962, Biología, 17(7): 533-534.

This species is distinguished from other forms by the characters designated in the key.

MALE. Length, excluding lamellae, 309 μ ; width, 146 μ . *Dorsal idiosoma*: Propodosomal shield 77 μ in length, 95 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 63 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.0 μ in length, 2.8 μ in width. Hysterosomal shield 167 μ in length, 42 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 44 μ in length. Lamellae 79 μ in length, 42 μ in width, oblong, internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad, weak connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level midway between legs III and IV; genital sheath tapering and extending to anterior opisthogastric setae; measurements: *a*,



FIGS. 163-166. *Proctophylloides pinnatus* (Nitzsch): male (163), females (164, 165) and spermatheca (166) from *Carduelis carduelis*. BC, bursa copulatrix; PD, primary spermathecal duct; SD, secondary spermathecal duct; SF, suspensory follicle; VI, vulva.

13.8µ; b, 6.9µ; c, 26.9µ; d, 113µ; e, 48µ x 9.7µ at base. Adanal discs each about 33µ x 10µ and bearing 22 teeth.

FEMALE. Length, excluding appendages, 463µ; width, 163µ. *Dorsal idiosoma*: Propodosomal shield 95µ in length, 110µ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 77µ. Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7µ in length, 4.1µ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 342µ in length, 104µ in width, with anterior margin shallowly

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concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 56μ in length; setae d_4 inserted on conjunctiva and separated by 32μ ; lobes normal; cleft doubly-concave, 43μ in length, 18μ in width; setae d_5 $1/2$ length of terminal appendages. Spermatheca as in figure 166. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad, weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Carduelis carduelis* (Fringillidae), Europe; location of type unknown.

Material examined. Fringillidae: 3 ♂♂, 3 ♀♀, from *Aimophila ruficeps*, México; 4 ♂♂, 4 ♀♀, from *Acanthis cannabina*, Bulgaria; 3 ♂♂, 8 ♀♀, from *Carduelis carduelis*, Bulgaria; 1 ♂, 19 ♀♀, from *Carduelis spinus*, Bulgaria; 2 ♂♂, 1 ♀, from *Carpodacus mexicanus*, México; 6 ♂♂, 6 ♀♀, from *Carduelis chloris*, Bulgaria, England, Germany; 3 ♂♂, 7 ♀♀, from *Carduelis sinica*, China, Japan; 1 ♂, 2 ♀♀, from *Serinus serinus*, California.

Remarks. *Proctophyllodes pinnatus* of earlier authors is a species group, thus, most host records are in doubt. Three species were removed from the complex in the late 1800's: *P. profusus*, *P. truncatus*, and *P. megaphyllus*. The first species cannot be recognized by the description and might be *P. militariae*, *P. emberizae* or an undetermined species. The latter two species are diagnosed by the females which lack terminal appendages (*P. truncatus*) and by the larger lamellae of the males (*P. megaphyllus*).

Gaud (1957) first recognized that *P. pinnatus* was a species complex. At this time Gaud began describing new forms which heretofore would have been placed in *P. pinnatus* (*s.l.*). Since 1957, more species have been removed from the complex, until now there are about twenty species which resemble either *P. pinnatus* (*s.s.*), *P. truncatus*, or *P. megaphyllus*.

Vitzthum (1922*b*) reported *Proctophyllodes truncatus* from *Carduelis carduelis*, however Gaud (personal communication) states that he has seen specimens of *P. pinnatus* (*s.s.*) from this host with females having abbreviated terminal lobes and appendages. Finally, Gaud (personal communication) and the present authors are unable to determine the species redescribed by Fritsch (1961) as *Proctophyllodes pinnatus pinnatus*. With the wide array of hosts reported for this form, and from the illustrations and redescription, it might be concluded that Fritsch inadvertently included *P. miliariae*. The drawings and redescription are based on specimens from *Carduelis carduelis* from Bulgaria.

HOSTS

The host list does not include all references to *Proctophyllodes pinnatus* (s.l.), but only includes probable records.

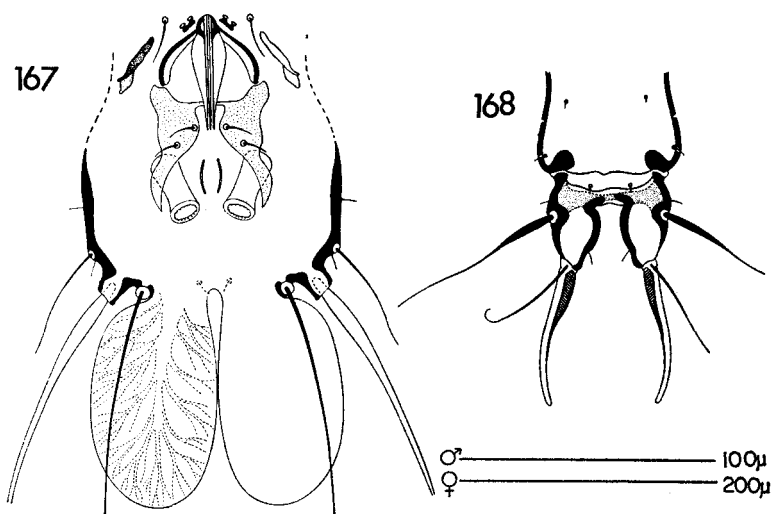
Fringillidae		
<i>Acanthis cannabina</i> (L.), 1758	Europe	Present study
<i>Acanthis hornemanni</i> (Holboell), 1843	Eurasia	Dubinín, 1952
<i>Aimophila ruficeps</i> (Cassin)	México	Present study
<i>Carduelis carduelis</i> (L.), 1758	Europe	Nitzsch, 1818 Vitzthum, 1922 <i>b</i> Fritsch, 1961 Lichard, 1962 Present study
<i>Carduelis chloris</i> (L.), 1758	Fr. Morocco Europe	Gaud, 1957 Fritsch, 1961 Lichard, 1962 Present study
<i>Carduelis sinica</i> (L.), 1766	Asia	Present study
<i>Carduelis spinus</i> (L.), 1758	Europe	Fritsch, 1961 Lichard, 1962 Present study
<i>Carpodacus mexicanus</i> (Müller), 1766	Fr. Morocco México	Gaud, 1957 Present study
<i>Coccothraustes coccothraustes</i> (L.), 1758	Europe	Lichard, 1962
<i>Fringilla coelebs</i> L., 1758	Europe	Vitzthum, 1922 <i>b</i> Gaud, 1957
<i>Serinus canaria</i> (L.), 1758	Fr. Morocco	Gaud, 1957
<i>Serinus serinus</i> (L.), 1766	United States	Present study

Proctophyllodes sylviae Gaud

Proctophyllodes sylviae Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37: 124–125, fig. 7G. Type host: *Sylvia atricapilla* (Sylviidae).

Four closely allied species have increasingly larger lamellae: *Proctophyllodes clavatus*, 45 μ x 30 μ ; *P. occidentalis*, new species, and *P. calamospizae*, new species, 60 μ x 40 μ ; and *P. sylviae*, 85 μ x 50 μ . The hosts on which these species are found are for the most part in different families of birds: *P. clavatus* and *P. sylviae* are found on Sylviidae, *P. occidentalis* on Corvidae, and *P. calamospizae* or Fringillidae. Differences in the genital and opisthogastric regions of the males and in the terminal portions of the females separate these morphologically similar species.

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FIGS. 167, 168. *Proctophyllodes sylviae* Gaud: paratype male (167), paratype female (168).

MALE (paratype). Length, excluding lamellae, 318 μ ; width, 148 μ . *Dorsal idiosoma*: Propodosomal shield 79 μ in length, 84 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 57 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 16.6 μ in length, 4.1 μ in width. Hysterosomal shield 169 μ in length, 90 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 47 μ in length. Lamellae 86 μ in length, 48 μ in width, oblong, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level of anterior articulations of legs IV; genital sheath expanded and extending to anterior opisthogastric setae; measurements: *a*, 12.4 μ ; *b*, 6.9 μ ; *c*, 25.5 μ ; *d*, 104 μ ; *e*, 47 μ x 13.8 μ at $\frac{1}{3}$ length. Adanal discs each about 21 μ x 10 μ and bearing 24 teeth.

FEMALE (paratype). Length, excluding terminal appendages, 455 μ ; width, 160 μ . *Dorsal idiosoma*: Propodosomal shield 90 μ in length, 101 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 73 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.0 μ in

length, 5.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 227 μ in length, 88 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 62 μ in length; setae d_4 inserted on conjunctiva and separated by 29 μ ; lobes normal; cleft doubly-concave, 45 μ in length, 9 μ in width at narrowest portion; setae d_5 $\frac{5}{6}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields.

Type material. From *Sylvia atricapilla* (Sylviidae), Rabat region, French Morocco: holotype δ (Gaud), allotype ♀ (Gaud), 6 δ δ , 12 ♀ ♀ paratypes, Rabat, February, 1951, J. Gaud; 8 δ δ , 3 ♀ ♀ paratypes, Khemisset, February, 1949, J. Gaud. Paratypes deposited: Gaud.

Material examined. Sylviidae: 3 δ δ , 4 ♀ ♀ (paratypes) and 17 δ δ , 17 ♀ ♀ , from *Sylvia atricapilla*, French Morocco, Bulgaria.

Remarks. The redescription and drawings are based on paratypes from Rabat.

HOSTS

Sylviidae		
<i>Sylvia atricapilla</i> (L.), 1758	Fr. Morocco	Gaud, 1957 Present study
	Europe	Present study
<i>Sylvia melanocephala</i> (Gmelin), 1789	Fr. Morocco	Gaud, 1957

Proctophyllodes pachycaulus Gaud and Mouchet

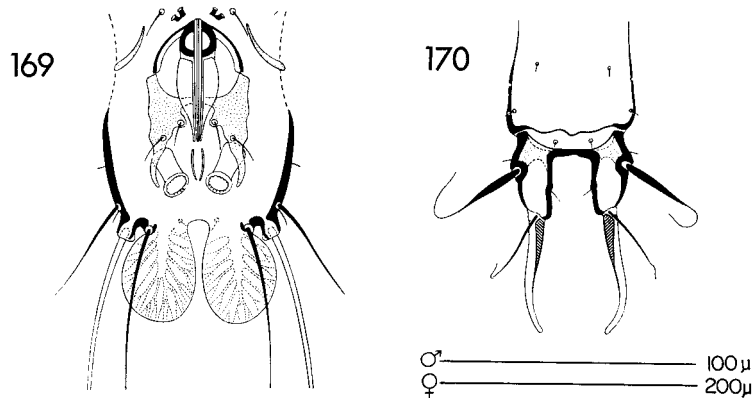
Proctophyllodes pachycaulus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32: 511, figs. 8C, 9C. Type host: *Chlorocichla simplex* (Pycnonotidae).

Proctophyllodes pachycaulus, Gaud and Till, 1961, Publ. So. Afr. Inst. Med. Res., 11 (L): 251.

The characteristic enlargement of the genital sheath attains the ultimate expansion in *Proctophyllodes pachycaulus*. At the widest portion, the sheath is 16 μ in width; in similar species, the sheath is less than 14 μ in width.

MALE (paratype). Length, excluding lamellae, 277 μ ; width, 122 μ . *Dorsal idiosoma*: Propodosomal shield 68 μ in length, 68 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 50 μ . Humeral

The Feather Mite Genus *Proctophyllodes*



FIGS. 169, 170. *Proctophyllodes pachycaulus* Gaud and Mouchet: paratype male (166), paratype female (167).

shields weakly developed and not bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 18.0μ in length, 4.1μ in width. Hysterosomal shield 150μ in length, 73μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 28μ in length. Lamellae 37μ in length, 28μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level of anterior articulations of legs IV; genital sheath expanded and extending to or slightly beyond posterior opisthogastric setae; measurements: a , 11.0μ ; b , 6.2μ ; c , 25.5μ ; d , 79μ ; e , $46\mu \times 15.9\mu$ at $\frac{1}{3}$ length. Adanal discs each about $14\mu \times 8\mu$ and bearing 24 teeth.

FEMALE (paratype). Length, excluding terminal appendages, 415μ ; width, 140μ . *Dorsal idiosoma*: Propodosomal shield 78μ in length, 84μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 62μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.6μ in length, 4.8μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 197μ in length, 78μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 59μ in length; setae d_4 inserted on conjunctiva and separated by 27μ ; lobes normal; cleft parallel-sided, 45μ in length, 28μ in width; setae

d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Chlorocichla simplex* (Pycnonotidae): holotype ♂ (Gaud), allotype ♀ (Gaud), 8 ♂♂, 8 ♀♀ paratypes (Gaud), Yaoundé, Nyong et Sanaga region, French Cameroons, August, 1955, J. Mouchet.

Material examined. Pycnonotidae: 2 ♂♂, 3 ♀♀ (paratypes), from *Chlorocichla simplex*, French Cameroons. Muscicapidae: 6 ♂♂, 4 ♀♀, from *Parisoma subcaeruleum*, Bechuanaland.

Remarks. The species has been collected only twice: the type series and the Bechuanaland series. The redescription and drawings are based on the paratypes.

HOSTS

Pycnonotidae		
<i>Chlorocichla simplex</i> (Hartlaub), 1855 (= <i>Pyrrhurus simplex</i>)	Fr. Cameroons	Gaud & Mouchet, 1957 Gaud & Till, 1961 Present study
Muscicapidae		
<i>Parisoma subcaeruleum</i> (Vieillot), 1817	Bechuanaland	Present study

Proctophyllodes clavatus Fritsch

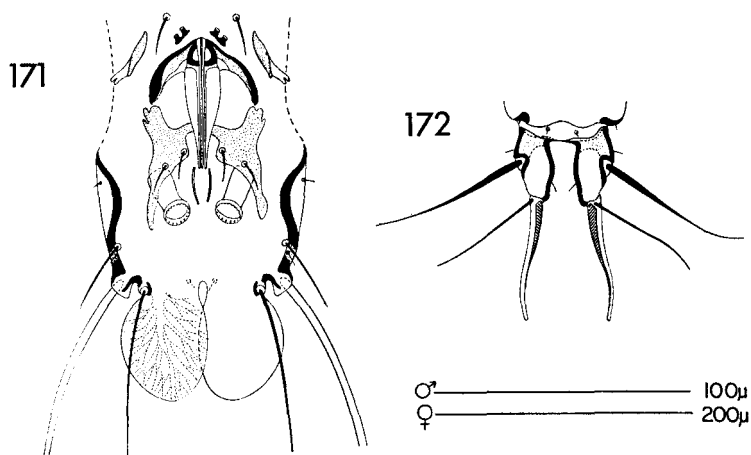
Proctophyllodes clavatus Fritsch, 1961, Z. Parasitenk., 21: 10–12, figs. 6, 7a–b, 8. Type host: *Sylvia curruca* (Sylviidae).

Proctophyllodes robustipennis Černý, 1961, Acarologia, 3(4):601–602, fig. 2. (New synonymy).

Of the species of *Proctophyllodes* having weakly expanded genital sheaths, the males of *P. clavatus* have the shortest lamellae. These structures measure approximately 45 μ in length and 30 μ in width at their broadest level.

MALE. Length, excluding lamellae, 314 μ ; width, 143 μ . *Dorsal idiosoma*: Propodosomal shield 77 μ in length, 86 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 59 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 16.6 μ in length, 2.1 μ in width. Hysterosomal shield 150 μ in length, 85 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 36 μ in length. Lamellae 43 μ in length, 31 μ in width,

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FIGS. 171, 172. *Proctophyllodes clavatus* Fritsch: male (171) and female (172) from *Sylvia nisoria*.

ovoid, internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad, strong connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level of anterior articulations of legs IV; genital sheath expanded and extending to posterior opisthogastric setae; measurements: *a*, 14.5 μ ; *b*, 5.5 μ ; *c*, 29.7 μ ; *d*, 92 μ ; *e*, 46 μ x 13.8 μ at $\frac{1}{4}$ length. Adanal discs each about 18 μ x 8 μ and bearing 20 teeth.

FEMALE. Length, excluding terminal appendages, 423 μ ; width, 151 μ . *Dorsal idiosoma*: Propodosomal shield 88 μ in length, 101 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 69 μ . Humeral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 20.7 μ in length, 3.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 201 μ in length, 93 μ in width, with anterior margin shallowly concave or straight, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 55 μ in length; setae d_4 inserted on conjunctiva and separated by 21 μ ; lobes normal; cleft doubly-concave, 45 μ in length, 17 μ in width; setae d_5 approximately equal in length to terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields.

Type material. From *Sylvia curruca* (Sylviidae), Erlangen, Germany; type destroyed (personal communication, H. J. Stammer).

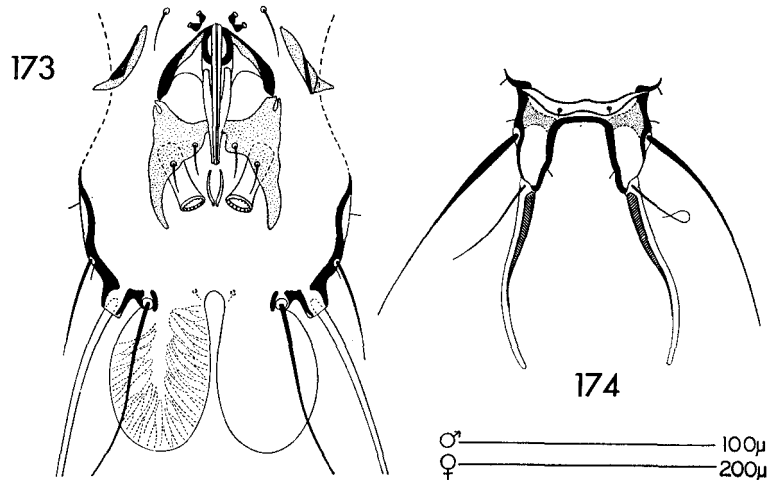
Material examined. Sylviidae: 1 ♂, 1 ♀, from *Sylvia nisoria*, Bulgaria; 1 ♂, 3 ♀♀, from *Acrocephalus schoenobaenus*, Bulgaria; 8 ♂♂, 17 ♀♀, from *Acrocephalus scirpaceus*, Bulgaria; 2 ♂♂, 3 ♀♀, from *Locustella luscinioides*, Bulgaria.

Remarks. The drawings and redescription are based on specimens taken from *Sylvia nisoria* in Bulgaria.

	HOSTS	
Sylviidae		
<i>Acrocephalus schoenobaenus</i> (L.), 1758	Europe	Present study
<i>Acrocephalus scirpaceus</i> (Hermann), 1804	Europe	Present study
<i>Locustella luscinioides</i> (Savi), 1824	Europe	Present study
<i>Sylvia curruca</i> (L.), 1758	Europe	Fritsch, 1961
<i>Sylvia nisoria</i> (Bechstein), 1795	Europe	Present study
Certhiidae		
<i>Certhia brachydactyla</i> Brehm, 1820	Europe	Fritsch, 1961

Proctophyllodes occidentalis, new species

This new species is closely related to *Proctophyllodes calamo-spizae*, new species. Distinction of these species is based upon measurements of the terminal cleft in females and relative insertions of anterior and posterior opisthogastric setae in the males. In



FIGS. 173, 174. *Proctophyllodes occidentalis*, new species: holotype male (173), allotype female (174).

The Feather Mite Genus Proctophyllodes

P. occidentalis the terminal cleft measures about $52\mu \times 38\mu$ and the males have the ratio of the distance between the opisthogastric setae approximating 1:2.5; in *P. calamospizae* the terminal cleft measures about $50\mu \times 21\mu$ and the setal ratio approximates 1:2.

MALE (holotype). Length, excluding lamellae, 328μ ; width, 165μ . *Dorsal idiosoma*: Propodosomal shield 83μ in length, 91μ in width; lateral margins incised posterior to external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 63μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 24.5μ in length, 3.5μ in width. Hysterosomal shield 177μ in length, 97μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 41μ in length. Lamellae 59μ in length, 38μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Genital discs joined; genital arch to level of anterior articulations of legs IV; genital sheath slightly expanded and extending to posterior opisthogastric setae; measurements: *a*, 13.8μ ; *b*, 6.9μ ; *c*, 32.4μ ; *d*, 102μ ; *e*, $54\mu \times 11.0\mu$ at base, 9.7μ at $\frac{1}{3}$ length. Adanal discs each about $24\mu \times 9\mu$ and bearing 20 teeth.

FEMALE (allotype). Length, excluding terminal appendages, 488μ ; width, 171μ . *Dorsal idiosoma*: Propodosomal shield 102μ in length, 124μ in width; lateral margins weakly incised posterior to external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 86μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 25.2μ in length, 4.2μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 346μ in length, 114μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 66μ in length; setae d_4 inserted on conjunctiva and separated by 37μ ; lobes normal; cleft divergent, 52μ in length, 38μ in width; setae d_5 $\frac{1}{2}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields.

Type material. From *Aphelocoma coerulescens* (Corvidae), Guerrero, México: holotype ♂ (NU), allotype ♀ (NU), 4 ♂♂, 7 ♀♀ paratypes, 15 kilometers south Chilpancingo, August 28, 1942, R. R. Rusche; paratypes: 21 ♂♂, 19 ♀♀, Almolonga, June 28, 1954.

J. Villanueva; 6 ♂♂, 6 ♀♀, 2.5 miles south Almolonga, June 28, 1954, K. L. Dixson. Paratypes deposited: André, BMNH, BAS, CAS, Gaud, MN, NU, Radford, RNH, SAIMR, SEA, USNM, ZSBS, ZSZM.

Additional material. Corvidae: 2 ♂♂, 3 ♀♀, from *Cyanocitta stelleri*, California, Alaska; 2 ♂♂, 1 ♀, from *Cyanocitta cristata*, Florida, Iowa. Tyrannidae (questionable record): 9 ♂♂, 2 ♀♀, from *Myiopagis viridicata*, México.

Remarks. The material from Tyrannidae and the paratypes collected by K. L. Dixson have the same collecting data. Contamination is possible or this might represent an example of a mite species infesting birds within the same geographical range; if the latter explanation is correct, the question remains as to whether or not the mites could become established. The name *occidentalis* is chosen as representative of the probable range of the species. The drawings are of the holotype and allotype.

HOSTS

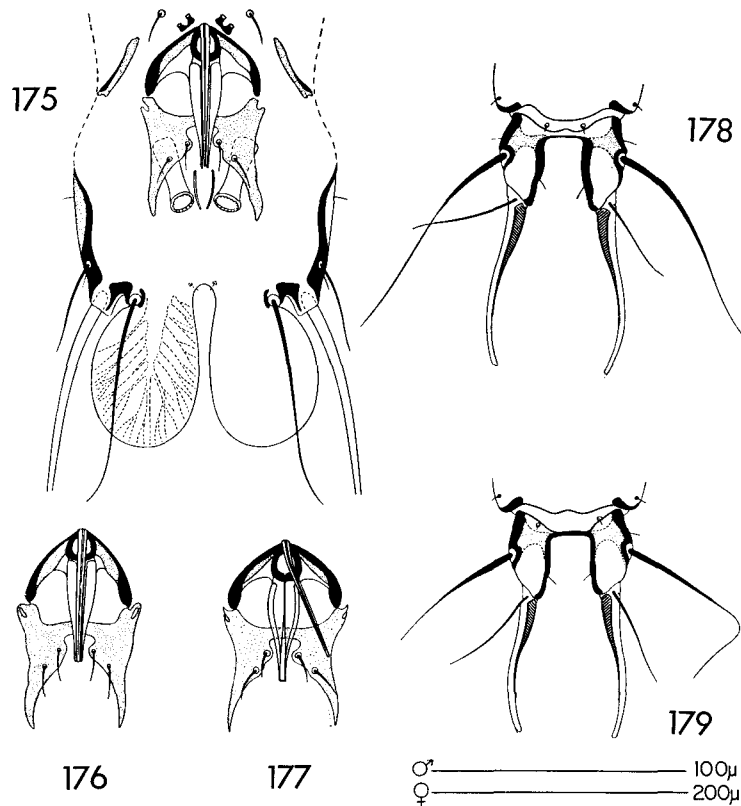
Corvidae		
<i>Aphelocoma coerulescens</i> (Bosc), 1795	México	Present study
<i>Cyanocitta cristata</i> (L.), 1758	United States	Present study
<i>Cyanocitta stelleri</i> (Gmelin), 1788	United States	Present study
Tyrannidae (Questionable record)		
<i>Myiopagis viridicata</i> (Vieillot) (= <i>Elaenia viridicata</i>)	México	Present study

Proctophyllodes calamospizae, new species

This new species, which is known only from one species of *Calamospiza* (Fringillidae) is most closely related to *Proctophyllodes occidentalis*, new species, which is known to occur on the Corvidae. The two species can be distinguished as follows: *P. calamospizae* has the terminal cleft of the females measuring about 50 μ x 21 μ and the males have the ratio of the distance between the setae of the anterior and posterior rows of opisthogastric setae approximating 1:2; *P. occidentalis* has the terminal cleft measuring about 52 μ x 38 μ and the males have the cited ratio of 1:2.5.

MALE (holotype). Length, excluding lamellae, 329 μ ; width, 154 μ . *Dorsal idiosoma*: Propodosomal shield 85 μ in length, 90 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 63 μ . Hum-

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FIGS. 175-179. *Proctophyllodes calamospizae*, new species: holotype male (175), paratype males (176, 177), allotype female (178), paratype female (179).

eral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 18.5μ in length, 2.5μ in width; anterior margin concave; without lacunae; without ventrolateral extensions; supranal concavity 40μ in length. Lamellae 60μ in length, 40μ in width, ovoid with inner margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Genital discs joined; genital arch to anterior articulations of legs IV; genital sheath expanded medially and extending slightly beyond posterior opistogastric setae; measurements: a , 11.7μ ; b , 6.2μ ; c , 24.2μ ; d , 100μ ; e , $54.5\mu \times 12.4\mu$ at base. Adanal discs each about $29\mu \times 7\mu$ and bearing 24 teeth.

FEMALE (allotype). Length, excluding terminal appendages,

491 μ ; width, 182 μ . *Dorsal idiosoma*: Propodosomal shield 102 μ in length, 117 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 82 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20 μ in length, 3.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 240 μ in length, 109 μ in width, with anterior margin concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 67 μ in length; setae d_4 inserted on conjunctiva and separated by 26 μ ; lobes normal; cleft parallel-sided, 50 μ in length, 21 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Calamospiza melanocorys* (Fringillidae): holotype δ (NU), allotype ♀ (NU), 1 δ , 8 ♀ paratypes, 7 miles southeast Lytle, Atascosa County, Texas, January 29, 1949, W. A. Thornton; 3 δ δ , 7 ♀ ♀ paratypes, King Ranch, Kleberg County, Texas, January 27, 1951, W. L. Thompson. Paratypes deposited: Gaud, NU, USNM.

Remarks. The name *calamospizae* is taken from the type host. The drawings are of the holotype (fig. 175), allotype (fig. 178) and paratypes.

HOSTS

Fringillidae		
<i>Calamospiza melanocorys</i> Stejneger, 1885	United States	Present study

Proctophyllodes orientalis Gaud

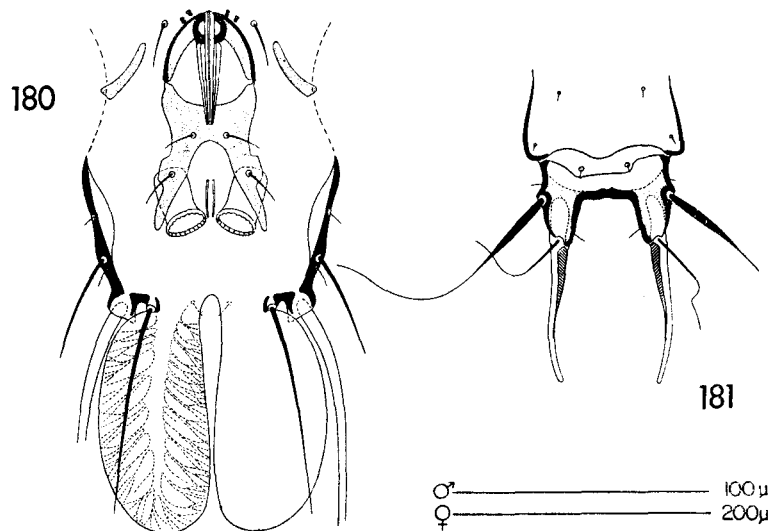
(?) *Proctophyllodes profusus*, Gaud and Petitot, 1948, Ann. Parasitol., 23(5-6): 341, fig. 3 and pl. XI, fig. 9.

Proctophyllodes orientalis Gaud, 1953, Ann. Parasitol. hum. comp., 28(3): 221. Type host: *Passer montanus* (Ploceidae).

Proctophyllodes orientalis is the only known species of the *pinnatus* complex in which the posterior margin of the opisthogastric shield is entire and the lamellae are more than 85 μ in length.

MALE (paratype). Length, excluding lamellae, 313 μ ; width, 140 μ . *Dorsal idiosoma*: Propodosomal shield 84 μ in length, 97 μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 68 μ . Hum-

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FIGS. 180, 181. *Proctophyllodes orientalis* Gaud: paratype male (180), paratype female (181).

eral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.6μ in length, 4.8μ in width. Hysterosomal shield 180μ in length, 98μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 44μ in length. Lamellae 90μ in length, 40μ in width, oblong, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Genital discs not united; genital arch to level midway between legs III and IV; genital sheath tapering and extending almost to anterior opisthogastric setae; measurements: a , 11.7μ ; b , 14.5μ ; c , 29.7μ ; d , 111μ ; e , 45μ in length. Adanal discs each about $24\mu \times 13\mu$ and bearing 24 teeth.

FEMALE (paratype). Length, excluding terminal appendages, 440μ ; width, 175μ . *Dorsal idiosoma*: Propodosomal shield 97μ in length, 112μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 77μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 21.4μ in length, 6.2μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 213μ in length, 105μ in width, with anterior margin shallowly concave; without lacunae; without supra-

nal concavity. Lobar region articulated with anterior shield; 61μ in length; setae d_4 inserted on conjunctiva and separated by 34μ ; lobes short; cleft slightly divergent, 34μ in length, 41μ in width; setae d_5 $\frac{2}{3}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Passer montanus* (Ploceidae): holotype δ (Gaud), allotype ♀ (Gaud), 16 $\delta\delta$, 12 ♀♀ paratypes (Gaud, NU), Nhatrang, Annam, Vietnam, February, 1953, J. Gaud.

Material examined. Ploceidae: 5 $\delta\delta$, 5 ♀♀ , (paratypes), from *Passer montanus*, Vietnam.

Remarks. This species was originally described in a footnote (Gaud, 1953); a statement was made that the species was closely related to *Proctophyllodes pinnatus* and had been collected from *Passer montanus* in Indochina. Previously Gaud and Petitot (1948) had figured the genital and opisthogastric regions and included a photomicrograph of a male from *Passer montanus* from Indochina. Even though the description of the species was extremely short, there is little question as to the species of mite that was being named. The drawings and redescription are based on paratypes.

HOSTS

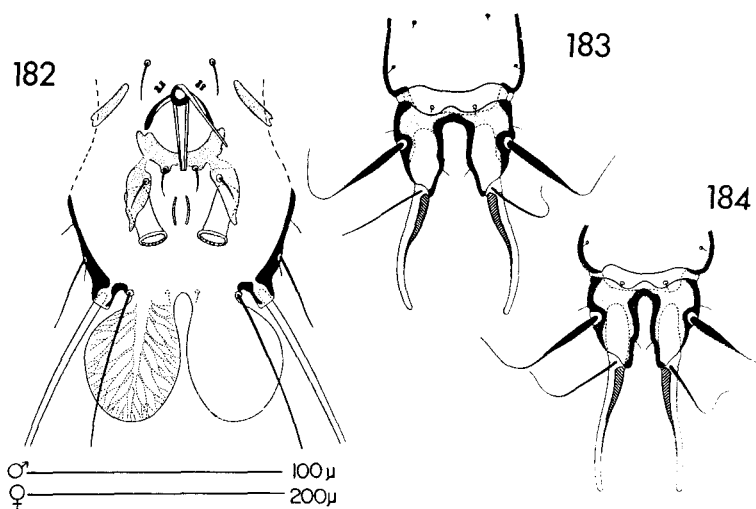
Ploceidae		
<i>Passer montanus</i> (L.), 1758	Vietnam	Gaud & Petitot, 1948 Gaud, 1953 Present study
<i>Passer domesticus</i> (L.), 1758	La Réunion, Indian Ocean	Gaud, 1953

Proctophyllodes schoenicli, new species

Proctophyllodes schoenicli, new species, and *P. poublani* each have the opisthogastric region composed of three weakly connected shields as illustrated. The genital organ and genital arch of the new species are fragile when compared to the same structures in *P. poublani*. An additional and easily recognizable difference is the length to width ratio of the terminal cleft of the female: approximately 1:1 in *P. poublani* and 5:1 in *P. schoenicli*.

MALE (holotype). Length, excluding lamellae, 293μ ; width, 141μ . *Dorsal idiosoma*: Propodosomal shield 77μ in length, 77μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 55μ . Humeral shields weakly developed and not bearing setae l_1 at extreme

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FIGS. 182-184. *Proctophyllodes schoenieli*, new species: holotype male (182), allotype female (183), paratype female (184).

anteromedial angles; subhumeral setae lanceolate, 15.9 μ in length, 3.5 μ in width. Hysterosomal shield 152 μ in length, 77 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 35 μ in length. Lamellae 48 μ in length, 36 μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level of anterior articulations of legs IV; genital sheath tapering and extending to anterior opisthogastric setae; measurements: *a*, 11.0 μ ; *b*, 4.1 μ ; *c*, 26.2 μ ; *d*, 73 μ ; *e*, 32.4 μ x 6.9 μ . Adanal discs each about 21 μ x 9 μ and bearing 20 teeth.

FEMALE (allotype). Length, excluding terminal appendages, 436 μ ; width, 168 μ . *Dorsal idiosoma*: Propodosomal shield 90 μ in length, 99 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 56 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 19.3 μ in length, 3.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 207 μ in length, 93 μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 62 μ in length; setae d_4 inserted on conjunctiva and separated by 31 μ ;

lobes normal; cleft slightly divergent, 55μ in length, 10μ in width; setae d_5 approximately equal length of terminal appendages. Spermatheca as in *pinnatus*. Ventral idiosoma: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Emberiza schoeniclus* (Fringillidae): holotype ♂ (BMNH), allotype ♀ (BMNH), 1 ♀ paratype (BMNH), Great Budworth, Cheshire, England, April 15, 1934, A. W. Boyd.

Remarks. The name of this new species is based on the specific name of the host. The drawings are of the holotype (fig. 182), allotype (fig. 183) and a female paratype.

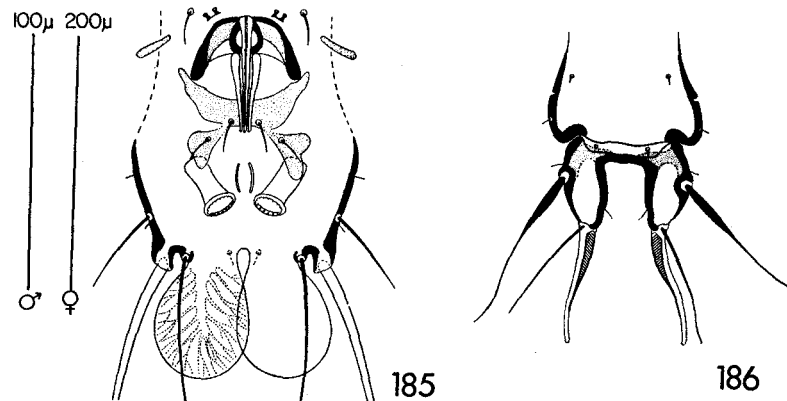
HOSTS

Fringillidae		
<i>Emberiza schoeniclus</i> (L.),	Europe	Present study
1758		

Proctophyllodes poublani Gaud

Proctophyllodes poublani Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37: 123-124, fig. 7E. Type host: *Anthus trivialis* (Motacillidae).

The strongly developed genital arch and the peculiar modification of the opisthogastric shield distinguish *Proctophyllodes poublani* from the similar species, *P. schoenici*, new species. In addition, the width of the terminal cleft of the female is approximately square in this species while in *P. schoenici*, it is about 10μ in width and 50μ in length.



FIGS. 185, 186. *Proctophyllodes poublani* Gaud: paratype male (185), paratype female (186).

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MALE (paratype). Length, excluding lamellae, 267 μ ; width, 98 μ . *Dorsal idiosoma*: Propodosomal shield 73 μ in length, 76 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 55 μ . Humeral shields weakly developed and not bearing setae l_1 (?) at extreme anteromedial angles; subhumeral setae lanceolate, 15.2 μ in length, 3.5 μ in width. Hysterosomal shield 84 μ in length, 76 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 37 μ in length. Lamellae 43 μ in length, 35 μ in width, ovoid, internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level of anterior articulations of legs IV; genital sheath slightly expanded and extending almost to posterior opisthogastric setae; measurements: *a*, 11.0 μ ; *b*, 10.4 μ ; *c*, 26.2 μ ; *d*, 90 μ ; *e*, 44 μ x 11.8 μ . Adanal discs each about 18 μ x 9 μ and bearing 18 teeth.

FEMALE (paratype). Length, excluding terminal appendages, 425 μ ; width, 150 μ . *Dorsal idiosoma*: Propodosomal shield 92 μ in length, 104 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 77 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 19.3 μ in length, 4.8 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 210 μ in length, 90 μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 59 μ in length; setae d_4 inserted on conjunctiva and separated by 38 μ ; lobes normal; cleft doubly-concave, 48 μ in length, 28 μ in width; setae d_5 approximately equal to length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Anthus trivialis* (Motacillidae): holotype δ (Gaud), allotype ♀ (Gaud), 3 δ δ , 10 ♀ ♀ paratypes (Gaud), Ouarazate, Marrakesh region, French Morocco, February, 1948, J. Gaud.

Material examined. Motacillidae: 1 δ , 3 ♀ ♀ (paratypes), from *Anthus trivialis*, French Morocco.

Remarks. In the original description, Gaud (1957) illustrates and states that the opisthogastric region has three shields, one con-

necting the tips of the genital arch and two small posterolateral shields bearing the posterior opisthogastric setae. The paratype male examined in the present study has weak connections between the various units of the opisthogastric regions—connections that would be difficult to discern without phase microscopy. The drawings and redescription are based on paratypes.

HOSTS

Motacillidae		
<i>Anthus trivialis</i> (L.), 1758	Fr. Morocco	Gaud, 1957 Present study

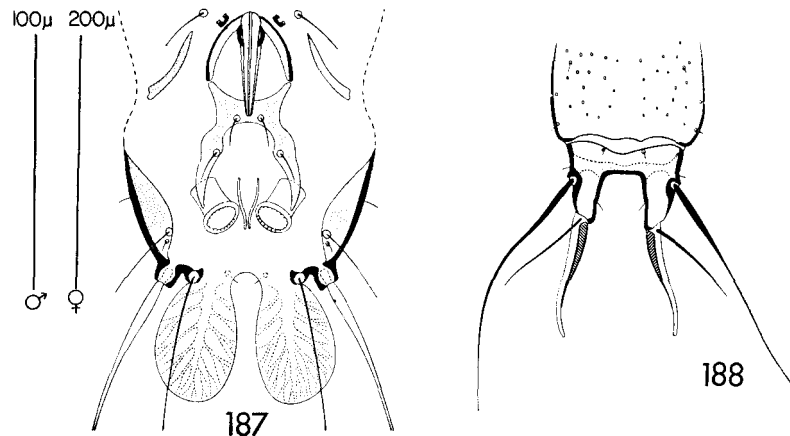
Proctophyllodes africanus Gaud

Proctophyllodes africanus Gaud, 1953, Ann. Parasitol. hum. comp., 28: 198, fig. 3. Type host: *Passer griseus* (Ploceidae).

Proctophyllodes africanus, Gaud & Till, 1961, Publ. So. Afr. Inst. Med. Res., 11(L): 249.

This is a distinctive species in that the genital region of the male is unlike other related species: widely separated rows of opisthogastric setae, short distance between the apex of the genital arch and the origins of the lamellae, short adanal discs, and an oddly shaped opisthogastric shield. The lamellae of the males are similar to those of *Proctophyllodes euryurus*, new species, but the named features are sufficient to distinguish the two species.

MALE (paratype). Length, excluding lamellae, 316 μ ; width, 155 μ . Dorsal idiosoma: Propodosomal shield 81 μ in length, 99 μ in



FIGS. 187, 188. *Proctophyllodes africanus* Gaud: paratype male (187), paratype female (188).

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width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 66 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.6 μ in length, 3.5 μ in width. Hysterosomal shield 179 μ in length, 104 μ in width; anterior margin straight; without lacunae; without ventrolateral extensions, but dorsal shield extends to ventral surface; supranal concavity 40 μ in length. Lamellae 57 μ in length, 35 μ in width, ovoid, internal margins not overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level of anterior articulations of legs IV; genital sheath tapering and extending to anterior opisthogastric setae; measurements: *a*, 11.0 μ ; *b*, 12.4 μ ; *c*, 29.0 μ ; *d*, 95 μ ; *e*, 40 μ x 10.4 μ at base. Adanal discs each about 17 μ x 10 μ and bearing 18 teeth.

FEMALE (paratype). Length, excluding terminal appendages, 455 μ ; width, 187 μ . *Dorsal idiosoma*: Propodosomal shield 97 μ in length, 113 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 84 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 21.4 μ in length, 4.8 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 214 μ in length, 124 μ in width, with anterior margin straight, with small lacunae on posterior half; without supranal concavity. Lobar region articulated with anterior shield; 66 μ in length; setae d_4 inserted on anterior margin of lobar shield and separated by 28 μ ; lobes narrow; cleft slightly divergent, 45 μ in length, 31 μ in width; setae d_5 approximately equal length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Passer griseus* (Ploceidae): holotype δ (Gaud), allotype φ (Gaud), 13 δ δ , 13 φ φ , Bougouni, Sudan, French West Africa, October, 1950, J. Gaud; 3 δ δ , 2 φ φ paratypes, Bos-sangoa, Oubangui-Chari, French Equatorial Africa, July, 1951, J. Gaud. Paratypes deposited: Gaud, NU.

Material examined. Fringillidae: 3 δ δ , 2 φ φ (paratypes), French Equatorial Africa.

Remarks. Gaud's figure (1953) shows a more massive opisthogastric shield than the current illustration. The shield, as depicted

by Gaud, has straight lateral margins from the tips of the genital arch to the level of the anterior opisthogastric setae; at this point, the shield is expanded laterally, approximately the distance equal to that between the anterior setae. Furthermore, the posterior margin anterior to the caudal row of setae is in the form of a square rather than an arch as illustrated by the present authors. The specimens examined show that the opisthogastric shield between the anterior and posterior opisthogastric setae may be narrow and more weakly sclerotized than the remainder of the shield.

The ventrolateral hysterosomal shields which are continuations of the dorsal shield are illustrated as being well developed. This may be due to mounting, etc. The drawings and redescription are based on paratypes from French Equatorial Africa.

HOSTS

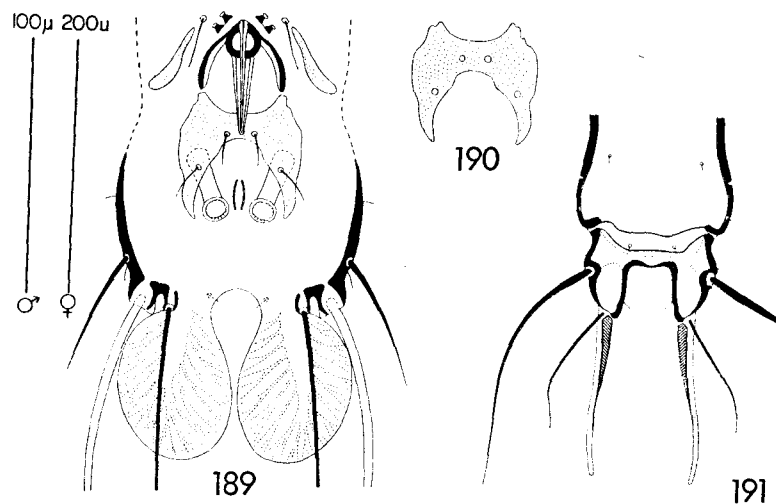
Ploceidae		
<i>Passer griseus</i> (Vieillot), 1817	Fr. West Africa Fr. Equatorial Africa	Gaud, 1953 Gaud, 1953 Gaud & Till, 1961 Present study
Fringillidae		
<i>Hypochoera</i> sp.	Fr. Cameroons Fr. West Africa	Gaud, 1953 Gaud, 1953

Proctophyllodes euryurus, new species

The opisthogastric shield of *Proctophyllodes euryurus*, new species, is similar to that of *P. miliariae* in that the structure is much wider at midlength than at the connections to the genital arch. However, in *P. miliariae*, the posterior margin of the shield is incised between the anterior opisthogastric setae rather than entire and the lamellae are approximate at their origins rather than distant.

MALE (holotype). Length, excluding lamellae, 309 μ ; width, 143 μ . *Dorsal idiosoma*: Propodosomal shield 86 μ in length, 97 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 61 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.1 μ in length, 2.8 μ in width. Hysterosomal shield 173 μ in length, 95 μ in width; anterior margin strongly concave; with few small lacunae; without ventrolateral extensions; supranal concavity 33 μ in length. Lamellae 64 μ in length, 43 μ in width, ovoid, distant at origins, approximate at $\frac{3}{4}$ length, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I narrow U-shaped with weak connective, without lateral

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FIGS. 189-191. *Proctophyllodes euryurus*, new species: holotype male (189), paratype female (191).

extensions; epimerites without surface fields. Genital discs united; genital arch to level of anterior articulations of legs IV; genital sheath tapering and extending to anterior opisthogastric setae; measurements: *a*, 9.0 μ ; *b*, 13.1 μ ; *c*, 29.0 μ ; *d*, 106 μ ; *e*, 43 μ x 9.7 μ at base. Adanal discs each about 23 μ x 9 μ and bearing 23 teeth.

FEMALE (allotype). Length, excluding terminal appendages, 463 μ ; width, 158 μ . *Dorsal idiosoma*: Propodosomal shield 102 μ in length, 114 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 77 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate or slightly rounded, 24.9 μ in length, 4.1 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 228 μ in length, 108 μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 54 μ in length; setae d_4 inserted on conjunctiva and separated by 33 μ ; lobes normal; cleft slightly divergent or doubly-concave, 41 μ in length, 35 μ in width; setae d_5 $\frac{5}{6}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Alauda arvensis* (Alaudidae): holotype δ (Gaud), allotype ♀ (Gaud), 15 $\delta\delta$, 14 ♀♀ paratypes, Amsterdam Zoo, the Netherlands, October, 1953; paratypes: 21 $\delta\delta$, 18 ♀♀ ,

Netherlands, October, 1953; 2 ♂♂, Norfolk, England, E. Spinks; 21 ♂♂, 10 ♀♀, Nantes, Loire atlantique, France, February, 1963, J. Gaud. Paratypes deposited: Gaud, NU, Radford.

Additional material. Turdidae: 8 ♂♂, 10 ♀♀, from *Turdus musicus*, Netherlands; 6 ♂♂, 12 ♀♀, from *Turdus merula*, Netherlands.

Remarks. The material from Turdidae was collected at the same time and at the same localities as the paratype series from the Netherlands. As collections from the hosts—*Alauda arvensis*, *Turdus musicus*, and *T. merula*—are extensive, it may be assumed that the new species of *Proctophyllodes* occurs on members of two families of birds. The name *euryurus*, meaning broad tail, was selected by Dr. J. Gaud, who recognized this form as a new species. The drawings are of the holotype (fig. 189), allotype (fig. 191) and a male paratype.

HOSTS

Alaudidae		
<i>Alauda arvensis</i> L., 1758	Europe	Present study
Turdidae		
<i>Turdus merula</i> L., 1758	Europe	Present study
<i>Turdus musicus</i> L., 1758	Europe	Present study

Proctophyllodes polyandrius Vitzthum

Proctophyllodes polyandrius Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 79–81, figs. 73–74. Type host: *Lanius excubitor* (Laniidae).

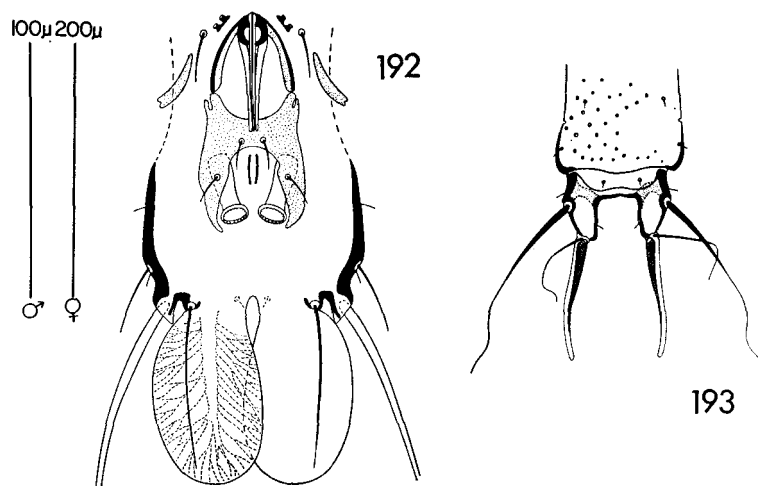
Proctophyllodes polyandrius, Fritsch, 1954, Mikrokosmos, 44(1): 4, fig. 3.

Proctophyllodes polyandrius, Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37: 123.

Proctophyllodes polyandrius, Fritsch, 1961, Z. Parasitenk., 21: 15–16, figs. 11, 12 a–c.

Although difficult to describe, the highly arched genital arch, as shown in figure 192 and by Vitzthum (1922b), is characteristic of this species. Only a few species in the *pinnatus* complex have the opisthogastric shield entire on the posterior margin, and of these only *Proctophyllodes polyandrius* and *P. euryurus*, new species, have the adanal discs with long cylinders. The former species has

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FIGS. 192, 193. *Proctophyllodes polyandrius* Vitzthum: male (192) and female (193) from *Lanius excubitor*.

the lamellae approximate at their origins; the latter species, *P. euryurus*, has the lamellae well separated at their origins.

MALE. Length, excluding lamellae, 320 μ ; width, 155 μ . *Dorsal idiosoma*: Propodosomal shield 77 μ in length, 90 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 62 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7 μ in length, 2.1 μ in width. Hysterosomal shield 176 μ in length, 97 μ in width; anterior margin shallowly concave; with small lacunae; without ventrolateral extensions; supranal concavity 39 μ in length. Lamellae 60 μ in length, 36 μ in width, oblong, internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Genital discs united; genital arch to level almost to posterior articulations of legs III; genital sheath tapering and extending almost to anterior opisthogastric setae; measurements: *a*, 7.6 μ ; *b*, 11.7 μ ; *c*, 27.6 μ ; *d*, 110 μ ; *e*, 46 μ x 10.4 μ at base. Adanal discs each about 19 μ x 8 μ and bearing 20 teeth.

FEMALE. Length, excluding terminal appendages, 445 μ ; width, 155 μ . *Dorsal idiosoma*: Propodosomal shield 95 μ in length, 104 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 73 μ . Humeral shields well developed and bearing setae l_1 at extreme antero-

medial angles; subhumeral setae lanceolate, 20.7 μ in length, 3.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 235 μ in length, 105 μ in width, with anterior margin shallowly concave, without lacunae, without supranal concavity. Lobar region articulated with anterior shield; 54 μ in length; setae d_4 inserted on conjunctiva and separated by 28 μ ; lobes normal; cleft parallel-sided, 32 μ in length, 32 μ in width, setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Lanius excubitor* (Laniidae); location of type unknown.

Material examined. Laniidae: 28 ♂♂, 13 ♀♀, from *Lanius excubitor*, Bulgaria, Yugoslavia.

Remarks. From the host records, it might be concluded that *Proctophyllodes polyandrius* is host specific on *Lanius excubitor*. The drawings and redescription are based on specimens from Bulgaria.

HOSTS

Laniidae		
<i>Lanius excubitor</i> L., 1758	Europe	Vitzthum, 1922b Fritsch, 1961 Present study

Group VII—the *weigoldi* group

Any group defined only by lengths of genital organs is, by the nature of the morphological character, artificial. Among the species included, there are at least two recognizable species complexes, each containing a few species. A limited number of the remaining species not included in these complexes are more closely related to species assigned to other arbitrary groups rather than to the group under discussion. These relationships will be discussed under individual species.

Various forms of genital organs are displayed in this group; the most conspicuous differences are apparent in the structure of the genital sheaths. In most instances the width of the genital sheath barely exceeds the width of the penis and forms a trough-like supporting structure approximating the length of the penis. A second modification is a relatively broad genital sheath, again trough-like, but terminating well before the tip of the penis, e.g., *Proctophyllodes*

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attenuatus. The last conspicuous modification is in *P. scolopacinus* and *P. corvorum*; in these species the genital sheath is very broad, straight, and extends to the tip of the penis.

Pertinent characters for species differentiation, males:

1. Size, shape and venation of lamellae.
2. Development of opisthogastric shields; note especially differential sclerotization.
3. Shape of external ring of adanal discs.
4. Type of adanal accessory gland if present.
5. Length to width ratio of adanal discs.
6. Structure of the genital organ.

Pertinent characters for species differentiation, females:

1. Presence or absence of supranal concavity.
2. Development and shape of terminal cleft and terminal appendages.
3. Relative lengths of terminal appendages and setae d_5 .
4. Positions of setae d_4 .
5. Configuration of posterolateral margins of idiosoma.
6. Type of spermatheca.
7. Presence or absence of heavily sclerotized lateral hysterosomal bands.

Key to the species of group VII

1. Epimera I of both sexes joined in U or V..... 2
Epimera I of both sexes not joined..... *arcticus*, p. 205
2. Lamellae of male over 125 μ in length..... 3
Lamellae less than 105 μ in length..... 5
3. Lamellae widely separated at origins and not parallel-sided; opisthogastric shields weakly connected anterior to opisthogastric setae 4
Lamellae not widely separated at origins and parallel-sided (reniform); opisthogastric shields divided.....
..... *cyanerpis*, n. sp., p. 207
4. External ring of adanal discs ovoid; lateral margins of lamellae notched distally..... *elegans*, n. sp., p. 209
External ring of adanal discs circular; lateral margins of lamellae entire..... *ornatus*, n. sp., p. 212
5. Lamellae leaflike, widely separated at origins and overlapping distally 6
Lamellae leaflike or otherwise modified and origins approximate (if widely separated, lamellae small, not overlapping distally) 9

6. Lamellae approximately 50 μ in length; females with circular supranal concavity..... 7
 Lamellae approximately 75 μ in length; females without supranal concavity 8
7. Opisthogastric shields divided or weakly joined anterior to opisthogastric setae..... *mexicanus*, n. sp., p. 213
 Opisthogastric shields broadly joined from genital arch to level of posterior opisthogastric setae.... *coerebae*, n. sp., p. 215
8. Opisthogastric shields broadly joined from anterior margin to posterior opisthogastric setae; terminal cleft of female in form of an arch..... *cyclarhis*, n. sp., p. 217
 Opisthogastric shields joined from anterior margin to anterior opisthogastric setae; terminal cleft of female rectangular..... *cathari*, n. sp., p. 219
9. Males without adanal accessory glands..... 10
 Males with heavily sclerotized, reniform adanal accessory glands..... *habiae*, n. sp., p. 221
10. Lamellae less than 25 μ , widely separated, apically rounded; lateral margins of female hysterosoma straight, without usual constriction at level of lobar articulations, terminal cleft large and approximately square..... *anisogamus*, p. 223
 Males and females differently constructed..... 11
11. Lamellae triangular and less than 25 μ in length..... 12
 Lamellae triangular or leaflike and more than 25 μ in length (except *P. xenopis*)..... 13
12. Opisthogastric shields widely separated; females with long terminal cleft..... *batis*, n. sp., p. 225
 Opisthogastric shields weakly joined at level of anterior setae; females with vestigial lobes.... *psomocolacis*, n. sp., p. 227
13. Lamellae not triangular; opisthogastric shields divided or joined only anterior to posterior row of opisthogastric setae 14
 Lamellae triangular, about 75 μ in length; opisthogastric shields joined for posterior quarter..... *attenuatus*, p. 228
14. Opisthogastric region not uniformly sclerotized: there are apparently two small shields at the tips of the genital arch, two bearing the anterior setae, and two larger shields bearing the posterior pair of opisthogastric setae; genital organ thick and usually extending between adanal discs in slide preparations. Females with primary spermathecal duct about 65 μ in length and thick-walled..... 15
 Opisthogastric region with well-defined shields; genital

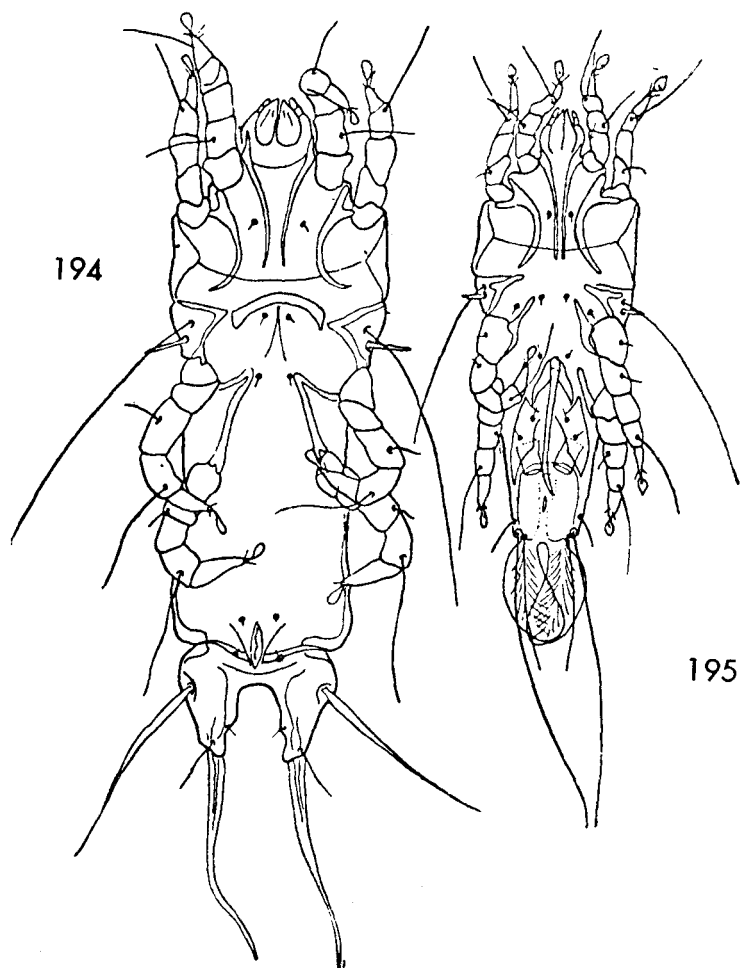
The Feather Mite Genus Proctophyllodes

- organ variously formed. Females with spermathecal duct longer and not thick-walled.....16
15. Females with supranal concavity and with vestigial hysterosomal lobes.....*corvorum*, p. 231
 Female without supranal concavity and with hysterosomal lobes*scolopacinus*, p. 233
16. Opisthogastric shields distinctly joined, the connection includes the insertions of the anterior opisthogastric setae...17
 Opisthogastric shields divided or if weakly joined, the insertions of the anterior opisthogastric setae are not included18
17. Female without dark lateral bands on hysterosomal shield*lordocaulus*, n. sp., p. 235
 Female with broad, dark lateral bands on hysterosomal shield.....*icteri*, n. sp., p. 237
18. Lobar shield not heavily sclerotized; terminal cleft square or rectangular and 15 μ or more in width at midlength.....19
 Lobar shield of female heavily sclerotized; terminal cleft narrow, about 7 μ in width at midlength.....*xenopsis*, n. sp., p. 240
19. Lamellae with pinnate venation; adanal discs less than two times longer than diameter; setae d_4 of female distant..... 20
 Lamellae with palmate venation; adanal discs two times longer than diameter; setae d_4 of female approximate.....
*weigoldi*, p. 241
20. Lamellae with length to width ratio, 4:3; adanal discs slightly longer than diameter; setae d_5 of female about as long as terminal appendages.....*orthocaulus*, p. 243
 Lamellae with length to width ratio, 2:1; adanal discs almost sessile, *i.e.*, cylinders extremely short; setae d_5 of female one-fourth length of terminal appendages.....
*diglossae*, n. sp., p. 245

Proctophyllodes arcticus Dubinin, provisional inclusion

Proctophyllodes arcticus Dubinin, 1952, Trav. Inst. Zool. Acad. Sci., U.S.S.R., 12: 261-262, fig. 6. Type host: *Anthus cervinus cervinus* (Motacillidae).

The separated epimerites I and the genital organ extending to the anterior margin of the anal orifice are unique. It is possible that epimerites I are weakly joined, and that this aspect was not distinguished by Dubinin. *Proctophyllodes arcticus* is the only species that the authors have been unable to study, hence a formal



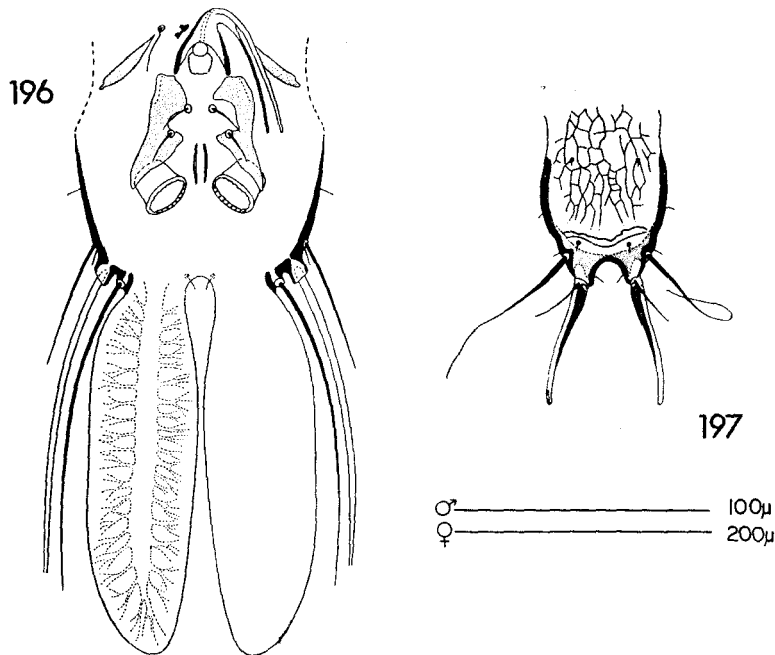
FIGS. 194, 195. *Proctophyllodes arcticus* Dubinin: female (194) and male (195) from Dubinin, 1952.

redescription is not presented. Dubinin's description is essentially a discussion of the mites as they are illustrated. The only pertinent information not included in the figures are the following measurements: male, 242 μ in length, 87 μ in width; female, 370–385 μ in length, 100–110 μ in width.

Type material. From *Anthus c. cervinus* (Motacillidae), Wrangel Island, W. Chukchi Sea, Khabarovsk Territory, Russian SFSR, July 6, 1938; location of type unknown.

Remarks. The series from which this species was described consisted of one male, two females and a tritonymph collected on July 6, 1938 and a male and a female collected from the type host on

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FIGS. 196, 197. *Proctophyllodes cyanerpis*, new species: holotype male (196), allotype female (197).

June 30, 1938 on the Chukchi peninsula. The illustrations are reproduced from Dubinin (1952).

HOSTS

Motacillidae
Anthus cervinus (Pallas), 1811 USSR Dubinin, 1952

Proctophyllodes cyanerpis, new species

The long, oar-shaped terminal lamellae are distinctive for the unique new species, *Proctophyllodes cyanerpis*; females have an indistinct and irregular reticulate pattern on the anterior hysterosomal shield.

MALE (holotype). Length, excluding lamellae, 269 μ ; width, 141 μ . Dorsal idiosoma: Propodosomal shield 75 μ in length, 85 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 63 μ . Humeral shields weakly developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 13.8 μ in length, 2.1 μ in width. Hysterosomal shield 159 μ in length, 92 μ in width; anterior

margin straight or shallowly convex; without lacunae; without ventrolateral extensions; supranal concavity 46μ in length. Lamellae 138μ in length, 41μ in width, long, parallel-sided, not overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, with lateral extensions; epimerites I with articulating surfaces heavily sclerotized and forming capitata structures, epimerites IV with distal triangular surface field. Pregenital apodeme absent; genital discs united; genital arch to level of posterior articulations of legs III; genital organ extending slightly beyond posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing one, or possibly two pairs of setae. Adanal discs circular, not measurable, length less than diameter and bearing approximately 24 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 340μ ; width, 153μ . *Dorsal idiosoma*: Propodosomal shield 86μ in length, 96μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 67μ . Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 19.3μ in length, 2.8μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 189μ in length, 101μ in width, with anterior margin shallowly concave, without lacunae, but with subcuticular reticulate pattern; without supranal concavity. Lobar region incompletely fused to anterior shield; 32μ in length; setae d_4 inserted on anterior portion of lobar shield and separated by 37μ ; lobes short; cleft in the form of an arch, 17μ in length; setae d_5 $1/2$ length of terminal appendages; setae l_5 longer than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes very well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Cyanerpes cyaneus* (Thraupidae): holotype ♂ (NU), allotype ♀ (NU), 1 ♂, 2 ♀♀ paratypes (NU), 9 miles northeast Santiago de Tuxtla, Veracruz, México, 1500', May 12, 1955, C. C. Lamb.

Remarks. The species is named for the genus of the type host. The drawings are of the holotype and allotype.

HOSTS

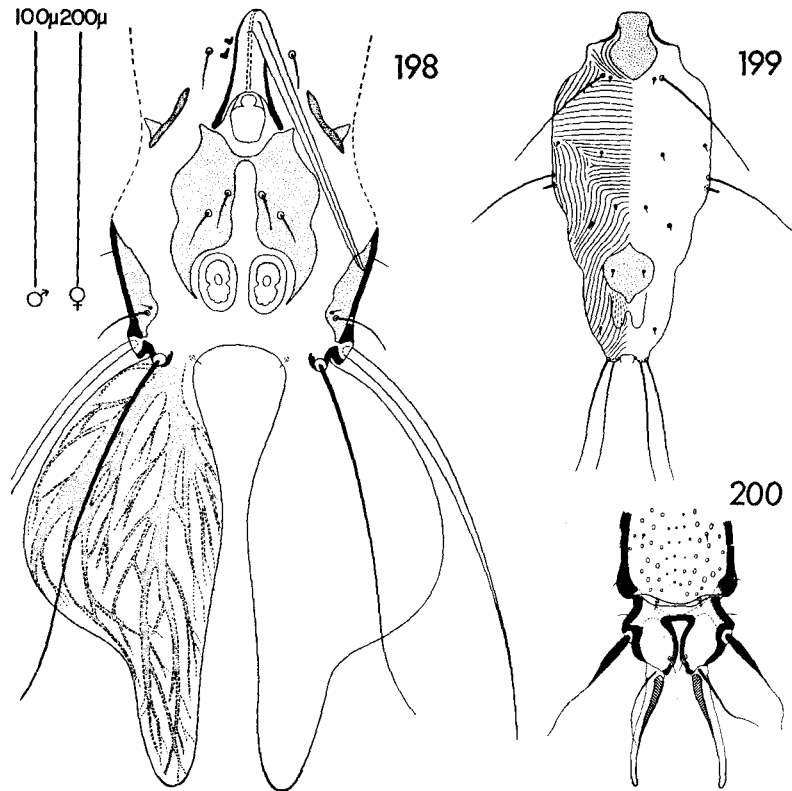
Thraupidae (= Coerebidae, in part)

Cyanerpes cyaneus
(L.), 1766

México

Present study

The Feather Mite Genus *Proctophyllodes*



FIGS. 198–200. *Proctophyllodes elegans*, new species: holotype male (198), tritonymph (199), allotype female (200).

Proctophyllodes elegans, new species

Large and elaborate terminal lamellae are found in the related *Proctophyllodes elegans*, new species, and *P. ornatus*, new species. These species can be distinguished not only by the shapes of the lamellae (see fig. 198 and fig. 201), but by the lengths of the genital organs and the shapes of the adanal discs. In *P. elegans*, the genital organ extends to the posterior margins of the oval adanal discs; in *P. ornatus*, the genital organ does not extend to the circular adanal discs.

MALE (holotype). Length, excluding lamellae, 293 μ ; width, 140 μ . *Dorsal idiosoma*: Propodosomal shield 76 μ in length, 91 μ in width; lateral margins entire; with lacunae; without external vertical setae; distance between external scapular setae, 59 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial

angles; subhumeral setae lanceolate, 15.2μ in length, 4.8μ in width. Hysterosomal shield 227μ in length, 107μ in width; anterior margin sinuous; with small lacunae; without ventrolateral extensions, although hysterosomal shield extends around margins of idiosoma to ventral surface; supranal concavity 41μ in length. Lamellae 162μ in length, 76μ in width, very broad, lateral margins extending beyond margin of idiosoma, distant at origins, may overlap near apices, with bifurcation of major stem, then modified pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I narrowly U-shaped with broad connective, with small lateral extensions; epimerites III and IIIa connected laterally by narrow surface band, IV and IVa with incomplete band between, I and II with narrow surface fields along their lengths. Pregenital apodeme absent; genital discs separate; genital organ reflexion to level midway between anterior and posterior articulations of legs III; genital organ extending to adanal discs; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields large, weakly connected by narrow bridge at extreme anterior margins and bearing two pairs of setae. Adanal discs oval, non-measurable for length, oval external ring $21\mu \times 15\mu$ and bearing approximately 12 small teeth on anterior half, 6 larger teeth on posterior half; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 400μ ; width, 146μ . *Dorsal idiosoma*: Propodosomal shield 90μ in length, 108μ in width; lateral margins entire; with large and small lacunae; without external vertical setae; distance between external scapular setae, 70μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7μ in length, 5.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 201μ in length, 107μ in width, with anterior margin sinuous, with lacunae; without supranal concavity. Lobar region articulated with anterior shield; 55μ in length; setae d_4 inserted on conjunctiva and separated by 30μ ; lobes broad; cleft doubly concave, inner margins almost touching, 60μ in length; setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_5 slightly longer than terminal appendages. Spermatheca with secondary ducts long, anterior portion of primary duct wide. *Ventral idiosoma*: Apodemes well developed; epimerites I narrow U-shaped with strong connective, with small lateral extensions; epimerites IVa fan-shaped, epimerites I and II with narrow surface fields along their lengths.

Type material. From *Muscicapa sundara* (Muscicapidae), Malaya: holotype δ (NU), allotype ♀ (NU), 2 ♀ paratypes, Rantau

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Panjang, Selangor, May 2, 1951; paratypes: 2 ♂♂, 2 ♀♀, December 14, 1961 and 1 ♂, 4 ♀♀, November 24, 1961, Mt. Brinchang, Pahang. Paratypes deposited: Gaud, NU, USNM.

Remarks. This species is named *elegans* for the spectacular terminal lamellae of the male. The drawings are of the holotype, allotype, and a tritonymph.

HOSTS

Muscicapidae

Muscicapa sundara
(Hodgson)

Malaya

Present study

Proctophyllodes ornatus, new species

The huge lamellae, widely separated at their origins and overlapping at their apices, are unique. The genital organ which extends to the posterior row of opisthogastric setae also distinguishes *Proctophyllodes ornatus*, new species, from the related *P. elegans*, new species, in which the genital organ extends to the posterior margins of the adanal discs.

MALE (holotype). Length, excluding lamellae, 349 μ ; width, 171 μ . *Dorsal idiosoma*: Propodosomal shield 97 μ in length, 99 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 73 μ . Humeral shields well developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae missing. Hysterosomal shield 207 μ in length, 117 μ in width; anterior margin shallowly concave; without lacunae; with external ventrolateral extensions; supranal concavity 48 μ in length. Lamellae 207 μ in length, 69 μ in width, elongate, triangular, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites IIIa with triangular surface field at distal ends. Pregenital apodeme absent; genital discs joined; genital organ reflexion to level midway between legs III and IV; genital organ extending to posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields weakly joined and bearing two pairs of setae. Adanal discs circular, each about 12 μ x 14 μ and bearing approximately 30 teeth; accessory glands absent.

FEMALE. Unknown.

Type material. From *Euplectes axillaris* (Ploceidae): holotype ♂ (TC), Mashonaland, Southern Rhodesia.

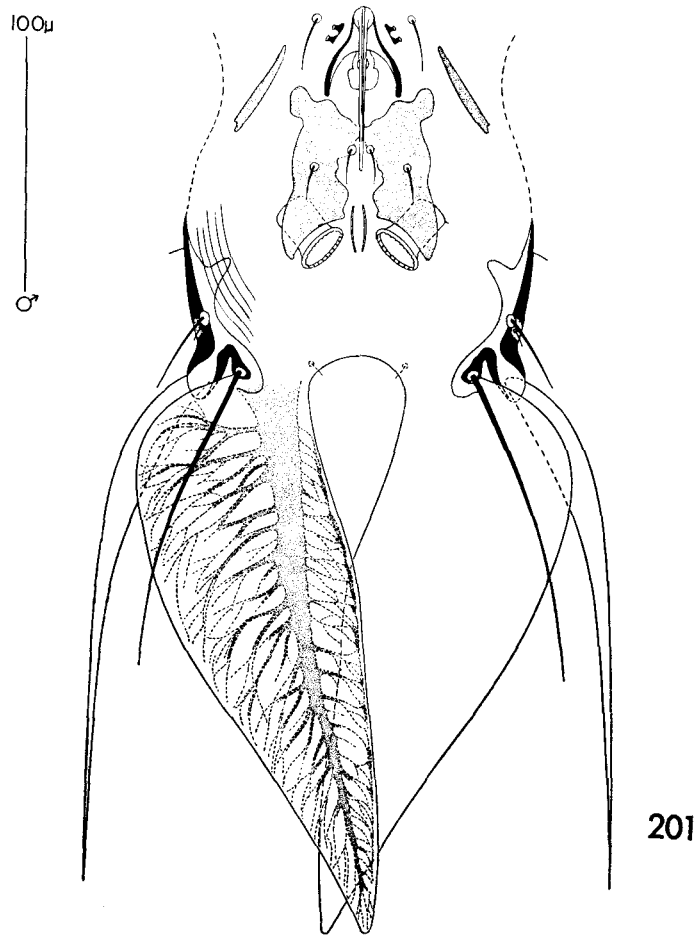


FIG. 201. *Proctophyllodes ornatus*, new species: holotype male.

Remarks. As the species is represented by a single specimen obtained from the Trouessart collection, and as Trouessart made many collections of feather mites from museum study skins, it is possible that the mite species is improperly correlated with the avian host. Whether this species is recollected from *Euplectes axillaris* or from other species, it will be easily recognized. The distinctive, terminal lamellae are the basis for the name *ornatus*. The drawing is of the holotype.

The Feather Mite Genus *Proctophyllodes*

HOSTS

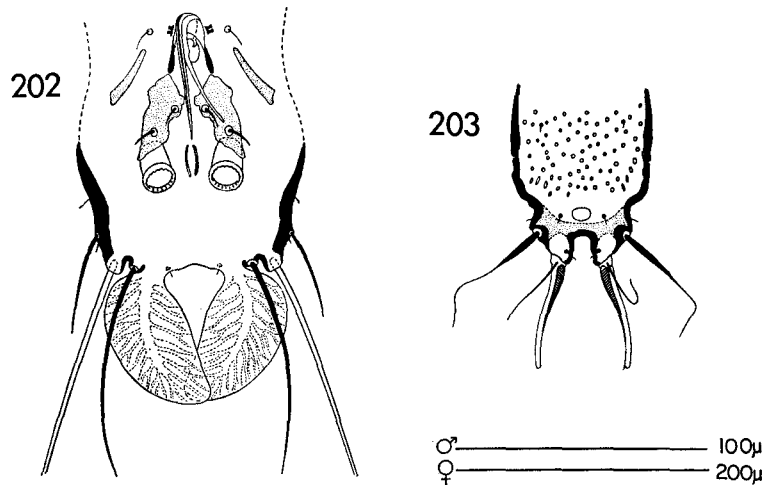
Ploceidae		
<i>Euplectes axillaris</i>		
(Smith), 1838	Rhodesia	Present study
(= <i>Urobrachya axillaris</i>)		

The following four species form a complex. The mites are morphologically similar, but each occurs on a different passerine family. Three of the families represented—Cyclarhidae, Parulidae, and Icteridae—are, according to ornithological authorities, closely related; the fourth family, Turdidae, is phyletically removed.

Proctophyllodes mexicanus, new species

On the bases of the similarity of the lamellar structures, lengths of the adanal discs, and the structures of the lobar region of the females, *Proctophyllodes mexicanus* and *P. coerebae* are closely related. Species differentiation is based in part on the relative development of the opisthogastric shield(s). In the species being described, there are divided or weakly connected shields, whereas in *P. coerebae* the shields are broadly joined.

MALE (holotype). Length, excluding lamellae, 266 μ ; width, 124 μ . *Dorsal idiosoma*: Propodosomal shield 73 μ in length, 84 μ in width; lateral margins entire; with small lacunae; without external vertical setae; distance between external scapular setae, 55 μ . Hum-



FIGS. 202, 203. *Proctophyllodes mexicanus*, new species: holotype male (202), allotype female (203).

eral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae narrowly lanceolate, 11μ in length, 2μ in width. Hysterosomal shield 161μ in length, 91μ in width; anterior margin shallowly concave; with small lacunae; without ventrolateral extensions; supranal concavity 38μ in length. Lamellae 54μ in length, 32μ in width, spatulate with bases broadly separated and apices overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital organ reflexion to level of posterior articulations of legs III; genital organ extending to level slightly beyond posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields weakly joined and bearing two pairs of setae. Adanal discs circular, each about $16\mu \times 24\mu$ and bearing approximately 36 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 438μ ; width, 165μ . *Dorsal idiosoma*: Propodosomal shield 93μ in length, 115μ in width; lateral margins entire; with small and large lacunae; with external vertical setae; distance between external scapular setae, 75μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18μ in length, 4μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 238μ in length, 113μ in width, with anterior margin shallowly concave, with small lacunae; with supranal concavity. Lobar region fused with anterior shield; lobes 45μ in length; setae d_4 inserted below line of lobar fusion and separated by 34μ ; lobes normal; cleft parallel-sided, 25μ in length, 16μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Cassidix mexicanus* (Icteridae), Texas: holotype ♂ (NU), allotype ♀ (NU), 4 ♂♂, 11 ♀♀ paratypes, Tarrant County, March 21, 1950; paratypes: 2 ♂♂, 1 ♀, Brownsville, April 8, 1954, R. E. Beer; 1 ♀, Brownsville, April 8, 1954, W. T. Atyeo and J. G. Borland. Paratypes deposited: Gaud, NU, SEM, USNM.

Additional material. Icteridae: 4 ♂♂, 1 ♀, *Euphagus carolinus*, no data; 12 ♂♂, 20 ♀♀, from *Quiscalus quiscula*, Texas, Maryland.

Remarks. The incidence of lacunae varies within the species, particularly on the propodosomal shield. Some specimens display

The Feather Mite Genus *Proctophyllodes*

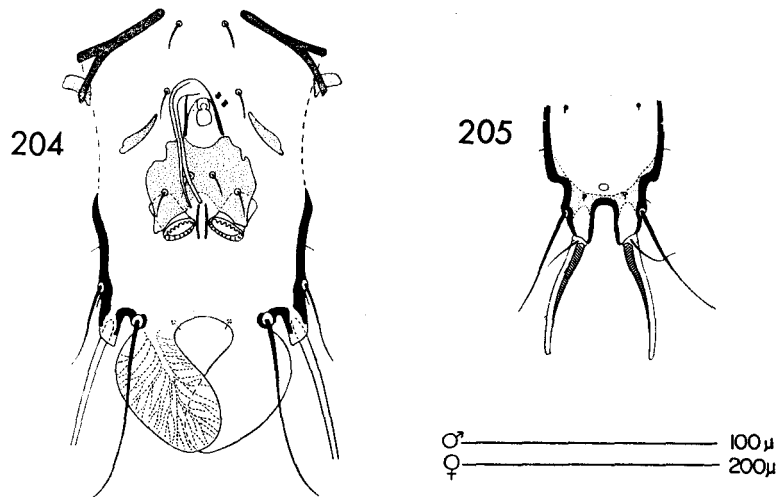
well-distributed lacunae on both the propodosomal and anterior hysterosomal shields; other specimens could easily be arranged in a series demonstrating gradual reduction in the numbers of lacunae to a condition characterized by only sparse lacunae on the antero-medial portion of the propodosomal shield. The condition also occurs where the weak juncture of the opisthogastric shields is disrupted. The females of most *Proctophyllodes* species collected from Icteridae have the lateral margins of the anterior hysterosomal shield darkened by the extreme deposition of melanin. The females of *P. mexicanus* lack these characteristic depositions. The name *mexicanus* is derived from the name of the type host. The drawings are of the holotype and allotype.

HOSTS

Icteridae		
<i>Cassidix mexicanus</i> (Gmelin), 1788	United States	Present study
<i>Euphagus carolinus</i> (Müller), 1776	United States	Present study
<i>Quiscalus quiscula</i> (L.), 1758	United States	Present study

Proctophyllodes coerebae, new species

Proctophyllodes coerebae, new species, is closely related to *P. cyclarhis*, new species. The genital regions and terminal lamellae



FIGS. 204, 205. *Proctophyllodes coerebae*, new species: holotype male (204), allotype female (205).

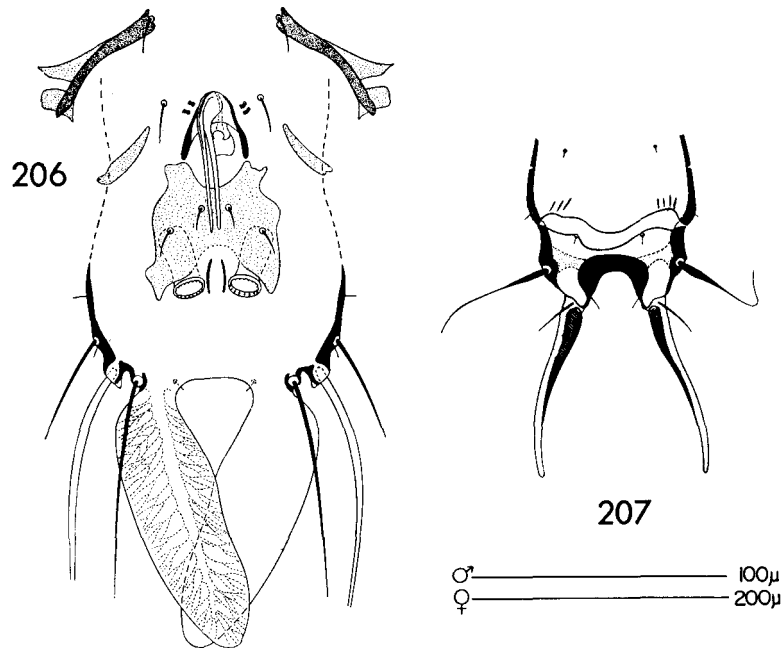
of these species are very similar; the greatest difference is the lamellar length: short in *P. coerebae* and long in *P. cyclarhis*. The females of these two species are quite different, those of *P. coerebae* have a supranal concavity and those of *P. cyclarhis* lack this structure.

MALE (holotype). Length, excluding lamellae, 245 μ ; width, 124 μ . *Dorsal idiosoma*: Propodosomal shield 67 μ in length, 83 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 57 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 13.8 μ in length. Hysterosomal shield 144 μ in length, 95 μ in width; anterior margin straight; without lacunae; without ventrolateral extensions; supranal concavity 37 μ in length. Lamellae 50 μ in length, 29 μ in width, spatulate, distant at origins, overlapping at apices, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital organ reflexion to level of posterior articulations of legs III; genital organ extending beyond posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields very broad, almost rectangular and bearing two pairs of setae. Adanal discs circular, each about 15 μ x 11 μ and bearing approximately 18 very strong teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 374 μ ; width, 143 μ . *Dorsal idiosoma*: Propodosomal shield 88 μ in length, 117 μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 81 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.0 μ in length, 2.8 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 188 μ in length, 121 μ in width, with anterior margin straight, without lacunae; with supranal concavity. Lobar region fused with anterior shield; 36 μ in length; setae d_4 inserted posterolateral to supranal concavity and separated by 30 μ ; lobes normal; cleft parallel-sided, 30 μ in length, 16 μ in width; setae d_5 $\frac{1}{2}$ length of terminal appendages; setae l_5 slightly longer than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Coereba flaveola* (Parulidae): holotype δ (NU), allotype ♀ (NU), 4 δ δ , 4 ♀ ♀ paratypes, Caymanas, Kingston,

The Feather Mite Genus *Proctophyllodes*



Figs. 206, 207. *Proctophyllodes cyclarhis*, new species: holotype male (206), allotype female (207).

Jamaica, West Indies, September 21, 1962, A. Ventura. Paratypes deposited: Gaud, NU, USNM.

Remarks. The name of the new species is derived from that of the avian host, *Coereba*. The drawings are of the holotype and allotype.

HOSTS

Parulidae (= Coerebidae, in part)		
<i>Coereba flaveola</i>	Jamaica	Present study
(L.), 1758		

Proctophyllodes cyclarhis, new species

Of the related species in which the males have the terminal lamellae widely separated at their origins, this is the only species in which the female has the terminal cleft in the form of a strongly sclerotized arch. *Proctophyllodes cyclarhis*, new species, and *P. cathari*, new species, are probably closely related and can be identified by the shape of the male opistogastric shields. In the former species, the right and left shields are joined by a broad connection extending from the articulations with the genital arch to the pos-

terior opisthogastric setae; in the latter species, this connection extends posteriorly only to the anterior opisthogastric setae.

MALE (holotype). Length, excluding lamellae, 303 μ ; width, 148 μ . *Dorsal idiosoma*: Propodosomal shield 85 μ in length, 91 μ in width; lateral margins entire or slightly incised behind external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 66 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.2 μ in length, 2.1 μ in width. Hysterosomal shield 166 μ in length, 97 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 41 μ in length. Lamellae 97 μ in length, 35 μ in width, elongate, bluntly rounded, distant at origins, overlapping at apices, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pre-genital apodeme absent; genital discs separate; genital organ reflexion to level midway between legs III and IV; genital organ extending to posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields very broad, almost rectangular and bearing two pairs of setae. Adanal discs circular, each about 21 μ x 11 μ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 407 μ ; width, 176 μ . *Dorsal idiosoma*: Propodosomal shield 102 μ in length, 117 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 88 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 22.8 μ in length, 2.8 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 225 μ in length, 117 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region incompletely fused with anterior shield; 56 μ in length; setae d_4 inserted on conjunctiva and separated by 48 μ ; lobes short; cleft in the form of an arch, 35 μ in length; setae d_5 $\frac{1}{4}$ length of terminal appendages; setae l_5 approximately equal in length to terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad, weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Cyclarhis gujanensis* (Cyclarhidae): holotype δ (NU), allotype ♀ (NU), 1 δ paratype (NU), Comitán de

The Feather Mite Genus *Proctophyllodes*

Domínguez, Chiapas, México, April 16, 1937, M. del Toro Aviles.

Remarks. The name *cyclarhis* is given to this new species for the genus of the avian host. The drawings are of the holotype and allotype.

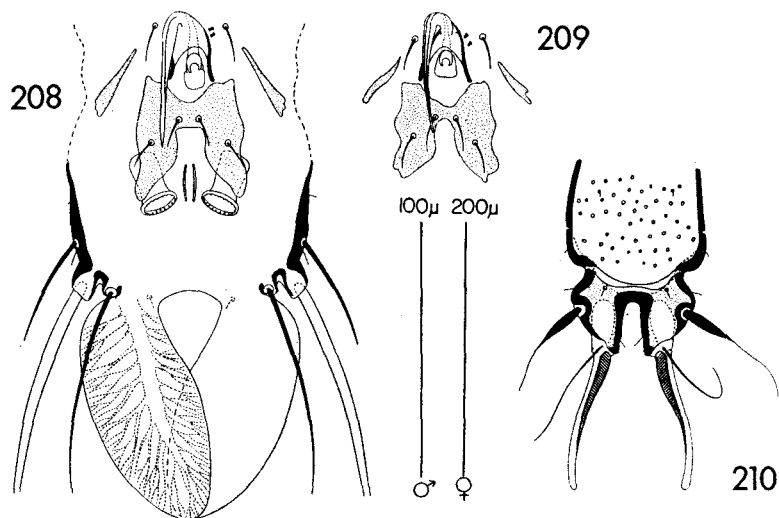
HOSTS

Cyclarhidae		
<i>Cyclarhis gujanensis</i> (Gmelin), 1789	México	Present study

Proctophyllodes cathari, new species

Proctophyllodes cathari, and *P. cyclarhis*, new species, two closely related species, can be separated by the relative lengths of genu I and the solenidion inserted on the dorsal surface of this leg segment. In *P. cathari*, the solenidion and genu are approximately equal in length; in *P. cyclarhis*, the length of the solenidion is much greater than the length of genu I.

MALE (holotype). Length, excluding lamellae, 295 μ ; width, 140 μ . *Dorsal idiosoma*: Propodosomal shield 79 μ in length, 91 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 65 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.9 μ in length, 3.5 μ in width. Hysterosomal shield 173 μ in length, 106 μ in width; anterior margin sinuous; with small lacunae, without ventrolateral



FIGS. 208-210. *Proctophyllodes cathari*, new species: holotype male (208), paratype male (209), allotype female (210).

extensions; supranal concavity 39μ in length. Lamellae 84μ in length, 40μ in width, long, rounded, distant at origins, overlapping at apices, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital organ reflexion to level midway between legs III and IV; genital organ extending beyond posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields broadly joined and bearing two pairs of setae. Adanal discs circular, each about $19\mu \times 12\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 414μ ; width, 153μ . *Dorsal idiosoma*: Propodosomal shield 93μ in length, 100μ in width; lateral margins entire; with small lacunae; without external vertical setae; distance between external scapular setae, 79μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 22.1μ in length, 5.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 229μ in length, 116μ in width, with anterior margin sinuous, with small lacunae; without supranal concavity. Lobar region articulated with anterior shield; 55μ in length; setae d_1 inserted on anterior margin of lobar shield and separated by 46μ ; lobes broad; cleft parallel-sided or slightly divergent, 41μ in length; 14μ in width; setae d_5 $\frac{2}{3}$ length of terminal appendages; setae l_5 approximately equal in length to setae d_5 . Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

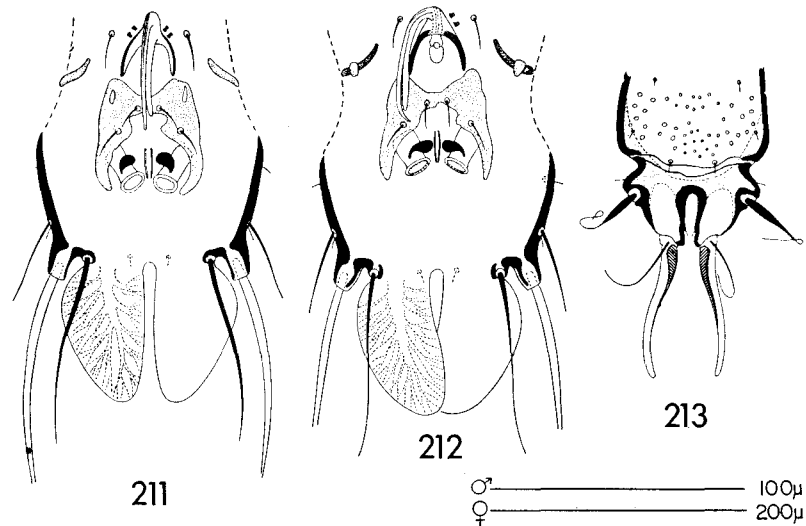
Type material. From *Catharus aurantiirostris* (Turdidae): holotype δ (NU), allotype ♀ (NU), 7 $\delta \delta$, 28 $\text{♀} \text{♀}$ paratypes, Almolonga, Guerrero, México, June 20, 1954, K. L. Dixon. Paratypes deposited: BAS, Gaud, NU, USNM.

Remarks. The holotype male lacks small lacunae on the propodosomal shield; all other specimens have small lacunae on this structure. The species is named *cathari* for the genus of the type host. The drawings are of the holotype, allotype and paratype male (fig. 209).

HOSTS

Turdidae		
<i>Catharus aurantiirostris</i> (Hartlaub), 1851	México	Present study

The Feather Mite Genus *Proctophyllodes*



FIGS. 211-213. *Proctophyllodes habiae*, new species: holotype male (211), male from *Habia gutturalis* (212), allotype female (213).

Proctophyllodes habiae, new species

The well-developed reniform adanal accessory glands and the triangular terminal lamellae of the males are distinctive for *Proctophyllodes habiae*, new species. The formation of the genital organ and opisthogastric shield is suggestive of the preceding four species, but the genital sheath is shorter than the penis and the internal margins of the lamellae are approximate.

MALE (holotype). Length, excluding lamellae, 264μ; width, 125μ. *Dorsal idiosoma*: Propodosomal shield 70μ in length, 93μ in width; lateral margins entire; with lacunae; with external vertical setae; distance between external scapular setae, 49μ. Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.6μ in length, 5.5μ in width. Hysterosomal shield 148μ in length, 90μ in width; anterior margin straight, with lacunae; without ventrolateral extensions; supranal concavity 48μ in length. Lamellae 52μ in length, 31μ in width, triangular, internal margins parallel and approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital organ reflexion to level of posterior articulations of legs III; genital organ extending to posterior opisthogastric setae;

genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields joined and bearing two pairs of setae. Adanal discs circular, each about $19\mu \times 10\mu$, teeth not apparent; heavily sclerotized reniform accessory glands present.

FEMALE (allotype). Length, excluding terminal appendages, 415μ ; width, 159μ . *Dorsal idiosoma*: Propodosomal shield 97μ in length, 117μ in width; lateral margins entire; with lacunae; with external vertical setae; distance between external scapular setae, 67μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 23.5μ in length, 5.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 204μ in length, 110μ in width, with anterior margin straight, with lacunae; without supranal concavity. Lobar region articulated or incompletely fused with anterior shield; 61μ in length; setae d_4 inserted on posterior margin of anterior shield and separated by 33μ ; lobes wide; cleft parallel-sided, 40μ in length, 11μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_5 approximately equal in length to terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Habia rubica* (Thraupidae): holotype δ (NU), allotype φ (NU), 15 $\delta \delta$, 21 $\varphi \varphi$ paratypes, 2 miles west San Pedro, Toledo District, British Honduras, May 21, 1956, S. M. Russell; 13 $\delta \delta$, 13 $\varphi \varphi$ paratypes, 1 mile east Tamazunchale, San Luis Potosí, México, March 27, 1950, Robert J. Newman. Paratypes deposited: André, BMNH, BAS, CAS, Gaud, MN, NU, Radford, RNH, SAIMR, SEA, Turk, USNM, ZSBS, ZSZM.

Additional material. Thraupidae: 1 δ , 3 $\varphi \varphi$, from *Habia gutturalis*, México.

Remarks. The following variations occur in the males of this species: adanal discs are apparently without teeth in the holotype, however minute teeth are present in specimens from *Habia gutturalis*; the connection between the opisthogastric shields may be narrow; epimerites IVa may have small surface fields. These differences are illustrated in figures 210 and 211. Also apparent in these figures are different appearances of the male genital organ attributable to mounting procedures. The species is named *habiae* for the genus of birds from which the specimens have been collected. The drawings are of the holotype, allotype, and a male from *Habia gutturalis* (fig. 212).

The Feather Mite Genus *Proctophyllodes*

HOSTS

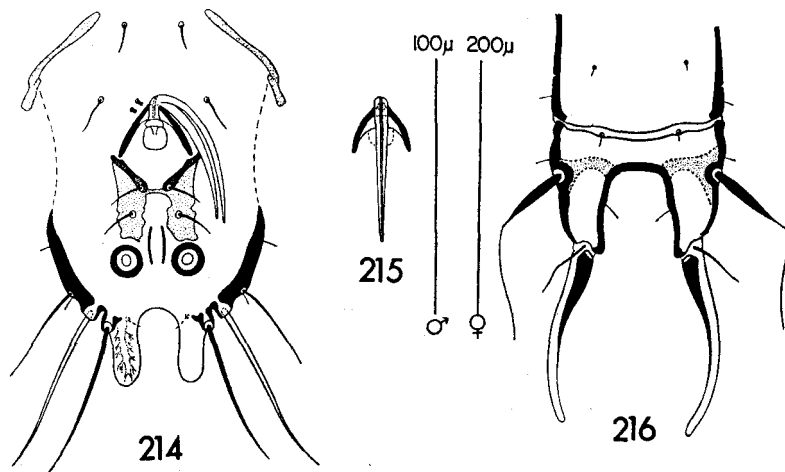
Thraupidae		
<i>Habia gutturalis</i> (Sclater), 1854	México	Present study
<i>Habia rubica</i> (Vieillot), 1817	Br. Honduras México	Present study Present study

Proctophyllodes anisogamus Gaud and Mouchet

Proctophyllodes anisogamus Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32: 509, figs., 7A, 7C. Type host: *Picathartes oreas* (Sturnidae).*

The sessile, edentate adanal discs and the short, widely separated lamellae of the males coupled with the extremely large terminal lobes of the females form a unique combination of characters. The characters of the male indicates that *Proctophyllodes anisogamus* is related to *P. batis*, new species. The characters of the females show a possible relationship to species of the genus *Monojoubertia*, or at least, in these respects, this species is atypical of *Proctophyllodes*.

MALE (paratype). Length, excluding lamellae, 277 μ ; width, 140 μ . Dorsal idiosoma: Propodosomal shield 86 μ in length, 87 μ in width; lateral margins entire; without lacunae; with external vertical



FIGS. 214-216. *Proctophyllodes anisogamus* Gaud and Mouchet: paratype male (214), probable reconstruction of genital organ (215), paratype female (216).

* Peters (1962, 15:75) states that, "The following genera have been assigned, at least tentatively, to the Sturnidae by some modern writers, but I regard them as better placed with the groups indicated: ... *Picathartes* (?subfamily of Muscipidae, allied to Timaliinae)...."

setae; distance between external scapular setae, 59 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 17.9 μ in length, 4.8 μ in width. Hysterosomal shield 145 μ in length, 86 μ in width; anterior margin straight; without lacunae; without ventrolateral extensions; supranal concavity 28 μ in length. Lamellae 24 μ in length, 10 μ in width, small, parallel-sided, lanceolate, distant, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I V-shaped, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital organ reflexion to level midway between legs III and IV; genital organ extending well beyond posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal, or almost rectangular arrangement; opisthogastric shields weakly joined and bearing two pairs of setae. Adanal discs circular, unmeasurable and teeth not apparent; accessory glands absent.

FEMALE (paratype). Length, excluding terminal appendages, 493 μ ; width, 189 μ . *Dorsal idiosoma*: Propodosomal shield 138 μ in length, 117 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 104 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 22.1 μ in length, 6.2 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 230 μ in length, 152 μ in width, with anterior margin straight, without lacunae; without supranal concavity. Lobar region articulated to anterior shield; 93 μ in length; setae d_4 inserted on anterior margin of lobar shield and separated by 56 μ ; lateral margins of lobes parallel with lateral margins of anterior plate; cleft parallel-sided or slightly divergent, 66 μ in length, 35 μ in width; setae d_5 $\frac{1}{4}$ length of terminal appendages; setae l_5 slightly longer than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Picathartes oreas* (Sturnidae): holotype δ (Gaud), allotype ♀ (Gaud), 7 $\delta\delta$, 7 ♀♀ paratypes (Gaud), Yaoundé, Nyong et Sanaga region, French Cameroons, May, 1956, J. Mouchet.

Material examined. Two male and two female paratypes.

Remarks. Gaud and Mouchet (1957) state that this species has certain characters of the genus *Monojoubertia*. It is assumed by the present authors that these characters referred especially to the

The Feather Mite Genus *Proctophyllodes*

formation of the terminal portions of the females. It will be noted that the terminal lobes and resultant cleft are disproportionately large and that the lateral idiosomal margin is essentially straight. As the males of most *Proctophyllodes* species clasp the females by the lateral concavity formed at the articulations of the lobar region, this particular configuration is odd. The females of *Monojoubertia* are similarly constructed, *i.e.*, the terminal lobes are quite large and the lateral idiosomal margin is straighter than normally associated with the females of *Proctophyllodes*. The drawings are of the paratypes; the small insert is a probable reconstruction of the genital organ.

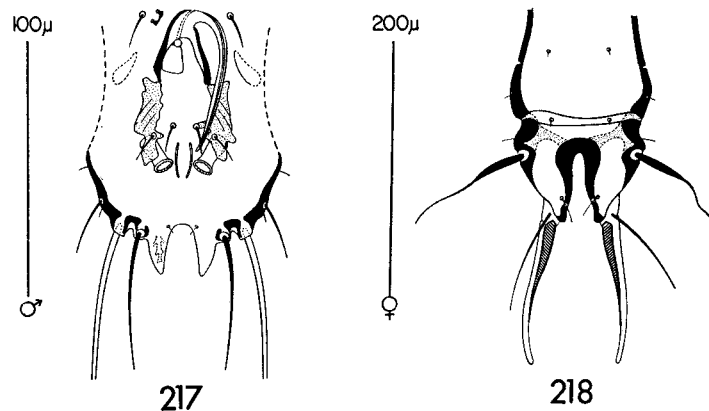
HOSTS

Sturnidae	Fr. Cameroons	Gaud and Mouchet, 1957
<i>Picathartes oreas</i> Reichenow		Present study

Proctophyllodes batis, new species

Proctophyllodes batis, new species, has the lobar region of the females heavily sclerotized. Such a condition is uncommon and the feature is useful for separating the related species, *P. psomocolacis*, new species. The females of *P. batis* have normally developed lobar regions, although heavily sclerotized, those of *P. psomocolacis* have a reduced lobar region.

MALE (holotype). Length, excluding lamellae, 255 μ ; width, 106 μ . Dorsal idiosoma: Propodosomal shield 70 μ in length, 62 μ in



FIGS. 217, 218. *Proctophyllodes batis*, new species: holotype male (217), allotype female (218).

width; lateral margins weakly incised; without lacunae; without external vertical setae; distance between external scapular setae, 43μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 17.3μ in length, 2.8μ in width. Hysterosomal shield 134μ in length, 66μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 22μ in length. Lamellae 17μ in length, 7μ in width, triangular, distant, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I narrowly U-shaped with thick connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs united; genital organ reflexion to level midway between legs III and IV; genital organ extending beyond posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields divided and bearing posterior pair of setae. Adanal discs circular, each about $14\mu \times 7\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 440μ ; width, 148μ . *Dorsal idiosoma*: Propodosomal shield weakly sclerotized, 86μ in length, 83μ in width; lateral margins weakly incised; without lacunae; without external vertical setae; distance between external scapular setae, 57μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 22.1μ in length, 5.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 196μ in length, 81μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 76μ in length; setae d_4 inserted on conjunctiva and separated by 41μ ; lobes wide; cleft divergent, 52μ in length, 11μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_5 approximately equal in length to terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Batis capensis* (Muscicapidae): holotype ♂ (SAIMR), allotype ♀ (SAIMR), 1 ♀ paratype (SAIMR), Knysna, Cape Colony, Union of South Africa, December 26, 1953, F. Zumpt.

Remarks. The male genital organ is disoriented due to the method of preparation. If this structure were centered, the genital arch and genital organ would be similar to that of *Proctophyllodes*

The Feather Mite Genus *Proctophyllodes*

psomocolacis, new species (fig. 219). The drawings are of the holotype and allotype.

HOSTS

Muscicapidae

Batis capensis (L.),
1766

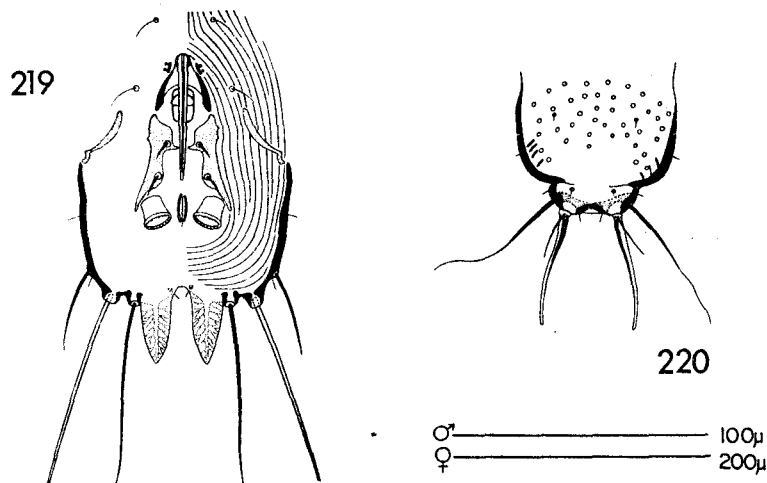
Un. So. Africa

Present study

Proctophyllodes psomocolacis, new species

This new species is closely related to *Proctophyllodes batis*, new species. These species can be differentiated best by the female terminus. In *P. psomocolacis* the female lobar region is markedly reduced; in *P. batis* this structure is normal.

MALE (holotype). Length, excluding lamellae, 245 μ ; width, 126 μ . *Dorsal idiosoma*: Propodosomal shield 64 μ in length, 89 μ in width; lateral margins entire; with large, anteromedial lacunae; with external vertical setae; distance between external scapular setae, 56 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 14 μ in length. Hysterosomal shield 149 μ in length, 98 μ in width; anterior margin straight; with large lacunae; without ventrolateral extensions; supranal concavity 27 μ in length. Lamellae 29 μ in length, 12 μ in width, triangular with inner margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral exten-



Figs. 219, 220. *Proctophyllodes psomocolacis*, new species: holotype male (219), allotype female (220).

sions; epimerites without surface fields. Pregenital apodeme absent; genital discs joined; genital organ reflexion to posterior articulations legs III; genital organ extending to posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields barely joined at level of anterior opisthogastric setae and bearing two pairs of setae. Adanal discs circular, each about $14\mu \times 14\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 231μ ; width, 139μ . *Dorsal idiosoma*: Propodosomal shield 76μ in length, 89μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 63μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 21μ in length. Hysterosoma with reduced lobes and with terminal appendages; anterior shield 200μ in length, 103μ in width, with anterior margin straight, with medium posteromedial lacunae; without supranel concavity. Lobar region fused with anterior shield; 22μ in length; setae d_4 inserted on anterior margin of lobar shield and separated by 30μ ; lobes reduced; setae d_5 $\frac{1}{2}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Psomocolax oryzivorus* (Icteridae): holotype ♂ (NU), allotype ♀ (NU), 4 ♂♂, 6 ♀♀ paratypes, Gallon Jug, Orange Walk District, British Honduras, March 8, 1955, Stephen M. Russell; paratypes: 2 ♀♀, same as holotype except March 15, 1955, D. A. Lancaster; 2 ♀♀, Izabal, Guatemala, February 26, 1959, H. C. Land. Paratypes deposited: Gaud, NU, USNM.

Remarks. The opisthogastric region may be as illustrated, or the connection between the shields may be less apparent. The name of this new species is derived from the generic name of the host. The drawings are of the holotype and allotype.

HOSTS

Icteridae

Psomocolax oryzivorus
(Gmelin), 1788

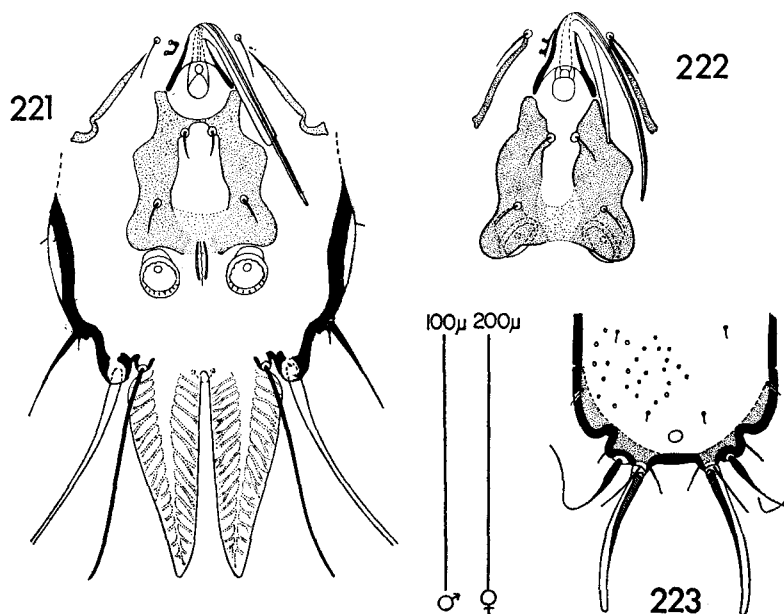
Central America

Present study

Proctophyllodes attenuatus Trouessart

Proctophyllodes attenuatus Trouessart, 1899, Bull. Soc. Étud. Sci. Angers, 28: 176. Type host: *Gymnostinops montezuma* (Icteridae).

The Feather Mite Genus *Proctophyllodes*



FIGS. 221–223. *Proctophyllodes attenuatus* Trouessart: male from *Gymnostinops montezuma* (221), lectotype male (222), syntype female (223).

Proctophyllodes attenuatus, Canestrini and Kramer, 1899, Tierreich, 7: 118.

Proctophyllodes attenuatus, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88: 63–64.

The unusual connection between the right and left opisthogastric shields and the triangular terminal lamellae are characteristic of *Proctophyllodes attenuatus*. In addition to the posterior connection, it is possible that the shields may be weakly connected at the level of the anterior opisthogastric setae.

MALE (lectotype). Length, excluding lamellae, 291 μ ; width, 141 μ . Dorsal idiosoma: Propodosomal shield 69 μ in length, 117 μ in width; lateral margins entire, posterolateral angles to lateral idiosomal margin; without lacunae, without external vertical setae; distance between external scapular setae, 64 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 25.0 μ in length. Hysterosomal shield 194 μ in length, 117 μ in width; anterior margin straight or very shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 59 μ in length. Lamellae 79 μ in length, 31 μ in width, large, triangular, with pinnate venation. Ventral

idiosoma: Apodemes well developed; epimerites I narrow U-shaped with strong connective, without lateral extensions; epimerites IV with surface fields at distal portion. Pregenital apodeme absent, although a slight sclerotization joins the genital discs on each side; genital organ reflexion to posterior articulations of legs III; genital organ extending beyond posterior pair of opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields joined posterior to the posterior setae by a broad weakly sclerotized band and bearing two pairs of setae. Adanal discs circular, unmeasurable, length less than diameter and bearing approximately 25 teeth; accessory glands absent.

FEMALE (syntype). Length, excluding terminal appendages, 398 μ ; width, 155 μ . *Dorsal idiosoma*: Propodosomal shield 86 μ in length, 119 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 71 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 32.0 μ in length. Hysterosoma without lobes and with terminal appendages; anterior shield 221 μ in length, 148 μ in width, with anterior margin shallowly concave, with few small lacunae on posterior $\frac{2}{3}$ of shield; with supranal concavity. Lobar region fused with anterior shield; 25 μ in length; setae d_4 inserted anterolateral to supranal concavity and separated by 39 μ ; lobes absent; setae d_5 $\frac{1}{3}$ length of terminal appendages; setae l_5 approximately equal in length to terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes extremely well developed; epimerites I narrow U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Gymnostinops montezuma* (Icteridae): lectotype δ (TC), 2 ♀♀ syntypes (TC), México.

Additional material. Icteridae: 2 δ δ , 2 ♀♀ , from *Gymnostinops montezuma*, British Honduras; 1 δ , 2 ♀♀ , from *Zarhynchus wagneri*, México.

Remarks. The type series was collected from a museum study skin by Trouessart at least sixty years ago. The authors have recollected this species from study skins prepared from birds collected in 1955.

The lectotype male lacks a connection between the opisthogastric shields at the level of the anterior opisthogastric setae (fig. 222), whereas, the male from British Honduras has a weak connection at this point (fig. 221). The drawings are of the lectotype, a syntype female, and a male from the type host collected in British Honduras.

The Feather Mite Genus *Proctophyllodes*

HOSTS

Icteridae		
<i>Gymnostinops montezuma</i> (Lesson), 1830	Central America	Trouessart, 1899 Canestrini & Kramer, 1899 Vitzthum, 1922 <i>b</i> Present study
<i>Zarhynchus wagleri</i> (Gray and Mitchell), 1844	México	Present study

Proctophyllodes corvorum Vitzthum

Proctophyllodes corvorum Vitzthum, 1922*b*, Arch. Naturgeschichte, A, 88(5): 82-85, figs. 77-92. Type host: *Corvus corone* (Corvidae).

Proctophyllodes corvorum, Dubinin, 1952, Trav. Inst. Zool. Acad. Sci. U.S.S.R., 12: 262.

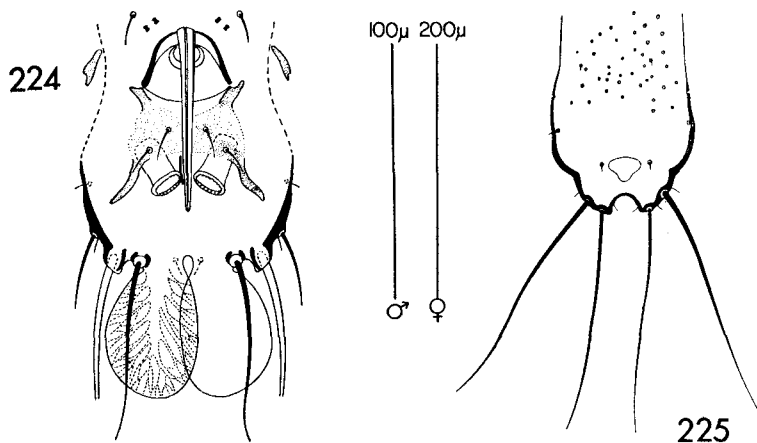
Proctophyllodes corvorum, Vassilev, 1959*a*, Bulgarian Acad. Sci., Proc. Zool. Inst., 8: 48.

Proctophyllodes corvorum, Fritsch, 1961, Z. Parasitenk., 21: 19-21, figs. 15*a-c*.

Proctophyllodes corvorum, Lichard, 1962, Biología, 17(7): 533.

Proctophyllodes corvorum, Vassilev, 1962, Bulgarian Acad. Sci., Bull. Dept. Biol. Sci., 158.

Proctophyllodes corvorum and *P. scolopacinus* are characterized by the stout genital organ supported by an angular genital arch. Although the opisthogastric shields of these species may be indis-



FIGS. 224, 225. *Proctophyllodes corvorum* Vitzthum: male (224) and female (225) from *Corvus frugilegus*.

tinct, there is always a line connecting the tips of the genital arch; this line represents the anterior margin of the weakly sclerotized opisthogastric shield. The two species may be separated as follows: *P. corvorum* lacks terminal lobes in the females and *P. scolopacinus* has well-developed terminal lobes in the females.

MALE. Length, excluding lamellae, 319 μ ; width, 155 μ . *Dorsal idiosoma*: Propodosomal shield 79 μ in length, 76 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 54 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 13.8 μ in length, 2.8 μ in width. Hysterosomal shield 157 μ in length, 73 μ in width; anterior margin shallowly concave; with a few, indistinct lacunae; without ventrolateral extensions; supranal concavity 40 μ in length. Lamellae 53 μ in length, 35 μ in width, ovoid, internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pre-genital apodeme absent; genital discs separate; genital arch to level of anterior articulations of legs IV; genital organ extending beyond adanal discs; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields may appear fragmented, joined, or very incomplete and bearing two pairs of setae. Adanal discs circular, each about 17 μ x 10 μ and bearing approximately 24 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 512 μ ; width, 179 μ . *Dorsal idiosoma*: Propodosomal shield 97 μ in length, 97 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 66 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.0 μ in length, 3.5 μ in width. Hysterosoma without lobes and without terminal appendages; anterior shield 248 μ in length, 94 μ in width, with anterior margin shallowly concave, with few small lacunae; with supranal concavity. Lobar region fused with anterior shield; 39 μ in length; setae d_4 inserted lateral to supranal concavity and separated by 38 μ ; lobes very short, almost vestigial; cleft in form of small arch, 10 μ in length; setae d_5 and l_5 very long and approximately equal in length. Spermathecal duct short, thick-walled. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

The Feather Mite Genus Proctophyllodes

Type material. From *Corvus corone* (Corvidae), Europe (?); location of type unknown.

Material examined. Corvidae: 4 ♂♂, 2 ♀♀, from *Corvus frugilegus*, England; 2 ♀♀, from *Corvus corone cornix*, England.

Remarks. The opisthogastric region of the male appears to have fragmented shields, but this appearance is due to unequal sclerotization of the opisthogastric region. Closer examination shows that the opisthogastric region has a broad shield, the majority of which is weakly sclerotized. The redescriptions and drawings are of specimens taken from *Corvus frugilegus*, England.

HOSTS

Corvidae		
<i>Corvus corax</i> L., 1758	Europe	Dubinin, 1952 Vassilev, 1959a
<i>Corvus corone corone</i> L., 1758	Europe	Vitzthum, 1922b Present study
<i>Corvus corone cornix</i> L., 1758	Europe	Lichard, 1962 Vassilev, 1962
<i>Corvus corone sardonius</i> Kleinschmidt, 1903	Europe	Vassilev, 1959a
<i>Corvus frugilegus</i> L., 1758	Europe	Vitzthum, 1922b Vassilev, 1959a Fritsch, 1961 Present study
<i>Corvus monedula</i> L., 1758	Europe	Vassilev, 1959a, 1962
<i>Pica pica</i> (L.), 1758	Europe	Vassilev, 1959a

Proctophyllodes scolopacinus (Koch)

Dermaleichus scolopacinus Koch, 1842, *Ubersicht Arachnidensystemen*, Heft 3: 122. Type host: *Scolopax rusticola* (Scolopacidae).

Proctophyllodes scolopacis Vitzthum, 1922a, *Zool. Jahrb.*, 44: 548, 5 text figs. Type host: *Scolopax rusticola* (Scolopacidae).

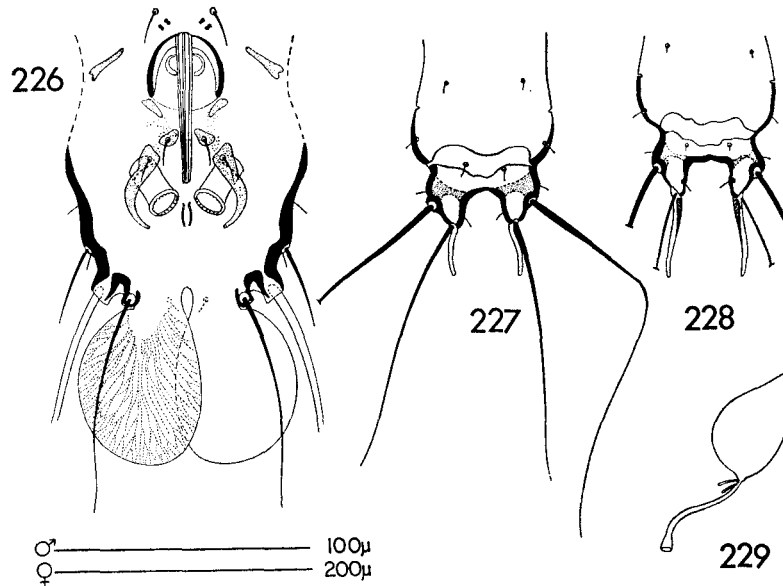
Proctophyllodes scolopacis, Vitzthum, 1922b, *Arch. Naturgeschichte*, A, 88(5): 30, 68.

Proctophyllodes scolopacinus, Vitzthum, 1922b, *Arch. Naturgeschichte*, A, 88(5): 30–33, figs. 23–25.

Proctophyllodes scolopacinus, Vitzthum, 1929, *Tierwelt Mitteleuropas*, 3(3): 100.

Proctophyllodes scolopacinus, Vassilev, 1959c, *Bulg. Acad. Sci., Proc. Sect. Biol. Med. Sci.*, 3(2): 15.

The palmate venation of the terminal lamellae of the male and the presence of terminal lobes on the female separate *Proctophyl-*



FIGS. 226-229. *Proctophyllodes scolopacinus* (Koch): male (226), females (227, 228), and spermatheca (229) from *Scolopax rusticola*.

lodes scolopacinus from *P. corvorum*. The latter species is characterized in part by pinnate venation in the terminal lamellae and the lack of terminal lobes in the females.

MALE. Length, excluding lamellae, 318 μ ; width, 146 μ . *Dorsal idiosoma*: Propodosomal shield 81 μ in length, 84 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 59 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae narrow, spiculiform, 18.6 μ in length. Hysterosomal shield 179 μ in length, 93 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 35 μ in length. Lamellae 65 μ in length, 45 μ in width, ovoid, internal margins overlapping, with palmate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level between anterior and posterior articulations of legs IV; genital organ extending beyond posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields fragmented, two small units at tips of genital arch, four units each bearing one

The Feather Mite Genus Proctophyllodes

opisthogastric seta. Adanal discs circular, each about $17\mu \times 14\mu$ and bearing approximately 40 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 488μ ; width, 174μ . *Dorsal idiosoma*: Propodosomal shield 106μ in length, 116μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 80μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 27.6μ in length. Hysterosoma with lobes and with terminal appendages; anterior shield 227μ in length, 101μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 45μ in length; setae d_4 inserted on conjunctiva or on anterior margin of lobar shield and separated by 28μ ; lobes short; cleft in the form of an arch, 28μ in length, 28μ in width; setae d_5 and l_5 extremely long. Spermatheca as in *corvorum*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Scolopax rusticola* (Scolopacidae), Europe (?); location of type unknown.

Material examined. Scolopacidae: 3 ♂♂, 5 ♀♀, from *Scolopax rusticola*, Netherlands, England; 3 ♂♂, 2 ♀♀, from *Philohela minor*, Louisiana.

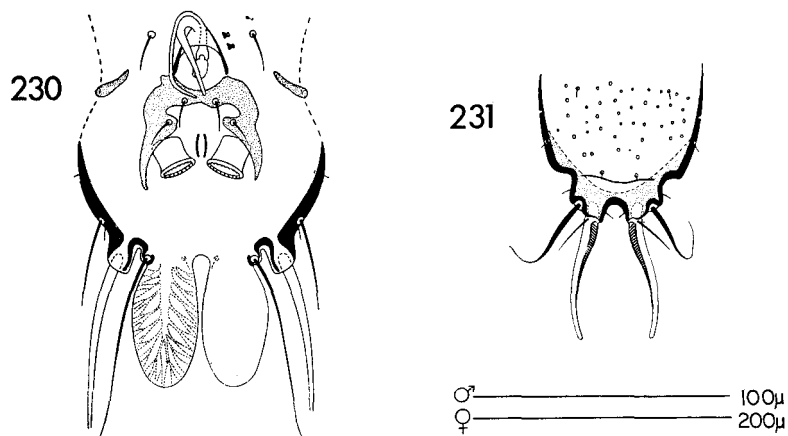
Remarks. Setae d_4 of the females may be inserted on the anterior margin of the lobar shield or on the conjunctiva separating the anterior hysterosomal shield from the lobar shield. The redescription and drawings are of specimens from the Netherlands.

HOSTS

Scolopacidae		
<i>Philohela minor</i> (Gmelin), 1789	United States	Present study
<i>Scolopax rusticola</i> (L.), 1758	Europe	Koch, 1842 Vitzthum, 1922a, 1922b Vassilev, 1959c Present study

Proctophyllodes lordocaulus, new species

The opisthogastric and genital regions of *Proctophyllodes lordocaulus*, new species, and *P. habiae*, new species, are similar. Each is characterized as having a short genital sheath, a distally bent penis, broadly connected plates, and short adanal discs. The species can be separated by the presence or absence of reniform adanal accessory glands: absent in *P. lordocaulus*, present in *P. habiae*.



FIGS. 230, 231. *Proctophyllodes lordocaulus*, new species: holotype male (230), allotype female (231).

MALE (holotype). Length, excluding lamellae, 238 μ ; width, 132 μ . *Dorsal idiosoma*: Propodosomal shield 60 μ in length; 90 μ in width; lateral margins entire; with large and medium lacunae on posterior half; with external vertical setae; distance between external scapular setae, 48 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculi-form, 16.3 μ in length. Hysterosomal shield 140 μ in length, 97 μ in width; anterior margin straight; with large and small lacunae over entire surface; without ventrolateral extensions; supranal concavity 37 μ in length. Lamellae 49 μ in length, 20 μ in width, ovoid with inner margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital organ reflexion to midpoint between legs III and IV; genital organ extending to anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields narrowly joined at level of anterior opisthogastric setae and bearing two pairs of setae. Adanal discs circular, each about 16 μ x 16 μ and bearing approximately 18 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 367 μ ; width, 170 μ . *Dorsal idiosoma*: Propodosomal shield 78 μ in length, 121 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 69 μ . Humeral shields well developed and bearing setae l_1 at

The Feather Mite Genus Proctophyllodes

extreme anteromedial angles; subhumeral setae spiculiform, 27.3 μ in length. Hysterosoma with reduced lobes and with terminal appendages; anterior shield 144 μ in length, 123 μ in width, with anterior margin straight, with small lacunae on posterior half; without supranal concavity. Lobar region fused with anterior shield; 33 μ in length; setae d_4 inserted anterior to line of fusion and separated by 27 μ ; lobes reduced; cleft arched, 13 μ in length, 12 μ in width; setae d_5 $1/2$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Caryothraustes poliogaster* (Fringillidae): holotype δ (NU), allotype ♀ (NU), 1 δ paratype (NU), 1 mile east Teapa, Tabasco, México, March 27, 1959, D. G. Berrett.

Remarks. The solenidion on genu I (σ_1) is unusually short; it is approximately half the length of the genu. In the female, the fusion of the anterior hysterosoma with the lobar shield is marked by a suture located caudal to setae d_4 . The name *lordocaulus* refers to the bent penis. The drawings are of the holotype and allotype.

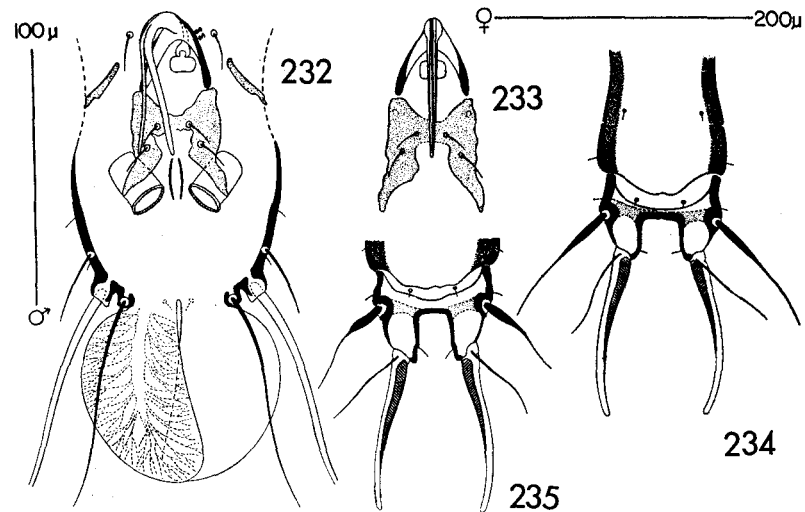
HOSTS

Fringillidae		
<i>Caryothraustes poliogaster</i>	México	Present study
(Du Bus), 1847		

Proctophyllodes icteri, new species

Proctophyllodes icteri, new species, apparently is restricted to birds of the family Icteridae, and as such, the females are characteristically marked by darkened lateral margins on the anterior hysterosomal shields. Males of this species are similar to those of *P. weigoldi* and can be distinguished by the small adanal discs; these structures in *P. weigoldi* are twice as long as wide.

MALE (holotype). Length, excluding lamellae; 306 μ ; width, 122 μ . *Dorsal idiosoma*: Propodosomal shield 76 μ in length, 72 μ in width; lateral margins incised around external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 52 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.6 μ in length, 2.8 μ in width. Hysterosomal shield 176 μ in length, 79 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 52 μ in length. Lamellae 69 μ in length, 38 μ in width, oblong, internal margins and apices overlapping, with pinnate venation.



FIGS. 232-235. *Proctophyllodes icteri*, new species: holotype male (232), probable reconstruction (233), allotype female (234), female from *Icterus spurius* (235).

Ventral idiosoma: Apodemes well developed; epimerites I V-shaped with strong connective, with small lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital organ reflexion to level midway between legs III and IV; genital organ extending slightly beyond posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields broadly joined and bearing two pairs of setae. Adanal discs circular, each about $22\mu \times 15\mu$ and bearing approximately 40 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 425μ ; width, 150μ . *Dorsal idiosoma*: Propodosomal shield 90μ in length, 90μ in width; lateral margins incised behind external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 66μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae missing. Hysterosoma with lobes and with terminal appendages; anterior shield 221μ in length, 90μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 48μ in length; setae d_4 inserted on conjunctiva and separated by 36μ ; lobes normal; cleft parallel-sided, 35μ in length, 28μ in width; setae d_5 $1\frac{1}{2}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idio-*

The Feather Mite Genus Proctophyllodes

soma: Apodemes well developed; epimerites I U-shaped with weak connective, with minute lateral extensions; epimerites without surface fields.

Type material. From *Cacicus cela* (Icteridae): holotype ♂ (TC), allotype ♀ (TC), 2 ♂♂, 1 ♀ paratypes (TC, NU), Brazil.

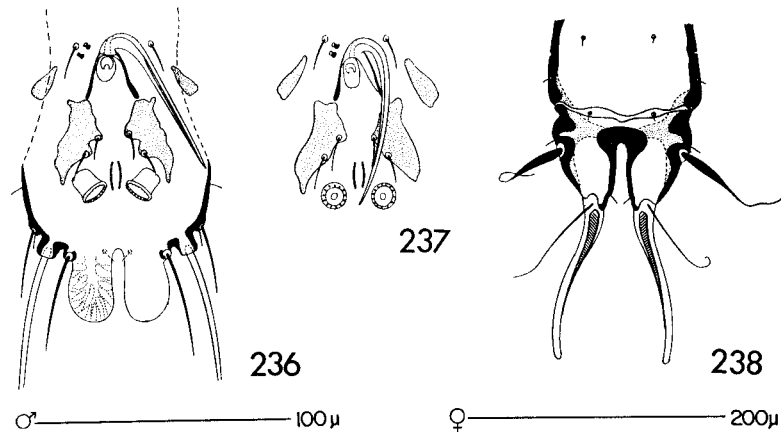
Additional material. Icteridae: 3 ♂♂, 3 ♀♀, from *Icterus bullockii*, México; 1 ♂, 1 ♀, from *Icterus cucullatus*, México; 2 ♀♀, from *Icterus graduacauda*, México; 2 ♀♀, from *Icterus mesomelas*, British Honduras; 4 ♂♂, 6 ♀♀, from *Icterus parisorum*, México; 3 ♂♂, 3 ♀♀, from *Icterus pustulatus*, México; 3 ♂♂, 3 ♀♀, from *Icterus spurius*, Texas.

Remarks. The slides on which this species is based were collected from a study skin in the Museum of Angers by E. L. Trouesart. To date, the authors have not attempted to recollect this species from the type host.

Within the study series, the opisthogastric region may be in the form of a single unit as illustrated, or may be weakly divided; figure 233 represents a probable reconstruction of the genital area. Some specimens from *Icterus* species are smaller in overall length and proportionately smaller in respect to other structures. For example, in mites from *Icterus spurius*, the lamellae measure 53μ in length and 23μ in width. Slight variations also are evident in the structure of the female hysterosomal lobes. The name *icteri* is chosen for the family containing the host species. The drawings are of the holotype, allotype, and a female from *Icterus spurius* (fig. 235).

HOSTS

Icteridae		
<i>Cacicus cela</i> (L.), 1758	Brazil	Present study
<i>Icterus bullockii</i> (Swainson), 1827	México	Present study
<i>Icterus cucullatus</i> Swainson, 1827	México	Present study
<i>Icterus graduacauda</i> Lesson, 1839	México	Present study
<i>Icterus mesomelas</i> (Wagler)	Br. Honduras	Present study
<i>Icterus parisorum</i> Bonaparte, 1837	México	Present study
<i>Icterus pustulatus</i> Wagler, 1829	México	Present study
<i>Icterus spurius</i> (L.), 1766	United States	Present study



FIGS. 236-238. *Proctophyllodes xenopis*, new species: holotype male (236), paratype male (237), allotype female (238).

Proctophyllodes xenopis, new species

Proctophyllodes xenopis, new species, is one of the few species in North and Central America in which the lobar region of the female is heavily sclerotized and in which setae d_4 of the female are widely separated. The males are similar to those of the previous species, *P. icteri*, new species, however, in *P. xenopis* the genital organ extends to the adanal discs and in *P. icteri*, the genital organ extends to the posterior row of opisthogastric setae.

MALE (holotype). Length, excluding lamellae, 260µ; width, 130µ. *Dorsal idiosoma*: Propodosomal shield 78µ in length, 79µ in width; lateral margins incised to include external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 55µ. Humeral shields well developed and bearing setae l_1 removed from anteromedial margins; subhumeral setae lanceolate, 15.8µ in length, 3.5µ in width. Hysterosomal shield 133µ in length, 70µ in width; anterior margin concave; without lacunae; without ventrolateral extensions; supranal concavity 39µ in length. Lamellae ovoid, 26µ in length, 16µ in width, approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites IV with surface field on anterior margin at midlength. Pregenital apodeme absent; genital discs separate; genital arch to anterior articulations of legs IV; genital organ extending to adanal discs; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric

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shields separate and bearing two pairs of setae. Adanal discs circular, each about $144\mu \times 9\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 425μ ; width, 150μ . *Dorsal idiosoma*: Propodosomal shield 97μ in length, 101μ in width; lateral margins incised to include external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 72μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; sub-humeral setae lanceolate, 17.3μ in length, 4.8μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 183μ in length, 88μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated or incompletely fused with anterior shield; 75μ in length; setae d_4 inserted on conjunctiva and separated by 47μ ; lobes wide; cleft divergent, 57μ in length, 7μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_5 approximately equal in length to terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Xenops minutus* (Furnariidae): holotype ♂ (NU), allotype ♀ (NU), 2 ♂ ♂ paratypes, 20 miles south Tezonapa (?), Veracruz, México, August 20, 1948, C. C. Lamb; 2 ♀ ♀ paratypes, Palenque, Chiapas, México, May 14, 1946, M. del Toro Aviles. Paratypes deposited: Gaud, NU, USNM.

Remarks. In females, setae d_4 may be inserted on the extreme anterior margin of the lobar shield. The species is named *xenops* for the genus of the avian host. The drawings are of the holotype, allotype, and a paratype male (fig. 237).

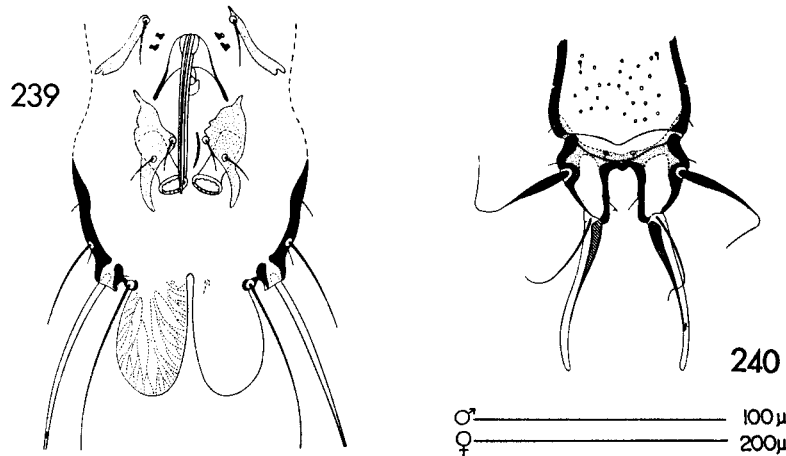
HOSTS

Furnariidae		
<i>Xenops minutus</i> (Sparrman), 1788	México	Present study

Proctophyllodes weigoldi Vitzthum

Proctophyllodes weigoldi Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 85-86, figs. 83, 84. Type host: *Turdus merula* (Turdidae).

There are two unique structures in *Proctophyllodes weigoldi*, both occurring in the females. First, the sclerotized portion border-



FIGS. 239, 240. *Proctophyllodes weigoldi* Vitzthum: male (239) and female (240) from *Turdus obscurus*.

ing the terminal cleft has a small posteriorly directed protuberance arising from the anterior margin of the cleft; this protuberance is sclerotized and is not to be confused with the end of the spermathecal duct. Second, the anterior end of the primary spermathecal duct is greatly expanded, thinly membranous, and decorated with small dark granulations.

MALE. Length, excluding lamellae, 318 μ ; width, 138 μ . *Dorsal idiosoma*: Propodosomal shield 86 μ in length, 84 μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 55 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 19.3 μ in length, 3.5 μ in width. Hysterosomal shield 183 μ in length, 97 μ in width; anterior margin straight or slightly concave; without lacunae; without ventrolateral extensions; supranal concavity 41 μ in length. Lamellae 45 μ in length, 26 μ in width, ovoid, internal margins approximate, with palmate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites III and IIIa with narrow, incomplete surface field between. Pregenital apodeme absent; genital discs separate; genital arch to level of anterior articulations of legs IV; genital organ extending slightly beyond posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields divided and bearing two pairs of setae. Adanal discs circular, each about 21 μ x 10 μ and bearing approximately 20 teeth; accessory glands absent.

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FEMALE. Length, excluding terminal appendages, 442 μ ; width, 155 μ . *Dorsal idiosoma*: Propodosomal shield 104 μ in length, 110 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 71 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 22.8 μ in length, 3.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 346 μ in length, 105 μ in width, with anterior margin shallowly concave, with small lacunae on posterior half; without supranal concavity. Lobar region articulated or incompletely fused with anterior shield; 50 μ in length; setae d_4 inserted on conjunctiva and separated by 21 μ ; lobes normal; cleft parallel-sided, 37 μ in length, 24 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_5 approximately equal in length to terminal appendages. Spermatheca with secondary ducts long, anterior portion of primary duct greatly expanded. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernible connective, without lateral extensions; epimerites without surface fields.

Type material. From *Turdus merula* (Turdidae), Helgoland; location of type unknown.

Material examined. Turdidae: 6 δ δ , 8 \varnothing \varnothing , from *Turdus obscurus*, Malaya; 2 δ δ , 4 \varnothing \varnothing , from *Turdus rufiventris*, Brazil.

Remarks. The connection between epimerites I may be barely discernible or well developed. In either condition, the appearance is not a rounded U, but an angular, or square-cornered U. The hysterosomal shields of either sex may have large, small, or no lacunae. The redescription and drawings are of specimens from the Malayan host.

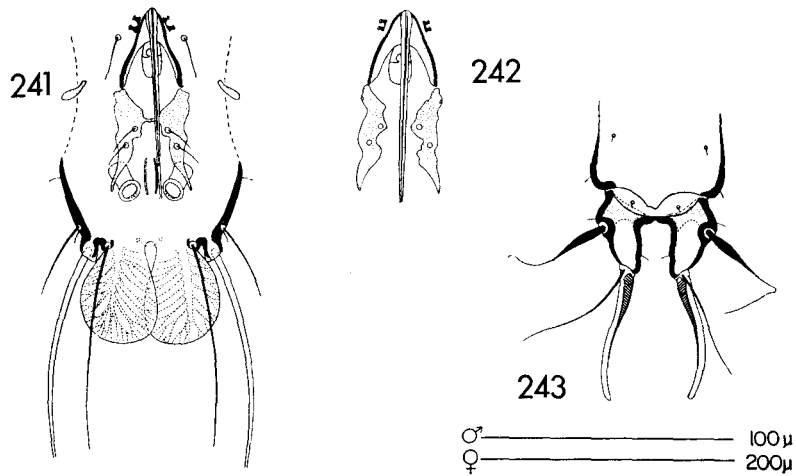
HOSTS

Turdidae		
<i>Turdus merula</i> L., 1758	Germany	Vitzthum, 1922b
<i>Turdus obscurus</i> Gmelin, 1789	Malaya	Present study
<i>Turdus rufiventris</i> Vieillot, 1818	Brazil	Present study

Proctophyllodes orthocaulus Gaud

Proctophyllodes orthocaulus Gaud, 1953, Ann. Parasitol. hum. comp., 28: 201, fig. 4(5). Type host: *Dicrurus adsimilis* (Dicruridae).

Proctophyllodes orthocaulus, Gaud and Till, 1961, Publ. So. Afr. Inst. Med. Res., 11 (L): 251.



FIGS. 241-243. *Proctophylloides orthocaulus* Gaud: males (241, 242) and female (243) from *Dicrurus atripennis*.

The females of *Proctophylloides orthocaulus*, *P. weigoldi* and *P. diglossae*, new species, are similar, however, those of *P. orthocaulus* lack the protuberance from the anterior margin of the terminal cleft as is characteristic for *P. weigoldi*. Setae d_4 are three-quarters of the length of the terminal appendages in *P. weigoldi* and one-quarter of this length in *P. diglossae*.

The males of *P. orthocaulus* differ from those of *P. weigoldi* in the diameter of the genital organ, the lengths of the adanal discs, and the shapes of the opisthogastric shields (compare figs. 241 and 239). The differences between the males of *P. orthocaulus* and *P. diglossae* are apparent in figures 241 and 244.

MALE (paratype). Length, excluding lamellae, 260 μ ; width, 114 μ . *Dorsal idiosoma*: Propodosomal shield 64 μ in length, 63 μ in width; lateral margins incised around external scapular setae; without lacunae; with external vertical setae; distance between external scapular setae, 45 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 23.5 μ in length, 2.8 μ in width. Hysterosomal shield 135 μ in length, 70 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 26 μ in length. Lamellae 39 μ in length, 29 μ in width, ovoid, internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes weakly developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate or

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weakly joined; genital organ reflexion to level of posterior articulations of legs III; genital organ extending half the distance between the posterior opisthogastric setae and the origins of the lamellae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields weakly joined by narrow bridge anterior to setae and bearing two pairs of setae. Adanal discs circular, each about $12\mu \times 8\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (paratype). Length, excluding terminal appendages, 393μ ; width, 145μ . *Dorsal idiosoma*: Propodosomal shield 87μ in length, 88μ in width; lateral margins incised around external scapular setae; without lacunae; with external vertical setae; distance between external scapular setae 67μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 22.1μ in length, 3.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 188μ in length, 93μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 55μ in length; setae d_4 inserted on conjunctiva and separated by 35μ ; lobes normal; cleft parallel-sided, 38μ in length, 24μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Dicrurus adsimilis* (Dicruridae): holotype ♂, Batangafo, Oubangui-Chari, French Equatorial Africa, 1950 (?), J. Gaud; location of type unknown.

Material examined. Dicruridae: 10 ♂♂, 7 ♀♀, from *Dicrurus atripennis*, French Equatorial Africa.

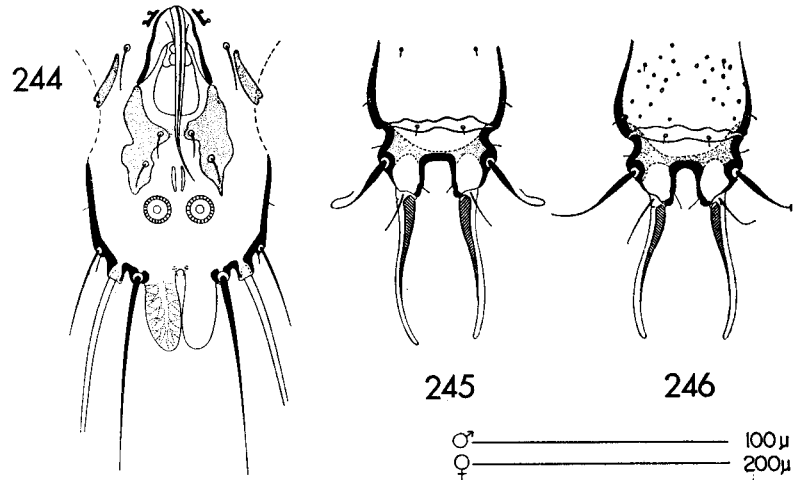
Remarks. The opisthogastric region of the males may have the shields divided or weakly joined at a level anterior to the opisthogastric setae. The redescription and drawings are of specimens from *Dicrurus atripennis*.

HOSTS

Dicruridae		
<i>Dicrurus adsimilis</i> (Bechstein), 1794	Fr. Eq. Africa	Gaud, 1953 Gaud & Till, 1961
<i>Dicrurus atripennis</i> Swainson, 1837	Fr. Eq. Africa	Present study

Proctophyllodes diglossae, new species

The seminal vesicle of this new species almost fills the area



FIGS. 244-246. *Proctophyllodes diglossae*, new species: holotype male (244), allotype female (245), female from *Piranga leucoptera* (246).

demarcated by the genital arch and anterior margin of the opisthogastric shield(s); also the distal $\frac{1}{5}$ of the genital organ is filamentous and curved.

Proctophyllodes diglossae is morphologically similar to *P. xenopis*, new species. The two species are most easily distinguished by the relative sclerotization and shape of the terminal clefts of the females: moderate sclerotization and square cleft in *P. diglossae*; heavy sclerotization and narrow, rectangular cleft in *P. xenopis*.

MALE (holotype). Length, excluding lamellae, 274 μ ; width, 119 μ . *Dorsal idiosoma*: Propodosomal shield 77 μ in length, 77 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 55 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.6 μ in length, 3.5 μ in width. Hysterosomal shield 152 μ in length, 85 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 38 μ in length. Lamellae 30 μ in length, 16 μ in width, small, parallel-sided, rounded, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites III and IIIa incompletely connected by narrow lateral surface field. Pregenital apodeme absent; genital discs united; genital arch to level of posterior articulations of legs III; genital organ extending to anal sclerites; genital sheath and penis extremely broad at

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origin and terminating in a delicate point. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields very weakly joined at level of anterior setae and bearing two pairs of setae. Adanal discs circular, nonmeasurable and bearing approximately 34 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 413 μ ; width, 143 μ . *Dorsal idiosoma*: Propodosomal shield 97 μ in length, 104 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 75 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 24.2 μ in length, 5.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 207 μ in length, 100 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 54 μ in length; setae d_4 inserted on conjunctiva and separated by 34 μ ; lobes normal; cleft parallel-sided, 30 μ in length, 21 μ in width; setae d_5 $\frac{1}{4}$ length of terminal appendages; setae l_5 $\frac{2}{3}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Diglossa baritula* (Thraupidae), Chiapas, México: holotype δ (NU), allotype ♀ (NU), 1 δ paratype, Tumbalá, June 19, 1945, M. del Toro Aviles; 3 δ δ , 1 ♀ paratypes, Villa Tacaná, April 8, 1943, M. del Toro Aviles. Paratypes deposited: Gaud, NU.

Additional material. Thraupidae: 2 δ δ , 5 ♀ ♀ , from *Piranga leucoptera*, British Honduras.

Remarks. Beecher (1951) considers the Coerebidae an unnatural group and reassigns the genera to Thraupidae and Parulidae. The hosts of *Proctophyllodes diglossae* support Beecher's investigations.

The apparent variations in this species are: the opisthogastric shields of the males may be divided or weakly joined; the anterior hysterosomal shields of the females may or may not be lacunate. The name *diglossae* is derived from the type host. The drawings are of the holotype, allotype, and a female from *Piranga leucoptera* (fig. 246).

HOSTS

Thraupidae (= Coerebidae, in part)

Diglossa baritula

México

Present study

Wagler, 1832

Piranga leucoptera

México

Present study

(Trudeau), 1839

Group VIII—the *tricetratus* group

This small group of species can only be characterized by the short genital organ and the reduced sclerotization of the opisthogastric region. Certain species are difficult to identify if the genital organ has been severely distorted during the preparation of the specimens. An example of this type of distortion is illustrated in figures 257 and 258.

Pertinent characters for species differentiation, males:

1. Position of the genital arch and genital organ in relation to the genital discs, setae c_2 and the opisthogastric setae.
2. Size and shape of the terminal lamellae.
3. Development of the opisthogastric shields.

Pertinent characters for species differentiation, females:

1. Presence or absence of terminal appendages, hysterosomal lobes, and supranal concavity.
2. Size and shape of the terminal cleft.
3. Presence or absence of dark marginal bands on the hysterosomal shield.
4. Position of setae d_4 .
5. Relative lengths of the terminal appendages and setae d_5 .

Key to the species of group VIII

1. Genital organ extending to or beyond the tips of the genital arch 2
Genital organ very small, extending less than half the distance between the apex of the genital arch and the tips of the arch..... *microcaulus*, p. 249
2. Terminal lamellae of male less than 50μ in length..... 3
Terminal lamellae more than 150μ in length.....
..... *ceratophyllus*, n. sp., p. 251
3. Anterior opisthogastric setae inserted on separate shields or on small, distinct shield connecting tips of genital arch... 4
Anterior opisthogastric setae not inserted on shields..... 6
4. Female with terminal appendages 5
Female without terminal appendages; setae d_5 and l_5 long; setae d_4 inserted on anterior margin of lobar shield
..... *petroniae*, n. sp., p. 254
5. Female with setae d_5 short, about $\frac{1}{5}$ length of terminal appendages; hysterosomal shield with dark lateral bands...
..... *pullizonatus*, n. sp., p. 256

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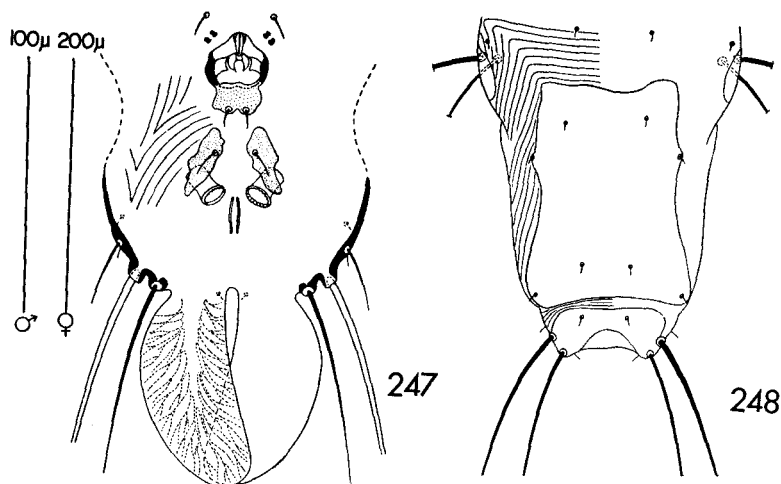
- Female with setae d_5 about $1/2$ length of terminal appendages; hysterosomal shield without dark lateral bands.....
.....*tricetratus*, n. sp., p. 257
6. Supranal concavity of male anteriorly as wide as diameter of adanal discs, venation of lamellae pinnate.....
.....*stachyris*, n. sp., p. 259
- Supranal concavity of male narrow; venation in truncated lamellae radiating from central area.....*minlae*, n. sp., p. 261

Proctophyllodes microcaulus Gaud

- Proctophyllodes truncatus* (in part), Vitzthum, 1922*b*, Arch. Naturgeschichte, A, 5(88): 47–51, figs. 38–44.
- Proctophyllodes truncatus* (in part), Vitzthum, 1929, Tierwelt Mitteleuropas, 3(3): 99.
- Proctophyllodes microcaulus* Gaud, 1957, Soc. Sci. nat. Phys. Maroc, 37: 120–121, figs. 6B, 6C. Type host: *Galerida cristata riggenbachi* (Alaudidae).
- Proctophyllodes truncatus*, Lichard, 1962, Biología, 17(7): 534.
- Proctophyllodes truncatus*, Vassilev, 1962, Bulg. Acad. Sci., Bull. Dept. Biol. Sci., p. 159.

The genital and opisthogastric regions, the configuration of epimerites I, and the unusual positions of the subhumeral setae, are characteristic for this species. Epimerites I are united in the form of an inverted π . The long subhumeral setae are approximate to the humeral setae and anteromedial to the positions found in other *Proctophyllodes* species. The anterior hysterosomal shield is reduced and does not include the insertions of setae d_1 .

MALE. Length, excluding lamellae, 319 μ ; width, 190 μ . *Dorsal idiosoma*: Propodosomal shield 92 μ in length, 96 μ in width; lateral margins incised behind internal scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 71 μ . Humeral shields well developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae setiform, 43 μ in length. Hysterosomal shield 155 μ in length, 107 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 25 μ in length. Lamellae 76 μ in length, 36 μ in width, oblong, with apices overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I shaped as inverted π , with lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level between legs III and IV; genital



FIGS. 247, 248. *Proctophylloides microcaulus* Gaud: male (247) and female (248) from *Eremophila alpestris*.

organ extending to level less than half the distance between apex and tips of genital arch; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing two pairs of setae. Adanal discs circular, each about $15\mu \times 11\mu$ and bearing approximately 16 teeth; accessory glands absent.

FEMALE. Length, 415μ ; width, 205μ . *Dorsal idiosoma*: Propodosomal shield 110μ in length, 112μ in width; lateral margins incised behind internal scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 71μ . Humeral shields well developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae setiform, 53μ in length. Hysterosoma without lobes and without terminal appendages; anterior shield 179μ in length, 106μ in width, with anterior margin irregular with shallow concavity, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 37μ in length; setae d_4 inserted on lobar shield and separated by 35μ ; lobes absent; setae d_5 $\frac{3}{4}$ length of setae l_5 . Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I shaped as inverted π , with lateral extensions; epimerites without surface fields.

Type material. From *Galerida cristata* (Alaudidae): holotype δ (Gaud), allotype ♀ (Gaud), 1 δ paratype (Gaud), Si Allal Tazi, Rabat region, French Morocco, August, 1944, J. Mouchet.

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Material examined. Alaudidae: 1 ♂, 3 ♀♀, from *Galerida cristata*, Fr. Morocco; 3 ♂♂, 5 ♀♀, from *Eremophila alpestris*, Alaska, Oklahoma, South Dakota.

Remarks. Vitzthum (1922*b*) identified specimens from *Eremophila alpestris* as *Proctophyllodes truncatus* Robin. This error is indicated by the redescription and especially by Vitzthum's figures in which the unique characteristics of *P. microcaulus* are illustrated. Vitzthum included *Carduelis carduelis* as a host for this species, however, the present authors question this record.

In one figure, Vitzthum (1922*b*) illustrated the usual and unusual conditions of the terminal appendages and setae d_5 . The usual condition is that terminal appendages are lacking, and setae d_5 are almost equal in length to setae l_5 . The unusual condition is that terminal appendages are present and setae d_5 are short. In the present study females so constructed have been examined. The redescription and drawings are based on specimens from *Eremophila alpestris*.

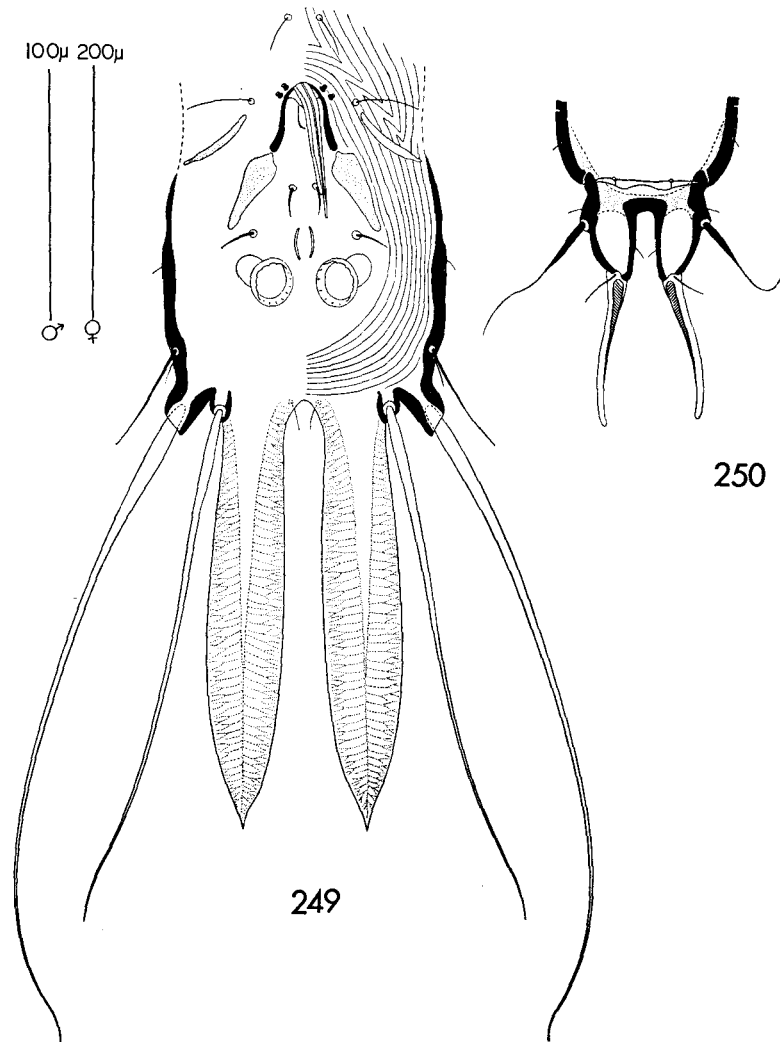
HOSTS

Alaudidae		
<i>Eremophila alpestris</i> (L.), 1758	United States	Vitzthum, 1922 <i>b</i> Present study
<i>Galerida cristata</i> (L.), 1758	Fr. Morocco	Gaud, 1957 Present study
	Europe	Lichard, 1962 Vassilev, 1962 Present study
<i>Galerida theklae</i> (Brehm), 1858	Fr. Morocco	Gaud, 1957
<i>Melanocorypha calandra</i> (L.), 1766	Fr. Morocco	Gaud, 1957

Proctophyllodes ceratophyllus, new species

The long, attenuate, and parallel-sided terminal lamellae of the male are distinctive for this unique species, and it is one of the few species in which the opisthogastric setae are not inserted on opisthogastric shields. The structures of the genital and opisthogastric regions of *Proctophyllodes ceratophyllus* are similar to those of *P. petroniae*, new species, and *P. stachyris*, new species. The short lamellae of the related species are quite different from those of *P. ceratophyllus*.

MALE (holotype). Length, excluding lamellae, 318 μ ; width, 150 μ . *Dorsal idiosoma*: Propodosomal shield 93 μ in length, 122 μ in width; lateral margins entire; with few small lacunae anterior to scapular setae; without external vertical setae; distance between



FIGS. 249, 250. *Proctophylloides ceratophyllus*, new species: holotype male (249), allotype female (250).

external scapular setae, 66μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.9μ in length, 3.5μ in width. Hysterosomal shield 283μ in length, 110μ in width; anterior margin straight; with small lacunae; without ventrolateral extensions; supranal concavity 60μ in length. Lamellae 162μ in length, 28μ in width, elongate, parallel-sided, apically attenuate, internal margins parallel, with pinnate

The Feather Mite Genus Proctophyllodes

venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites with narrow, posterolateral surface field. Pregenital apodeme absent; genital discs separate; genital arch to level midway between legs III and IV; genital organ extending almost to posterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate, each directed posterolaterally from genital arch and not bearing setae. Adanal discs circular, nonmeasurable and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 440 μ ; width, 214 μ . *Dorsal idiosoma*: Propodosomal shield 95 μ in length, 145 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 90 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.2 μ in length, 3.5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 207 μ in length, 131 μ in width, with anterior margin straight or shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with or incompletely fused with anterior shield; 79 μ in length; setae d_4 inserted on posterior margin of anterior shield and separated by 41 μ ; lobes normal; cleft parallel-sided, 55 μ in length, 15 μ in width; setae d_5 $\frac{1}{4}$ length of terminal appendages; setae l_5 approximately equal in length to terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Zosterops conspicillata* (Zosteropidae): holotype δ (CMNH), allotype φ (CMNH), 2 $\delta\delta$ paratypes (NU), Ritidian Point, Guam Island, Marianas, May 29, 1945, H. S. Dybas.

Additional material. Zosteropidae: 3 $\delta\delta$, 2 $\varphi\varphi$, from *Zosterops pallidus*, Cape Province, Union of South Africa; 2 $\delta\delta$, from *Zosterops albogularis*, Norfolk Island (Australia). Eurylaimidae: 1 δ , from *Psarismus dalhousiae*, Borneo. Parulidae: 1 δ , 2 $\varphi\varphi$, from *Eremomela scotops*, Mozambique.

Remarks. The material examined from this new species includes diverse sources, namely, the collections of the Chicago Natural History Museum, J. Gaud, South African Institute for Medical Research, and E. L. Trouessart. It should be noted that all of the collections are small, and the only related hosts are representatives from the family Zosteropidae. Thus, it is quite possible that the

hosts, other than those of the cited family, represent accidental infestations. The name *ceratophyllus* is chosen to denote the peculiar shape of the terminal lamellae of the male. The drawings are of the holotype and allotype.

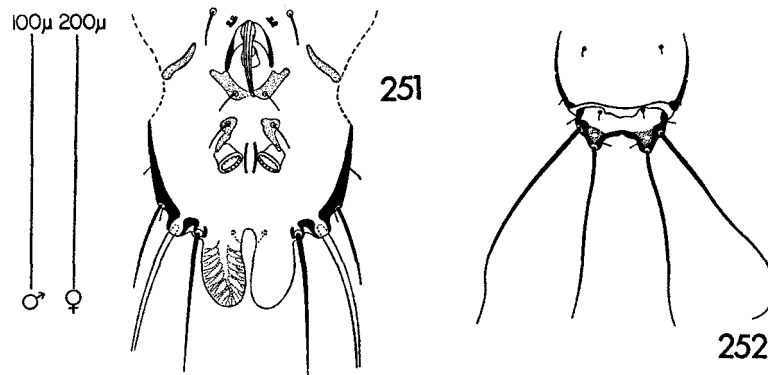
HOSTS

Zosteropidae		
<i>Zosterops albogularis</i>	Australia	Present study
<i>Zosterops conspicillata</i> Kittlitz	Marianas	Present study
<i>Zosterops pallidus</i> Swainson, 1838	Un. So. Africa	Present study
Eurylaimidae (questionable record)		
<i>Psarisomus dalhousiae</i> (Jameson), 1835	Borneo	Present study
Sylviidae (questionable record)		
<i>Eremomela scotops</i> Sundevall, 1850	Mozambique	Present study

Proctophyllodes petroniae, new species

The almost rectangular arrangement of the opisthogastric setae might indicate that this species is closely allied to species of the *quadrata* complex, but the structure of the male genital region and the lack of the ventrolateral apodemes negates this premise. This new species is also closely related to *P. minlae*, new species, but can be readily distinguished as the females lack terminal appendages.

MALE (holotype). Length, excluding lamellae, 261 μ ; width, 130 μ . Dorsal idiosoma: Propodosomal shield 73 μ in length, 87 μ in width; lateral margins entire; with few lacunae on anterior $\frac{1}{4}$;



FIGS. 251, 252. *Proctophyllodes petroniae*, new species: holotype male (251), allotype female (252).

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with external vertical setae; distance between external scapular setae, 61μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae setiform, 19.3μ in length. Hysterosomal shield 152μ in length, 107μ in width; anterior margin sinuous; without lacunae; without ventrolateral extensions; supranal concavity 28μ in length. Lamellae 29μ in length, 15μ in width, small, parallel-sided, apically rounded, internal margins not overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level slightly anterior to anterior articulations of legs IV; genital organ extending to anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields fragmented into three shields of which anterior shield connects tips of genital arch and bears anterior pair of opisthogastric setae, posteriorly two small shields, each bearing one opisthogastric seta. Adanal discs circular, not measurable, although length is less than diameter, each bearing approximately 24 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 371μ ; width, 163μ . *Dorsal idiosoma*: Propodosomal shield 83μ in length, 102μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 75μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae setiform, 21.2μ in length. Hysterosoma with lobes and without terminal appendages; anterior shield 201μ in length, 117μ in width, with anterior margin sinuous, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 31μ in length; setae d_4 inserted on anterior margin of lobar shield and separated by 28μ ; lobes absent; cleft reduced, 15μ in length; setae d_5 and l_5 very long. Spermatheca as in *pinnatus* except with vulva 2 times longer. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, with minute lateral extensions; epimerites without surface fields.

Type material. From *Petronia superciliaris* (Ploceidae): holotype ♂ (SAIMR), allotype ♀ (SAIMR), 3 ♂♂, 4 ♀♀, Buzi, Mozambique, September 7, 1961, F. Zumpt. Paratypes deposited: Gaud, NU, SAIMR.

Remarks. The name *petroniae* indicates the genus of the type host. The drawings are of the holotype and allotype.

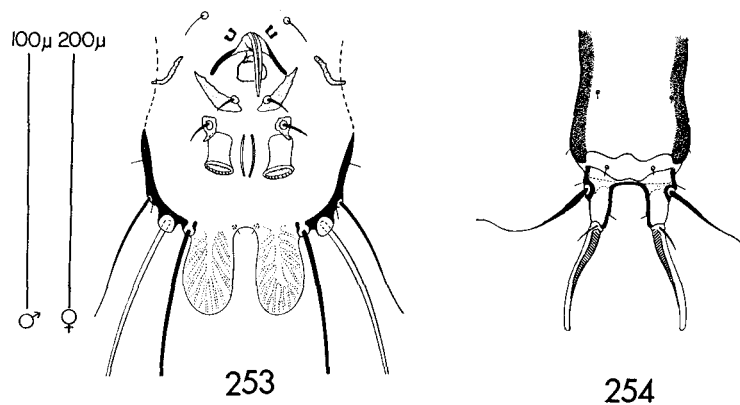
HOSTS

Ploceidae		
<i>Petronia superciliaris</i>	Mozambique	Present study
(Blyth), 1845		

Proctophyllodes pullizonatus, new species

Proctophyllodes pullizonatus, new species, is similar to *P. tricetratus*, new species. The former species is distinguished by dark, lateral bands on the anterior hysterosomal shield of the females and the genital organ extending to the anterior opisthogastric setae in the male. Conversely, in *P. tricetratus*, the dark bands are wanting in the female, and the genital organ extends to the tips of the genital arch in the male.

MALE (holotype). Length, excluding lamellae, 278 μ ; width, 142 μ . *Dorsal idiosoma*: Propodosomal shield 73 μ in length, 73 μ in width; lateral margins incised behind internal scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 50 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 14 μ in length, 2.5 μ in width. Hysterosomal shield 152 μ in length, 78 μ in width; anterior margin concave; without lacunae; without ventrolateral extensions; supranal concavity 32 μ in length. Lamellae 35 μ in length, 20 μ in width, oblong, internal margins not overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to anterior



FIGS. 253, 254. *Proctophyllodes pullizonatus*, new species: holotype male (253), allotype female (254).

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articulations of legs IV; genital organ extending to level of anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields fragmented, each unit bearing a seta. Adanal discs circular, each about $16\mu \times 10\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 418μ ; width, 165μ . *Dorsal idiosoma*: Propodosomal shield 87μ in length, 88μ in width; lateral margins incised behind internal scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 66μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; sub-humeral setae lanceolate, 17μ in length, 3.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 190μ in length, 90μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 50μ in length; setae d_4 inserted on conjunctiva and separated by 36μ ; lobes normal; cleft slightly divergent, 35μ in length, 24μ in width; setae d_5 $\frac{1}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with moderate connective, without lateral extensions; epimerites IIa with surface fields.

Type material. From *Dolichonyx oryzivorus* (Icteridae): holotype ♂ (NU), allotype ♀ (NU), 22 ♂♂, 21 ♀♀ paratypes, 3 miles west Danville, Bienville Parish, Louisiana, May 18, 1950, R. E. Tucker. Paratypes deposited: André, BAS, BMNH, CAS, Gaud, MN, NU, Radford, RNH, SAIMR, SEA, USNM, ZSBS, ZSZM.

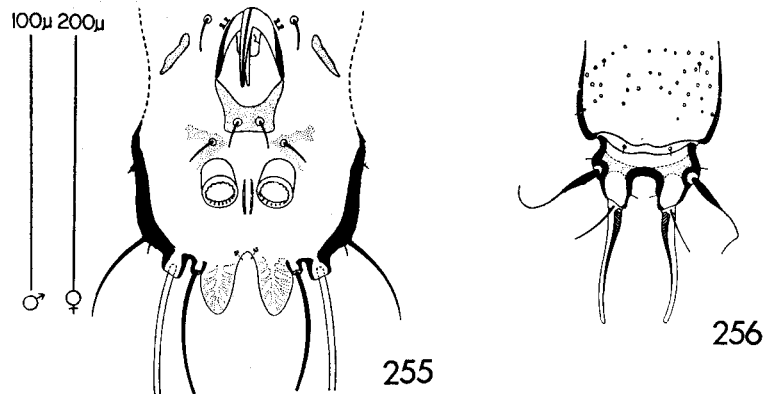
Remarks. The apodemes (including the epimerites) are reddish-brown in color. The specific name, *pullizonatus*, is derived from the condition of the dark hysterosomal borders. The drawings are of the holotype and allotype.

HOSTS

Icteridae		
<i>Dolichonyx oryzivorus</i> (L.), 1758	United States	Present study

Proctophyllodes tricetratus, new species

The males of *Proctophyllodes tricetratus*, new species, can be distinguished from those of the preceding species, *P. pullizonatus*, new species, by the shape of the opisthogastric shield and the shape of the lamellae (compare figs. 253 and 255). The females of these two species can be separated as follows: in *P. tricetratus*, the



FIGS. 255, 256. *Proctophyllodes tricetratus*, new species: holotype male (255), allotype female (256).

anterior hysterosomal shield lacks darkened lateral margins; in *P. pullizonatus*, these bands are present.

MALE (holotype). Length, excluding lamellae, 276μ; width, 142μ. *Dorsal idiosoma:* Propodosomal shield 78μ in length, 87μ in width; lateral margins entire; with very sparse lacunae; with external vertical setae; distance between external scapular setae, 54μ. Humeral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 12μ in length, 4μ in width. Hysterosomal shield 154μ in length, 87μ in width; anterior margin straight; with lacunae; without ventrolateral extensions; supranal concavity 29μ in length. Lamellae 25μ in length, 13μ in width, triangular, internal margins approximate with pinnate venation. *Ventral idiosoma:* Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs joined; genital arch to anterior articulations of legs IV; genital organ extending slightly beyond posterior limits of genital arch; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields fragmented and bearing two pairs of setae. Adanal discs circular, each about 16μ x 11μ and bearing approximately 16 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 405μ; width, 154μ. *Dorsal idiosoma:* Propodosomal shield 90μ in length, 111μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 74μ. Humeral shields well developed and bearing setae l_1 at extreme

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anteromedial angles; subhumeral setae lanceolate, 16 μ in length, 4 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 217 μ in length, 109 μ in width, with anterior margin straight, with lacunae; without supranal concavity. Lobar region articulated with anterior shield; 56 μ in length; setae d_4 inserted on conjunctiva and separated by 36 μ ; lobes normal; cleft parallel-sided, 24 μ in length, 21 μ in width; setae d_5 $\frac{1}{2}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Spiza americana* (Fringillidae), Texas; holotype δ (NU), allotype φ (NU), 8 δ δ , 13 φ φ paratypes, 9 miles east Stinnett, Hutchinson County, June 15, 1950, W. L. Thompson; paratypes: 3 δ δ , 3 φ φ , Tarrant County, May 1, 1945; 2 δ δ , 2 φ φ , Hick's Ranch, Terrell County, July 7, 1949, W. A. Thornton. Paratypes deposited: BAS, BMNH, Gaud, SAIMR, USNM.

Remarks. In male and female specimens, lacunae may or may not be present on the propodosomal shield, however, when present, the lacunae are sparsely distributed. The name *tricetratus* denotes the three opisthogastric shields in the male. The drawings are of the holotype and allotype.

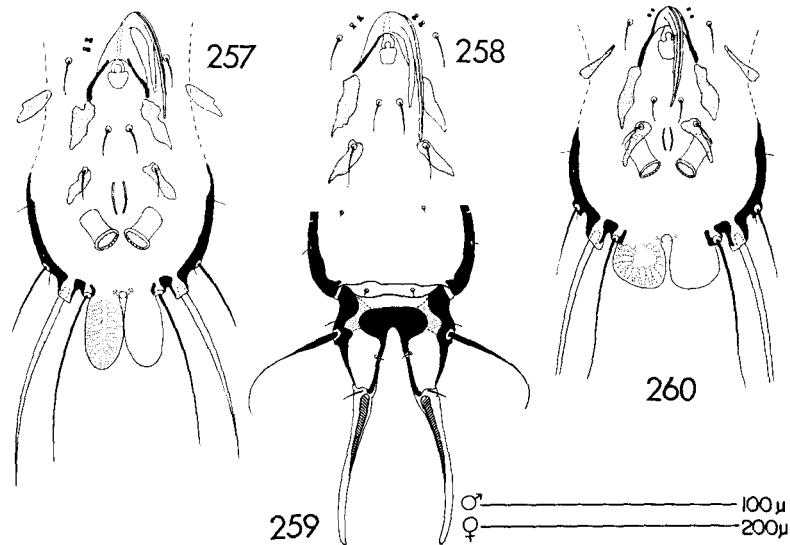
HOSTS

Fringillidae		
<i>Spiza americana</i>	United States	Present study
(Gmelin), 1789		

Proctophyllodes stachyris, new species

The ovoid lamellae and the short genital sheath distinguish the new species, *Proctophyllodes stachyris*, from the closely related *P. minlae*, new species. The latter species has nearly square lamellae and the genital sheath extends the entire length of the penis.

MALE (holotype). Length, excluding lamellae, 270 μ ; width, 138 μ . *Dorsal idiosoma*: Propodosomal shield 77 μ in length, 86 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 51 μ . Humeral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 13.8 μ in length, 2.8 μ in width. Hysterosomal shield 146 μ in length, 86 μ in width; anterior margin straight; without lacunae; without ventrolateral extensions; supranal concavity 39 μ in length. Lamellae 30 μ in length, 15 μ in width, inner margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with



FIGS. 257-260. *Proctophyllodes stachyris*, new species: holotype male (257), paratype female (259); *Proctophyllodes minlae*, new species: holotype male (260).

weak connective, without lateral extensions; epimerites I-IVa without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to posterior articulations of legs III; genital organ extending to anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields fragmented and posterior shields bearing one pair of setae. Adanal discs circular, each about $12\mu \times 8\mu$ and bearing approximately 22 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 425μ ; width, 170μ . *Dorsal idiosoma*: Propodosomal shield 86μ in length, 128μ in width; lateral margins entire; without lacunae; with external vertical setae (?); distance between external scapular setae, 80μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 14.5μ in length, 2.8μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 197μ in length, 114μ in width, with anterior margin straight, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 79μ in length; setae d_4 inserted on conjunctiva and separated by 32μ ; lobes elongate; cleft divergent in the form of a triangle, 51μ in length; setae d_5 minute; setae l_5 approximately equal in length to terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apo-

The Feather Mite Genus *Proctophyllodes*

demes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Stachyris poliocephala* (Timaliidae): holotype ♂ (NU), allotype ♀ (NU), 14 ♂♂, 17 ♀♀ paratypes (from eight birds), Gombak, Malaya, January 10, 1964. Paratypes deposited: André, BAS, BMNH, CAS, Gaud, NU, USNM.

Additional material. Timaliidae: 2 ♂♂, 3 ♀♀, from *Macronus ptilosus*, Malaya.

Remarks. When the genital organ is in the normal position, the tip extends approximately to the anterior row of opisthogastric setae. When the genital organ has been distorted by mounting, the tip may extend to the posterior row of setae (fig. 258). The name *stachyris* is chosen to indicate the type host. The drawings are of the holotype, allotype, and a male paratype (fig. 258).

HOSTS

Timaliidae		
<i>Macronus ptilosus</i>	Malaya	Present study
Jardine & Shelby, 1835		
<i>Stachyris poliocephala</i>	Malaya	Present study
(Temminck), 1836		

Proctophyllodes minlae, new species

Females are unknown for this new species, but the males indicate that the species is closely related to *Proctophyllodes stachyris*, new species. The very narrow supranal concavity and radiate venation of the terminal lamellae are sufficient to distinguish *P. minlae* from *P. stachyris*. The latter species has a broad supranal concavity and pinnate venation.

MALE (holotype). Length, excluding lamellae, 265 μ ; width, 130 μ . *Dorsal idiosoma*: Propodosomal shield 77 μ in length, 99 μ in width; lateral margins entire; with few small lacunae on anterior half; with external vertical setae; distance between external scapular setae, 54 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 11.7 μ in length, 2.1 μ in width. Hysterosomal shield 152 μ in length, 98 μ in width; anterior margin straight; with few small lacunae; without ventrolateral extensions; supranal concavity 30 μ in length. Lamellae 21 μ in length, 19 μ in width, small, rectangular, with radiate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I narrowly U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital organ reflexion to level mid-

way between legs III and IV; genital organ extending to anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields fragmented and two posterior plates each bearing one seta. Adanal discs circular, each about $14\mu \times 8\mu$ and bearing approximately 30 teeth; accessory glands absent.

FEMALE. Unknown.

Type material. From *Minla cyanouroptera* (Timaliidae): holotype ♂ (NU), allotype ♀ (NU), 1 ♂ paratype (NU), Mt. Brinchang, Pahang, Malaya, November 22, 1961.

Remarks. The ambulacra are unusual for *Proctophyllodes* as each has a spine-like projection at the apex. The name *minlae* has been selected for the avian host. The drawing is of the holotype.

HOSTS

Timaliidae		
<i>Minla cyanouroptera</i> (Hodgson) (= <i>Siva c.</i>)	Malaya	Present study

Group IX—the *musicus* group

In their typical form, the arbitrary characters employed to differentiate group IX and group X are easily observable, that is, the opisthogastric shields divided or weakly connected in group IX *versus* the opisthogastric shields broadly connected in group X. The various configurations of the shields reflect the amount of sclerotization of this region; this in turn may determine whether or not the anterior opisthogastric setae are inserted on or off the opisthogastric shields. As could be expected, species in either group may have more or less sclerotization than is typical for that species; consequently the atypical form would be difficult to determine; see figures 280–282.

Pertinent characters for species differentiation, males:

1. Length of the genital organ in respect to the genital arch.
2. Size and shape of the terminal lamellae.
3. Length to diameter ratio of the adanal discs.
4. Positions of the opisthogastric setae.
5. Presence or absence of adanal accessory glands.

Pertinent characters for species differentiation, females:

1. Size and shape of the terminal cleft.
2. Relative lengths of the terminal appendages and setae d_5 .
3. Positions of setae d_4 .
4. Articulation or fusion of the lobar region with the anterior hysterosomal shield.

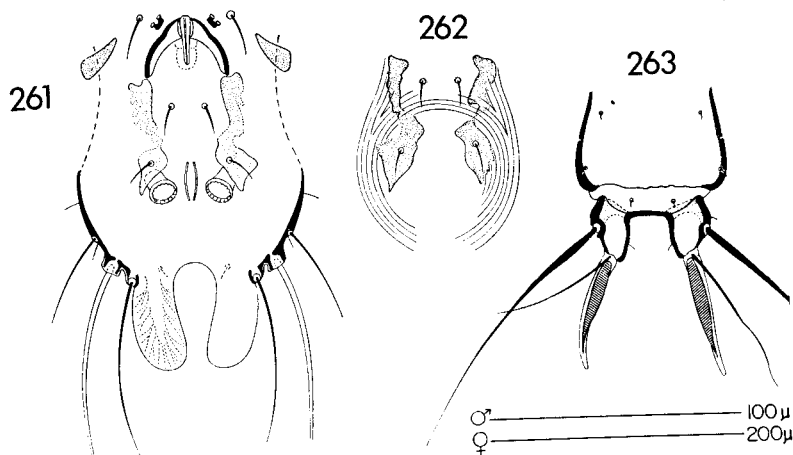
- shields, total length (excluding lamellae) more than 300 μ , and lamellae about 48 μ x 39 μ*leptocaulus*, p. 276
 Female with setae d_5 $\frac{3}{4}$ length of terminal appendages; males with genital organ and opisthogastric shields approximately equal in length, total length (excluding lamellae) usually less than 300 μ , and lamellae about 30 μ x 20 μ*hipposideros*, p. 278
9. Anterior opisthogastric setae inserted on shields.....10
 Anterior opisthogastric setae not inserted on shields.....13
 10. Male without adanal accessory glands; female with short hysterosomal lobes which form archlike cleft.....11
 Male with adanal accessory glands; female with well-developed hysterosomal lobes.....*macedo*, p. 280
 11. Genital structures not robust; terminal lamellae with length and width approximately equal.....12
 Genital arch, genital organ and seminal vesicle disproportionately large; terminal lamellae two times longer than wide.....*gularis*, n. sp., p. 282
 12. Female with supranal concavity and with setae d_4 approximate.....*sialiae*, n. sp., p. 285
 Female without supranal concavity and with setae d_4 distant.....*saltatoris*, n. sp., p. 286
 13. Males with epimerites I strongly connected and with length to width ratio of discs of 1:1; female with elongate lacunae on anterior hysterosomal shield.....*tenericaulus*, p. 288
 Males with epimerites I weakly connected and with length to width ratio of adanal discs of 3:2; female without lacunae on anterior hysterosomal shield.....*picae*, p. 290

Proctophyllodes dasyxiphus, new species

The short genital organ and the widely separated lamellae of the male and the large internal supporting rods in the terminal appendages of the females form a unique combination of characters. The short genital organ of *Proctophyllodes dasyxiphus* is similar to that of *P. microcaulus*, but the latter species has a differently constructed genital arch, and the females have reduced terminal lobes.

MALE (holotype). Length, excluding lamellae, 300 μ ; width, 151 μ . *Dorsal idiosoma*: Propodosomal shield 79 μ in length, 87 μ in width; lateral margins incised almost completely around external scapular setae; without lacunae; with external vertical setae; distance between external scapular setae, 57 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles;

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Figs. 261–263. *Proctophyllodes dasyxiphus*, new species: holotype male (261), paratype male (262), allotype female (263).

subhumeral setae setiform, 24.2μ in length. Hysterosomal shield 163μ in length, 87μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 26μ in length. Lamellae 41μ in length, 17μ in width, parallel-sided, bluntly rounded, internal margins distant, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad, weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs united; genital arch to level of anterior articulations of legs IV; genital organ not attaining tips of genital arch; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing posterior pair of setae. Adanal discs circular, nonmeasurable, length less than diameter and bearing approximately 22 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 425μ ; width, 189μ . *Dorsal idiosoma*: Propodosomal shield 104μ in length, 112μ in width; lateral margins incised almost around external scapular setae; without lacunae; with external vertical setae; distance between external scapular setae, 73μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae setiform, 28.0μ in length. Hysterosoma with lobes and with widened terminal appendages; anterior shield 224μ in length, 102μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 47μ in length; setae d_4 inserted on con-

junctiva and separated by 32μ ; lobes short; cleft slightly divergent, 31μ in length, 28μ in width; setae d_5 slightly longer than terminal appendages; setae l_5 about three times length of terminal appendages. Spermatheca with secondary ducts long, anterior of primary duct narrow. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad, weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Oriolus larvatus* (Oriolidae): holotype δ (Gaud), allotype φ (Gaud), 5 $\delta\delta$, 7 $\varphi\varphi$ paratypes (Gaud, NU), Cape Province, Union of South Africa, January, 1954.

Remarks. The terminal appendages of the females have a construction different than other species of *Proctophyllodes*. In this new species, the internal support of each appendage is almost as large as the appendage; in other species, the support tapers to a small, elongate termination.

Proctophyllodes dasyxiphus, a manuscript name given to this species by J. Gaud, has been selected for the shape of the genital organ. The drawings are of the holotype, allotype, and a male paratype. The latter drawing is included to illustrate the striation pattern in the opisthogastric region of the males.

HOSTS

Oriolidae		
<i>Oriolus larvatus</i>	Un. So. Africa	Present study
Lichtenstein, 1823		

Proctophyllodes musicus Vitzthum

Proctophyllodes musicus Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 68-72, figs. 51-57. Type host: *Turdus musicus* (Turridae).

Proctophyllodes musicus, Vitzthum, 1929, Tierwelt Mitteleuropas, 3(3): 100.

Proctophyllodes musicus, Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37(2): 122.

Proctophyllodes musicus, Vassilev, 1960, Bulgarian Acad. Sci., Proc. Zool. Inst., 9: 432-433.

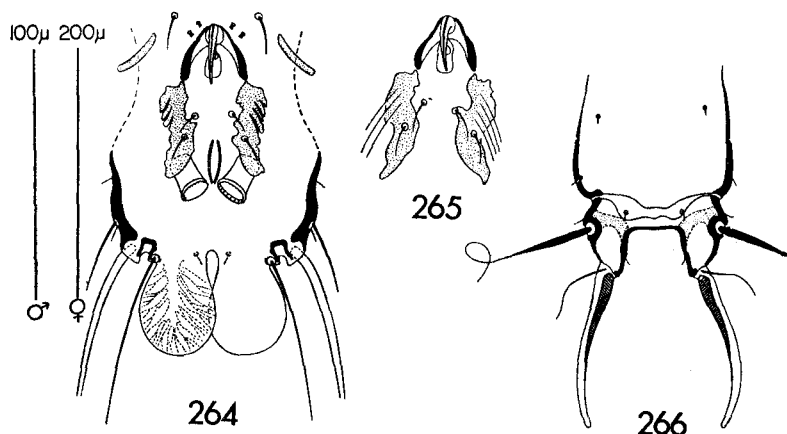
Proctophyllodes musicus, Fritsch, 1961, Z. Parasitenk., 21: 24, figs. 18a-c.

Proctophyllodes musicus, Lichard, 1962, Biología, 17(7): 534.

Proctophyllodes musicus, Vassilev, 1962, Bulgarian Acad. Sci., Bull. Dept. Biol. Sci., p. 159.

Proctophyllodes musicus and *P. tenericaulus* each have a short

The Feather Mite Genus *Proctophyllodes*



FIGS. 264-266. *Proctophyllodes musicus* Vitzthum: males (264, 265) and female (266) from *Turdus merula*.

curved genital organ which extends approximately to the tips of the genital arch. The terminal cleft of the females in each of these species is wider than long. Species differentiation can be based on the relative positions of the opisthogastric setae and the comparative lengths of setae d_5 in the female.

MALE. Length, excluding lamellae, 287 μ ; width, 143 μ . *Dorsal idiosoma*: Propodosomal shield 77 μ in length, 82 μ in width; lateral margins incised slightly in front and behind external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 56 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.9 μ in length, 2.8 μ in width. Hysterosomal shield 162 μ in length, 86 μ in width; anterior margin concave; without lacunae; without ventrolateral extensions; supranal concavity 35 μ in length. Lamellae 40 μ in length, 28 μ in width, ovoid, inner margins not overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level of anterior articulations of legs IV; genital organ extending slightly beyond posterior limits of genital arch; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing one pair of setae. Adanal discs circular, each about 14 μ x 12 μ and bearing approximately 26 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 463 μ ; width,

179 μ . *Dorsal idiosoma*: Propodosomal shield 99 μ in length, 114 μ in width; lateral margins incised weakly anterior and posterior of external scapular setae; without lacunae; with external vertical setae (?); distance between external scapular setae, 81 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7 μ in length, 4.1 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 235 μ in length, 114 μ in width, with anterior margin shallowly concave, with few lacunae on posterior $\frac{1}{4}$ of shield; without supranal concavity. Lobar region articulated with anterior shield; 48 μ in length; setae d_4 inserted on conjunctiva and separated by 46 μ ; lobes short; cleft parallel-sided or slightly divergent, 31 μ in length, 36 μ in width; setae d_5 $\frac{1}{2}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Turdus musicus* (Turdidae), Europe (?); location of type unknown.

Material examined. Turdidae: 1 δ , 4 ♀ , from *Turdus ericetorum*, England; 1 δ , 1 ♀ , from *Turdus iliacus*, Europe; 10 δ δ , 25 ♀ ♀ , from *Turdus merula*, Bulgaria, England, Germany; 2 δ δ , 3 ♀ ♀ , from *Turdus migratorius*, United States; 2 δ δ , 2 ♀ ♀ , from *Turdus naumanni*, China; 2 δ δ , 3 ♀ ♀ , from *Turdus olivaceous*, Union of South Africa.

Remarks. Ultimately, *Proctophyllodes musicus* should be found to be cosmopolitan and restricted to birds of the genus *Turdus*. To date, other *Proctophyllodes* species known to occur on members of Turdidae are rarely reported from *Turdus*.

The presence or absence of lacunae, which is not a specific character, but one varying considerably within a species, is found as a gradient within *P. musicus*. There is no apparent correlation with geographic or host distribution. The anterior opisthogastric setae, normally not inserted on the shields, are occasionally connected to the shields by weak extensions of these shields. The redescription and drawings are based on specimens from *Turdus merula* collected in Bulgaria.

HOSTS

Turdidae		
<i>Turdus ericetorum</i> Turton, 1796	Europe	Present study
<i>Turdus iliacus</i> L., 1766	Europe	Present study

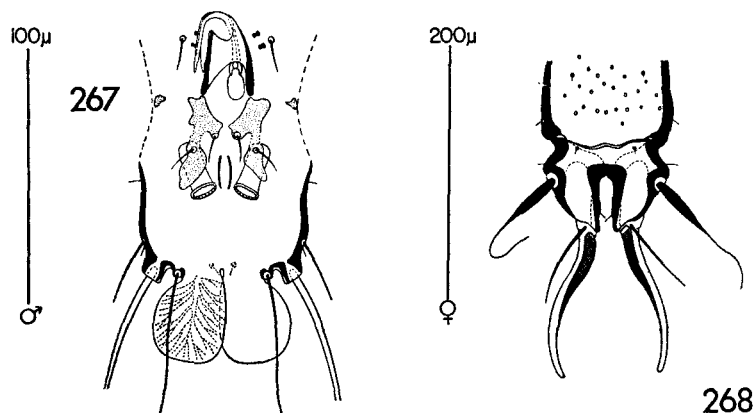
The Feather Mite Genus Proctophyllodes

<i>Turdus merula</i> L., 1758	Europe	Vassilev, 1960 Lichard, 1962 Present study
<i>Turdus migratorius</i> L., 1766	Fr. Morocco United States	Gaud, 1957 Present study
<i>Turdus musicus</i> L., 1758	Europe	Vitzthum, 1922 <i>b</i> , 1929
<i>Turdus naumanni</i> Temminck, 1820	Asia	Present study
<i>Turdus olivaceus</i> L., 1766	Un. So. Africa	Present study
<i>Turdus philomelos</i> C. L. Brehm, 1831	Europe	Fritsch, 1961
<i>Turdus pilaris</i> L., 1758	Europe	Vitzthum, 1922 <i>b</i> , 1929 Fritsch, 1961 Lichard, 1962
<i>Turdus torquatus</i> L., 1758	Europe	Vitzthum, 1922 <i>b</i> , 1929
<i>Turdus viscivorus</i> L., 1758	Europe	Vassilev, 1962 Lichard, 1962 Present study

Proctophyllodes myadestis, new species

This new species is similar to *Proctophyllodes macedo* and can be differentiated by the lack of adanal accessory glands. In the female of *P. myadestis*, setae d_4 are distant, while, in *P. macedo*, the setae are approximate.

MALE (holotype). Length, excluding lamellae, 250 μ ; width, 111 μ . *Dorsal idiosoma*: Propodosomal shield 64 μ in length, 73 μ in width; lateral margins entire; with few anteromedial lacunae; without external vertical setae; distance between external scapular setae, 50 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 14 μ in length, 3.2 μ in width. Hysterosomal shield 152 μ in length, 78 μ in width; anterior margin straight; with small lacunae; without ventrolateral extensions; supranal concavity 38 μ in length. Lamellae 35 μ in length, 27 μ in width, ovoid, with inner margins slightly overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital organ reflexion to anterior articulations of legs IV; genital organ extending $\frac{3}{4}$ length of genital arch; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing two pairs of setae. Adanal discs circular, each about 18 μ x 9 μ and bearing approximately 20 teeth; accessory glands absent.



FIGS. 267, 268. *Proctophyllodes myadestis*, new species: holotype male (267), allotype female (268).

FEMALE (allotype). Length, excluding terminal appendages, 415 μ ; width, 142 μ . *Dorsal idiosoma*: Propodosomal shield 104 μ in length, 100 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 67 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 18.5 μ in length, 5.4 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 215 μ in length, 94 μ in width, with anterior margin straight, with small, medial lacunae; without supranal concavity. Lobar region articulated with anterior shield; 62 μ in length; setae d_4 inserted on conjunctiva and separated by 44 μ ; lobes normal; cleft parallel-sided, 45 μ in length, 9 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

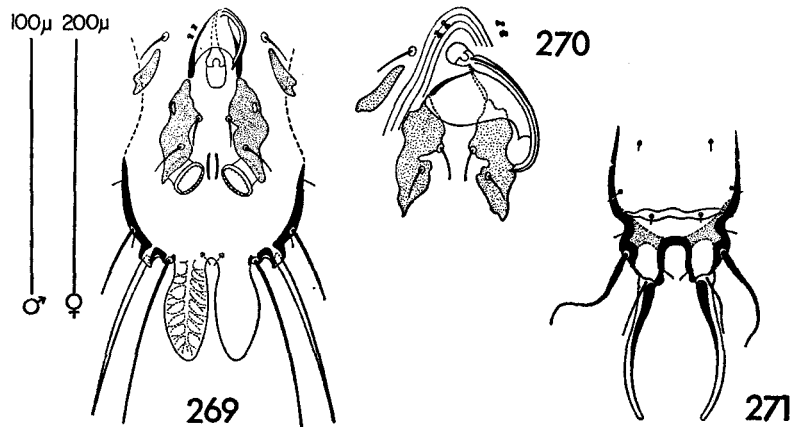
Type material. From *Myadestes obscurus* (Turdidae): holotype δ (NU), allotype ♀ (NU), 1 δ , 2 ♀ paratypes (NU), 5 kilometers north Jalapa, Veracruz, México, July 4, 1941, R. L. Peterson.

Remarks. Within the type series, the only material available for study, there is little apparent variation. The name *myadestis* is for the type host. The drawings are of the holotype and allotype.

HOSTS

Turdidae <i>Myadestes obscurus</i> Lafresnaye, 1839	México	Present study
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The Feather Mite Genus *Proctophyllodes*



FIGS. 269–271. *Proctophyllodes melopyrrhae*, new species: holotype male (269), male from *Pselliophorus tibialis* (270), allotype female (271).

Proctophyllodes melopyrrhae, new species

Proctophyllodes melopyrrhae, new species, *P. macedo*, and *P. saltatoris*, new species, are morphologically similar. The adanal accessory glands of *P. macedo*, the small lamellae and odd terminal cleft of the females of *P. saltatoris*, and the elongate lamellae and short genital organ of *P. melopyrrhae* are distinguishing features.

MALE (holotype). Length, excluding lamellae, 265 μ ; width, 120 μ . *Dorsal idiosoma*: Propodosomal shield 83 μ in length, 80 μ in width; lateral margins entire; without lacunae; without external vertical setae (?); distance between external scapular setae, 55 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.9 μ in length, 3.5 μ in width. Hysterosomal shield 144 μ in length, 90 μ in width; anterior margin straight; without lacunae; without ventrolateral extensions; supranal concavity 39 μ in length. Lamellae 37 μ in length, 17 μ in width, elongate, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital organ to level of posterior articulations of legs III; genital organ not extending beyond tips of genital arch in normal position; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing two pairs of setae. Adanal discs circular, nonmeasureable, length less than diameter and bearing approximately 21 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 410 μ ; width, 158 μ . *Dorsal idiosoma*: Propodosomal shield 97 μ in length, 104 μ in width; lateral margins entire; without lacunae; without external vertical setae (?); distance between external scapular setae, 74 μ . Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7 μ in length, 4.1 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 197 μ in length, 105 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated or incompletely fused with anterior shield; 50 μ in length; setae d_4 inserted on conjunctiva and separated by 35 μ ; lobes normal; cleft parallel-sided, 28 μ in length, 16 μ in width; setae d_5 $1/2$ length of terminal appendages; setae l_5 approximately equal in length to terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernible connective, without lateral extensions; epimerites without surface fields.

Type material. From *Melopyrrha nigra* (Fringillidae): holotype δ (NU), allotype ♀ (NU), 3 δ δ , 1 ♀ paratypes (Gaud, NU), Jobabo, Oriente Province, Cuba, March 11, 1958, G. Sanford.

Additional material. Fringillidae: 4 δ δ , 3 ♀ ♀ , from *Pselliophorus tibialis*, Panama.

Remarks. The paratype female has external vertical setae present and has lacunae on the propodosomal and hysterosomal shields; other types apparently lack external vertical setae, as well as lacunae. The name *melopyrrhae* is chosen to be illustrative of one of the genera of birds on which this mite species is known to occur. The drawings are of the holotype, allotype, and a male from *Pselliophorus tibialis* (fig. 270); the latter is included to illustrate the position of the genital organ as commonly observed.

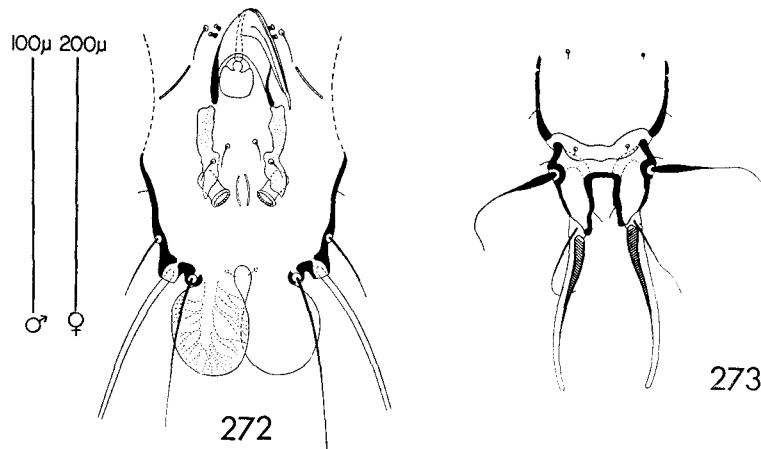
HOSTS

Fringillidae		
<i>Melopyrrha nigra</i> (L.), 1758	Cuba	Present study
<i>Pselliophorus tibialis</i> (Lawrence), 1864	Panama	Present study

Proctophyllodes troglodytis, new species

The similarity of the genital region of *Proctophyllodes troglodytis* to that of *P. macedo* suggests an affinity between these species. In contrast to the narrowly separated rows of opisthogastric setae and the lack of adanal accessory glands in the new species being

The Feather Mite Genus *Proctophyllodes*



FIGS. 272, 273. *Proctophyllodes troglodytis*, new species: paratype male (272), allotype female (273).

described, *P. macedo* has widely separated rows of opisthogastric setae and has adanal accessory glands.

MALE (holotype). Length, excluding lamellae, 286µ; width, 137µ. *Dorsal idiosoma:* Propodosomal shield 78µ in length, 79µ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 56µ. Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 16µ in length, 3µ in width. Hysterosomal shield 165µ in length, 86µ in width; anterior margin irregular and shallowly concave; with anteromedial lacunae; without ventrolateral extensions; supranal concavity 30µ in length. Lamellae 40µ in length, 30µ in width, ovoid, inner margins overlapping, with pinnate venation. *Ventral idiosoma:* Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch extending to level between legs III and IV; genital organ extending to midpoint between genital arch and anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing one pair of setae. Adanal discs circular, each about 13µ x 8.5µ and bearing approximately 16 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 433µ; width, 160µ. *Dorsal idiosoma:* Propodosomal shield 98µ in length, 101µ in width; lateral margins entire; without lacunae;

without external vertical setae; distance between external scapular setae, 72μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 22μ in length, 4μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 205μ in length, 91μ in width, with anterior margin concave, with posteromedial lacunae; without supranal concavity. Lobar region articulated with anterior shield; 65μ in length; setae d_4 inserted on conjunctiva and separated by 38μ ; lobes normal; cleft parallel-sided, 41μ in length, 14μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Thryomanes bewickii* (Troglodytidae): holotype δ (NU), allotype ♀ (NU), 1 δ , 8 ♀ paratypes (NU), 20 miles north Dallas, Dallas County, Texas, March 21, 1946.

Additional material. Troglodytidae: 11 δ δ , 9 ♀ ♀ , from *Thryothorus ludovicianus*, Texas.

Remarks. Feather mites are rarely encountered on members of Troglodytidae. Of approximately 250 wrens examined, representing fourteen species occurring in North America and México, only nine birds supported a feather mite fauna. Seven of the nine samples collected represented feather mite genera exclusive of *Proctophyllodes*. The name *troglydytis* is selected to call attention to Troglodytidae as the host group. The drawings are based on a paratype male and the allotype.

HOSTS

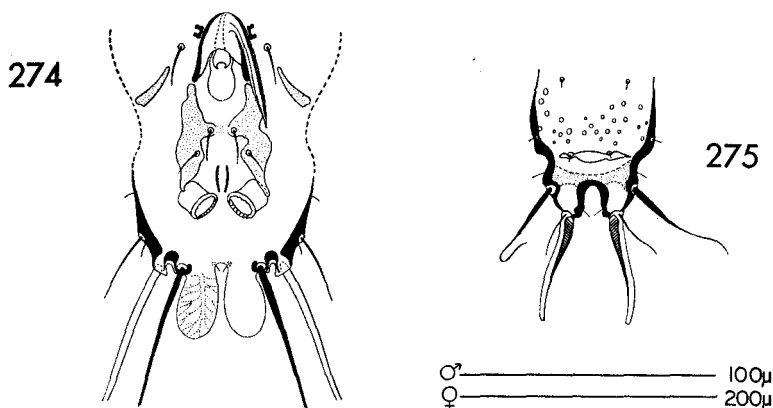
Troglodytidae		
<i>Thryomanes bewickii</i> (Audubon), 1827	United States	Present study
<i>Thryothorus ludovicianus</i> (Latham), 1790	United States	Present study

Proctophyllodes tiaris, new species

The terminal lobes of the females of *Proctophyllodes tiaris*, new species, are fused with the anterior hysterosomal shield. The conjunctiva, normally extensive or reduced to a circular area between setae d_4 , is intermediate to these conditions. The species is related to *P. batis*, new species (group VII), but the genital organ is shorter and the terminal lamellae are leaflike rather than triangular.

MALE (holotype). Length, excluding lamellae, 260μ ; width, 122μ . *Dorsal idiosoma*: Propodosomal shield 79μ in length, 79μ in

The Feather Mite Genus *Proctophyllodes*



FIGS. 274, 275. *Proctophyllodes tiaris*, new species: holotype male (274), allotype female (275).

width; lateral margins entire; with lacunae; without external vertical setae; distance between external scapular setae, 52μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 13.1μ in length, 2.8μ in width. Hysterosomal shield 144μ in length, 90μ in width; anterior margin sinuous; with lacunae; without ventrolateral extensions; supranal concavity 34μ in length. Lamellae ovoid, 30μ in length, 15μ in width, inner margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernible connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs joined; genital arch to posterior articulations of legs III; genital organ extending almost to anterior pair of opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields weakly joined at level of anterior setae and each shield bearing two setae. Adanal discs circular, each about $10\mu \times 9\mu$ and bearing approximately 21 teeth; accessory glands wanting.

FEMALE (allotype). Length, excluding terminal appendages, 345μ ; width, 135μ . *Dorsal idiosoma*: Propodosomal shield 90μ in length, 89μ in width; lateral margins entire; with lacunae; without external vertical setae; distance between external scapular setae, 64μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 16.6μ in length, 3.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 193μ in length, 95μ in width, with anterior

margin straight, with lacunae; without supranal concavity. Lobar region fused to anterior shield; 47μ in length; setae d_4 inserted on posterior margin of anterior shield and separated by 30μ ; lobes small; cleft in the form of an arch, 25μ in length, 13μ in width; setae d_5 $1/2$ length of terminal appendages; setae l_5 $1 1/2$ times length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernable connective, without lateral extensions; epimerites without surface fields.

Type material. From *Tiaris olivacea* (Fringillidae): holotype ♂ (NU), allotype ♀ (NU), 1 ♂, 4 ♀♀ paratypes (NU), Kingston, Jamaica, October 11, 1962, A. Ventura.

Remarks. The species is named for the genus of the host. The drawings are of the holotype and allotype.

HOSTS

Fringillidae		
<i>Tiaris olivacea</i> (L.), 1766	Jamaica	Present study

Proctophyllodes leptocaulus Gaud

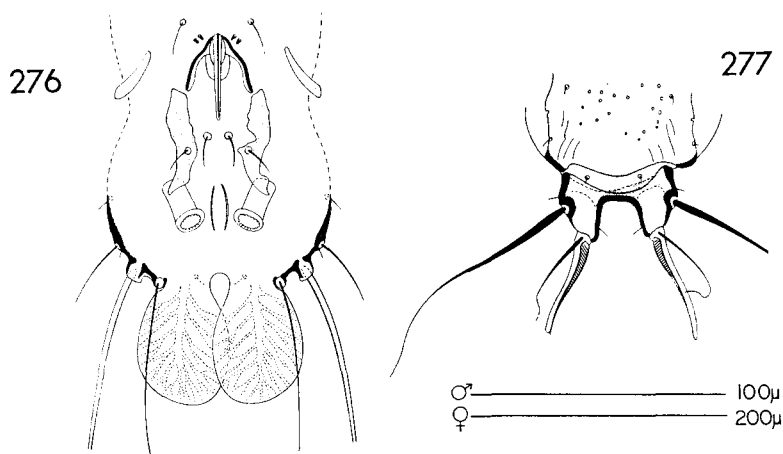
Proctophyllodes leptocaulus Gaud, 1957, Soc. Sci. nat. Phys. Maroc, 37: 120, fig. 7B. Type host: *Lanius senator* (Laniidae).

Proctophyllodes picae (in part), Fritsch, 1961, Z. Parasitenk., 21: 22-24, figs. 17a-b.

The characters given in the key are sufficient to distinguish this species from the closely related *Proctophyllodes hipposideros*.

MALE (paratype). Length, excluding lamellae, 314μ ; width, 179μ . *Dorsal idiosoma*: Propodosomal shield 79μ in length, 88μ in width; lateral margins incised behind external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 57μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 15.9μ in length. Hysterosomal shield 169μ in length, 92μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 34μ in length. Lamellae 48μ in length, 39μ in width, ovoid, internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes weakly developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level of anterior articulations of legs IV; genital organ extending almost

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Figs. 276, 277. *Proctophyllodes leptocaulus* Gaud: paratype male (276), paratype female (279).

to anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing posterior pair of setae. Adanal discs circular, each about $18\mu \times 9\mu$ and bearing approximately 24 teeth; accessory glands absent.

FEMALE (paratype). Length, excluding terminal appendages, 455μ ; width, 204μ . *Dorsal idiosoma*: Propodosomal shield 104μ in length, 108μ in width; lateral margins entire or incised behind external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 78μ . Humeral shields moderately developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae spiculiform, 18.6μ in length. Hysterosoma with lobes and with terminal appendages; anterior shield 231μ in length, 109μ in width, with anterior margin shallowly concave, with few indistinct lacunae; without supranal concavity. Lobar region articulated with anterior shield; 43μ in length; setae d_4 inserted on conjunctiva and separated by 36μ ; lobes short; cleft parallel-sided or slightly divergent, 29μ in length, 28μ in width; setae d_5 approximately equal length of terminal appendages; setae l_5 about three times length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad, weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Lanius senator* (Laniidae), French Morocco: holotype δ (Gaud), allotype ♀ (Gaud), 9 $\delta\delta$, 13 ♀♀ paratypes,

Camp Bataille, Meknès region, March, 1953, J. Gaud; 29 ♂♂, 18 ♀♀ paratypes, Lalla Mimouna, Rabat region, April, 1953, J. Gaud. Paratypes deposited: Gaud, NU.

Material examined. Laniidae: 4 ♂♂, 5 ♀♀ (paratypes), and 7 ♂♂, 13 ♀♀, from *Lanius senator*, French Morocco, Bulgaria; 6 ♂♂, 12 ♀♀, from *Lanius minor*, Bulgaria; 1 ♂, from *Lanius bucephalus*, Japan.

Remarks. In a redescription of *Proctophyllodes picae*, Fritsch (1961) included illustrations of mites taken from *Lanius collurio*. Considering the hosts and the illustrations, there is no doubt that two species, *P. picae* from *Pica pica* and *P. leptocaulus* from *Lanius collurio* have been included under the older name.

The mite species that are similar, but distinct, are *Proctophyllodes leptocaulus* from Laniidae, *P. hipposideros* from Turridae, and *P. picae* from Corvidae. Species that have been identified as any of these species from an inappropriate host are probably misidentified. The redescription and drawings are based on paratypes.

HOSTS

Laniidae		
<i>Lanius bucephalus</i>	Japan	Present study
Temminck & Schlegel, 1847		
<i>Lanius collurio</i> L.,	Europe	Fritsch, 1961
1758		
<i>Lanius minor</i>	Europe	Present study
Gmelin, 1788		
<i>Lanius senator</i> L.,	Fr. Morocco	Gaud, 1957
1758		Present study

Proctophyllodes hipposideros Gaud

Proctophyllodes hipposideros Gaud, 1953, Ann. Parasitol. hum. comp., 28: 199–200, fig. 4(1). Type host: *Saxicola rubetra* (Turridae).

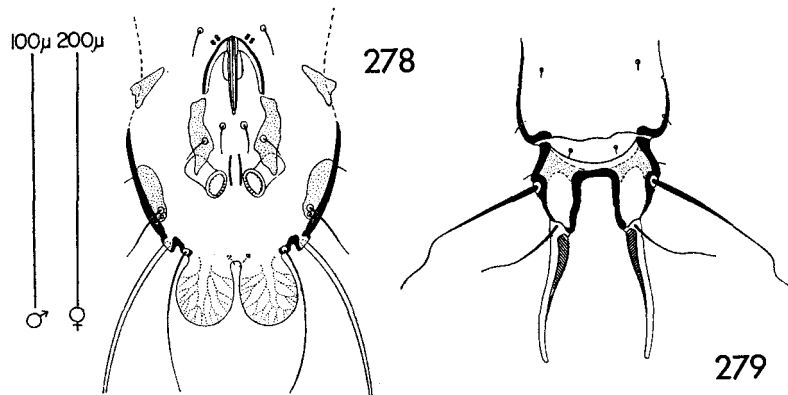
Proctophyllodes hipposideros, Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37: 119–120.

Proctophyllodes hipposideros, Gaud and Till, 1961, Publ. So. Afr. Inst. Med. Res., 11(L): 250.

Proctophyllodes hipposideros and *P. leptocaulus* are very similar but occur respectively on Turridae and Laniidae. Short lamellae, short adanal discs, and short opisthogastric shields distinguish *P. hipposideros* from the related species.

MALE (paratype). Length, excluding lamellae, 282μ; width, 132μ. *Dorsal idiosoma*: Propodosomal shield 78μ in length, 73μ in width; lateral margins incised behind external scapular setae; with-

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FIGS. 278, 279. *Proctophyllodes hipposideros* Gaud: paratype male (278), paratype female (279).

out lacunae; without external vertical setae; distance between external scapular setae, 51μ . Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 13.1μ in length. Hysterosomal shield 143μ in length, 77μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions, but dorsal shield extends to ventral surface; supranal concavity 28μ in length. Lamellae 31μ in length, 21μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level of anterior articulations of legs IV; genital organ extending almost to anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing posterior pair of setae. Adanal discs circular, each about $14\mu \times 10\mu$ and bearing approximately 22 teeth; accessory glands absent.

FEMALE (paratype). Length, excluding terminal appendages, 450μ ; width, 187μ . *Dorsal idiosoma*: Propodosomal shield 106μ in length, 110μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 78μ . Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 18.0μ in length. Hysterosoma with lobes and with terminal appendages; anterior shield 214μ in length, 108μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 61μ in length; setae

d_4 inserted on conjunctiva and separated by 33μ ; lobes normal; cleft parallel-sided, 41μ in length, 25μ in width; setae d_3 $1/2$ length of terminal appendages. Spermatheca similar to *pinnatus* except secondary ducts very broad. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with broad, weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Saxicola rubetra* (Turdidae): holotype ♂ (Gaud), allotype ♀ (Gaud), 11 ♂♂, 9 ♀♀ paratypes (Gaud, NU), Bouar, Oubangui-Chari, French Equatorial Africa, November, 1950, J. Gaud.

Materials examined. Turdidae: 1 ♂, 3 ♀♀ (paratypes) and 13 ♂♂, 19 ♀♀, from *Saxicola rubetra*, French Equatorial Africa, England, Bulgaria; 2 ♂♂, 2 ♀♀, from *Phoenicurus phoenicurus*, Bulgaria.

Remarks. *Proctophyllodes hipposideros*, which has been reported on many species of Turdidae, has not been recorded as occurring on birds of the genus *Turdus*. Conversely, the species *P. musicus*, which infests many species of *Turdus*, has seldom been reported from the same hosts as the species under discussion. The redescription and drawings are based on paratypes

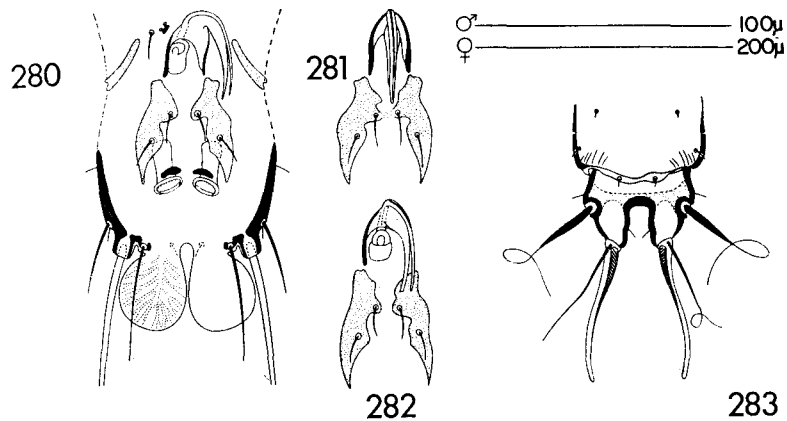
HOSTS

Turdidae		
<i>Cercotrichas galactotes</i> (Temminck), 1820 (= <i>Agrobates</i> g.)	Fr. Morocco	Gaud, 1957
<i>Oenanthe hispanica</i> (L.), 1758	Fr. Morocco	Gaud, 1953, 1957
<i>Oenanthe moesta</i> (Lichtenstein), 1823	Fr. Morocco Europe	Gaud, 1953, 1957 Gaud, 1953
<i>Oenanthe rufa</i> (Brisson)	Fr. Morocco Europe	Gaud, 1953, 1957 Gaud, 1953
<i>Phoenicurus moussieri</i> (Olph-Galliard), 1852 (= <i>Diplootocus</i> m.)	Fr. Morocco Europe	Gaud, 1953, 1957 Gaud, 1953
<i>Phoenicurus phoenicurus</i> (L.), 1758	Fr. Morocco Europe	Gaud, 1953, 1957 Gaud, 1953 Present study
<i>Saxicola rubetra</i> (L.), 1758	Fr. Eq. Africa	Gaud, 1953, 1957 Gaud & Till, 1961 Present study
<i>Saxicola torquata</i> (L.),	Europe Fr. Morocco Europe	Present study Gaud, 1953, 1957 Gaud, 1953

Proctophyllodes macedo Vitzthum

Proctophyllodes macedo Vitzthum, 1922b, Arch. Naturgeschichte, A

The Feather Mite Genus *Proctophyllodes*



FIGS. 280-283. *Proctophyllodes macedo* Vitzthum: males (280-282) and female (283) from *Dendronanthus indicus*.

88(5): 72-75, figs. 58-63. Type host: *Motacilla flava* (= *Budytes melanocephalus*) (Motacillidae).

Proctophyllodes macedo, Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37: 120.

Proctophyllodes macedo, Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5-6): 510.

Proctophyllodes macedo, Gaud and Till, 1961, Publ. So. Afr. Inst. Med. Res., 11(L): 251.

The presence of adanal accessory glands is unique among the species of this group. Other species which resemble *Proctophyllodes macedo*, e.g., *P. picae*, *P. melopyrrhae*, new species, and *P. saltatoris*, new species, lack adanal accessory glands and most have the adanal discs with the length approximately equal to the diameter.

MALE. Length, excluding lamellae, 265 μ ; width, 122 μ . *Dorsal idiosoma*: Propodosomal shield 76 μ in length, 77 μ in width; lateral margins entire; with few large lacunae anterior to scapular setae; with external vertical setae; distance between external scapular setae, 49 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.9 μ in length, 2.8 μ in width. Hysterosomal shield 159 μ in length, 93 μ in width; anterior margin straight or shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 40 μ in length. Lamellae 28 μ in length, 17 μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Pregenital apodeme absent; genital arch to level midway between legs III and IV; genital organ extending to or slightly beyond anterior opisthogastric setae in normal position; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing two pairs of setae. Adanal discs circular, each about $21\mu \times 8\mu$ and bearing approximately 20 teeth apparently restricted to anterior half of disc; reniform accessory glands present.

FEMALE. Length, excluding terminal appendages, 415μ ; width, 165μ . *Dorsal idiosoma*: Propodosomal shield 90μ in length, 99μ in width; lateral margins entire; with few large lacunae on anterior $\frac{1}{4}$; with external vertical setae; distance between external scapular setae, 67μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 19.3μ in length, 5.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 228μ in length, 107μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 49μ in length; setae d_4 inserted on conjunctiva or anterior edge of lobar shield and separated by 32μ ; lobes normal; cleft parallel-sided, 33μ in length, 16μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_5 slightly longer than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Motacilla flava* (Motacillidae): lectotype ♂ (ZSBS), 6 ♂♂, 6 ♀♀ syntypes (ZSBS), Macedonia, June 25, 1918.

Additional material. Motacillidae: 4 ♂♂, 11 ♀♀, from *Dendronanthus indicus*, Malaya.

Remarks. Vitzthum (1922b) states that he collected the type series from *Motacilla flava* (= *Budytes melanocephalus*) from Macedonia (Ueskub) on June 25, 1918. The slides in the Vitzthum collection contain six females, seven males and two tritonymphs, and are labelled in Vitzthum's handwriting: *Proctophyllodes macedo*, n. sp. Although additional information concerning the collecting data is wanting, the present authors believe that these materials represent the type series and therefore designate a male lectotype and twelve syntypes.

There are a number of species of *Proctophyllodes* which could be mistaken for *P. macedo* as described by Vitzthum (1922b). For example, Vassilev (1960) reports *P. macedo* from *Sitta europaea*; the correct identification would probably be *P. vitzthumi*. As depicted

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in the illustrations, the opisthogastric shields may be divided, or weakly joined. The redescription and drawings are based on the Malayan material.

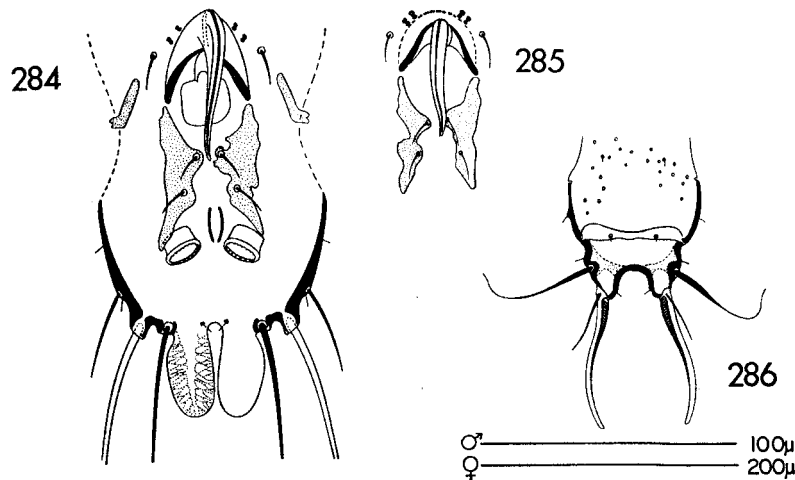
HOSTS

Motacillidae		
<i>Motacilla flava</i> L., 1758	Macedonia Fr. Morocco Fr. Cameroons	Vitzthum, 1922b Gaud, 1957 Gaud & Mouchet, 1957 Gaud & Till, 1961 Present study
<i>Dendronanthus indicus</i> (Gmelin), 1789	Malaya	Present study

Proctophyllodes gularis, new species

The three new species, *Proctophyllodes gularis*, *P. melopyrrhae*, and *P. saltatoris* are extremely similar. The significant differences are in the structures of the genital organs of the males. In *P. gularis*, this structure is robust and distally is bent ventrad; in *P. melopyrrhae* and *P. saltatoris*, the genital organ is relatively delicate and the distal bend is dorsad.

MALE (holotype). Length, excluding lamellae, 293 μ ; width, 148 μ . *Dorsal idiosoma*: Propodosomal shield 88 μ in length, 90 μ in width; lateral margins incised around external scapular setae; without lacunae; without external vertical setae; distance between external scapular setae, 63 μ . Humeral shields weakly developed and



FIGS. 284-286. *Proctophyllodes gularis*, new species: holotype male (284), paratype male (285), allotype female (286).

not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.9μ in length, 2.8μ in width. Hysterosomal shield 166μ in length, 101μ in width; anterior margin sinuous; without lacunae; without ventrolateral extensions; supranal concavity 43μ in length. Lamellae 37μ in length, 16μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level midway between anterior and posterior articulations of legs III; genital organ extending to anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate at level of anterior opisthogastric setae and bearing two pairs of setae. Adanal discs circular, each about $10\mu \times 12\mu$ and bearing approximately 21 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 395μ ; width, 158μ . *Dorsal idiosoma*: Propodosomal shield 92μ in length, 93μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 71μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 17.3μ in length, 3.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 244μ in length, 105μ in width, with anterior margin sinuous, with few minute lacunae on posterior half; without supranal concavity. Lobar region articulated with anterior shield; 46μ in length; setae d_4 inserted on conjunctiva and separated by 32μ ; lobes normal; cleft in the form of an arch, 18μ in length; setae d_5 $\frac{2}{3}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Icterus gularis* (Icteridae), Tabasco, México: holotype ♂ (NU), 2 ♀♀ paratypes, 11 miles north Balancan, May 12, 1961, E. Armstrong; allotype ♀ (NU), 7 ♂♂, 6 ♀♀ paratypes, Balancan, April 25, 1961, D. G. Berrett. Paratypes deposited: BAS, BMNH, Gaud, NU, USNM.

Remarks. The position of the genital organ of this species is not distorted as much as in the related *P. melopyrrhae* (see figure 269), rather, the genital organ may be pushed caudally during slide preparation as illustrated in figure 285. The name *gularis* is

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chosen from the specific name of the host. The drawings are of the holotype and allotype.

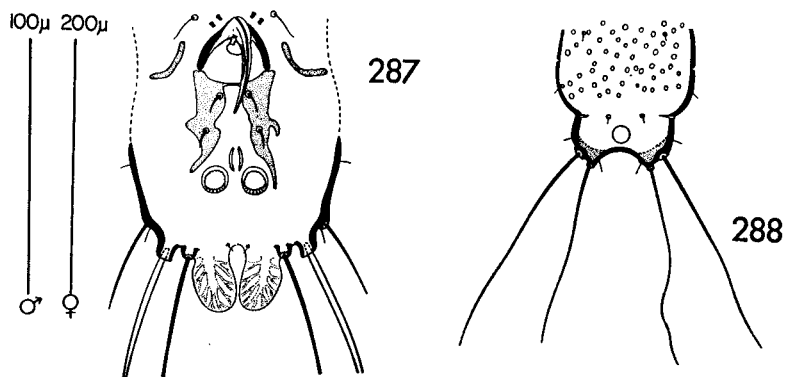
HOSTS

Icteridae		
<i>Icterus gularis</i>	México	Present study
(Wagler), 1829		

Proctophyllodes sialiae, new species

Males of this new species are similar to *Proctophyllodes saltatoris*, but can be distinguished by the structure of the female terminus: *P. sialiae* lacks terminal appendages and supports a supranal concavity; the reverse situation applies in *P. saltatoris*.

MALE (holotype). Length, excluding lamellae, 288 μ ; width, 132 μ . *Dorsal idiosoma*: Propodosomal shield 75 μ in length, 84 μ in width; lateral margins entire; with large lacunae on anterior half; without external vertical setae; distance between external scapular setae, 57 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 16 μ in length. Hysterosomal shield 174 μ in length, 90 μ in width; anterior margin straight; with large lacunae; without ventrolateral extensions; supranal concavity 33 μ in length. Lamellae 25 μ in length, 10 μ in width, ovoid with internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to anterior articulations of legs IV; genital organ extending to midpoint between anterior and pos-



FIGS. 287, 288. *Proctophyllodes sialiae*, new species: holotype male (287), allotype female (288).

terior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields narrowly joined and bearing two pairs of setae. Adanal discs circular, each about $9\mu \times 9\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 408μ ; width, 150μ . *Dorsal idiosoma*: Propodosomal shield 85μ in length, 102μ in width; lateral margins entire; with large lacunae on anterior half; without external vertical setae; distance between external scapular setae, 71μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 16μ in length. Hysterosoma with reduced lobes and without terminal appendages; anterior shield 228μ in length, 113μ in width, with anterior margin straight, with large lacunae; with supranal concavity. Lobar region fused with anterior shield; 35μ in length; setae d_4 inserted on line of fusion and separated by 25μ ; lobes reduced; cleft shallow arch, 12μ in length, 38μ in width. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Sialia mexicana* (Turdidae): holotype ♂ (NU), allotype ♀ (NU), 5 ♀♀ paratypes (NU), Río Otlati, Puebla, México, August 9, 1942, J. W. McKamy.

Remarks. The genital region as illustrated represents a probable reconstruction, as the genital sheath and arch are irretrievably distorted in the holotype. The name *sialiae* is derived from the type host. Drawings are of the holotype and allotype.

HOSTS

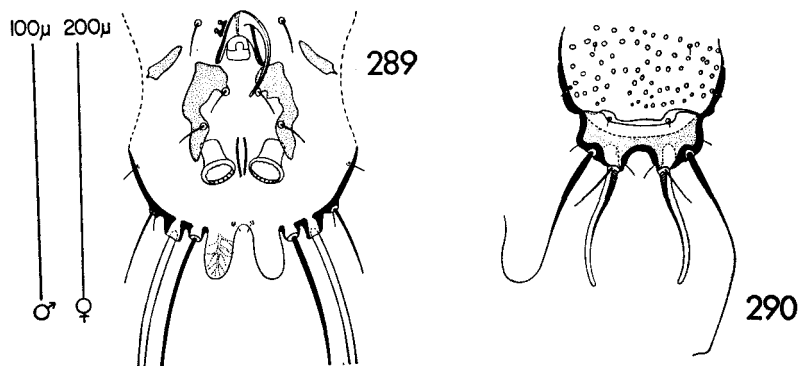
Turdidae		
<i>Sialia mexicana</i> Swainson, 1831 (1832)	México	Present study

Proctophyllodes saltatoris, new species

Proctophyllodes saltatoris, new species, is related to *P. gularis*, new species. In the former species, the opisthogastric shields are not approximate at the level of the anterior opisthogastric setae, whereas, in the latter species, the shields are separated by less than 10μ . In addition, there are distinct differences in the relative sizes of the genital organs and seminal vesicles: small in *P. saltatoris* and large in *P. gularis*.

MALE (holotype). Length, excluding lamellae, 250μ ; width, 130μ . *Dorsal idiosoma*: Propodosomal shield 78μ in length, 87μ in

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FIGS. 289, 290. *Proctophyllodes saltatoris*, new species: male from *Saltator maximus* (289), allotype female (290).

width; lateral margins entire; with lacunae; without external vertical setae; distance between external scapular setae, 57μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 13.8μ in length, 2.1μ in width. Hysterosomal shield 135μ in length, 91μ in width; slightly concave; with lacunae; without ventrolateral extensions; supranal concavity 35μ in length. Lamellae ovoid, 22μ in length, 10μ in width, mesal margins parallel, approximate, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernible connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs joined; genital arch to level midway between legs III and IV; genital organ extending slightly beyond anterior setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing two pairs of setae. Adanal discs circular, each about $10\mu \times 9\mu$ and bearing approximately 18 teeth; poorly defined accessory glands present (?).

FEMALE (allotype). Length, excluding terminal appendages, 380μ ; width, 175μ . *Dorsal idiosoma*: Propodosomal shield 97μ in length, 127μ in width; lateral margins entire; with lacunae; without external vertical setae; distance between external scapular setae, 76μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 23.5μ in length, 3.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 186μ in length, 120μ in width, with anterior margin straight or shallowly concave, with lacunae; without supranal concavity. Lobar region incompletely fused with anterior shield; 39μ in length; setae d_4 inserted on conjunctiva and separated by

42 μ ; lobes short; cleft in the form of an arch, 14 μ in length; setae d_5 $\frac{1}{2}$ length of terminal appendages; setae l_5 $1\frac{1}{2}$ times length of terminal appendages. Spermatheca not visible. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with barely discernible connective, without lateral extensions; epimerites without surface fields.

Type material. From *Saltator coerulescens* (Fringillidae): holotype δ (USNM), allotype ♀ (USNM), Vega de Oropouche, Trinidad, West Indies, December 1, 1959, T. H. G. Aitken.

Additional material. Fringillidae: 2 $\delta \delta$, from *Saltator maximus*, British Honduras.

Remarks. The presence of accessory glands is questionable; if present, they are reticulated and poorly sclerotized. The anterior opisthogastric setae are inserted on the shields or just off of the shields. The species is named for the genus of birds from which the species is known. The drawing of the male is of the specimen from *Saltator maximus*; the drawing of the female is of the allotype.

HOSTS

Fringillidae		
<i>Saltator coerulescens</i> Vieillot, 1817	West Indies	Present study
<i>Saltator maximus</i> (Müller), 1776	West Indies	Present study

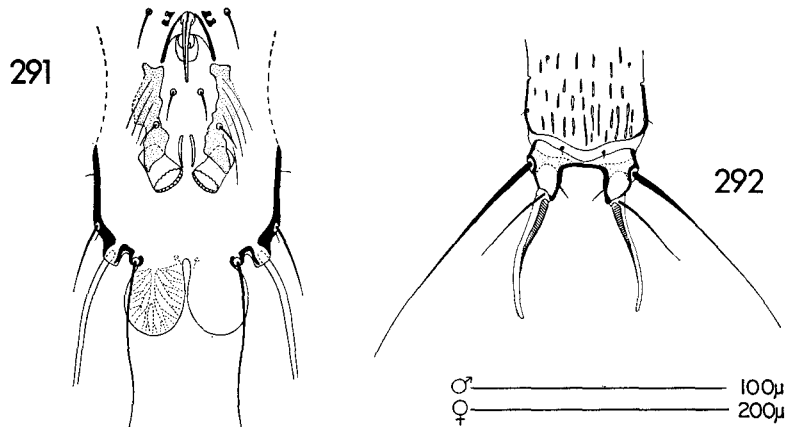
Proctophyllodes tenericaulus Atyeo and Vassilev

Proctophyllodes tenericaulus Atyeo and Vassilev, 1964, Bull. Univ. Nebraska St. Mus., 4(13): 275-277, fig. 2.

Although this species is near *Proctophyllodes leptocaulus* and *P. hipposideros* in the key, *Proctophyllodes tenericaulus* is closely allied to *P. musicus*. Of the three species mentioned, *P. tenericaulus* is unique in having the rows of opisthogastric setae separated by a distance greater than the distance between the setae of the anterior row of opisthogastric setae.

MALE (holotype). Length, excluding lamellae, 277 μ ; width, 130 μ . *Dorsal idiosoma*: Propodosomal shield 75 μ in length, 79 μ in width; lateral margins weakly incised; without lacunae; without external vertical setae; distance between external scapular setae, 51 μ . Humeral shields poorly developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae setiform, 15.9 μ in length. Hysterosomal shield 162 μ in length, 81 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 37 μ in length. Lamellae 31 μ in

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FIGS. 291, 292. *Proctophyllodes tenericaulus* Atyeo and Vassilev: holotype male (291), allotype female (292).

length, 28μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level midway between legs III and IV; genital organ extending beyond tips of genital arch but not reaching anterior pair of opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing one pair of setae. Adanal discs circular, each about $15\mu \times 9\mu$ and bearing approximately 18 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 460μ ; width, 173μ . *Dorsal idiosoma*: Propodosomal shield 98μ in length, 109μ in width; lateral margins weakly incised; without lacunae; without external vertical setae; distance between external scapular setae, 71μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 23.5μ in length, 2.8μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 235μ in length, 110μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 39μ in length; setae d_4 inserted on conjunctiva and separated by 32μ ; lobes normal; cleft parallel-sided, 26μ in length, 32μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_5 about 2 times longer than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes moderately developed; epimerites I

U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Turdus viscivorus* (Turdidae): holotype ♂ (BAS), allotype ♀ (BAS), 7 ♂♂, 10 ♀♀ paratypes (BAS), near Gotse Delchev, District of Gorna Dzhumaya, Bulgaria, October 20, 1960, I. D. Vassilev.

Additional material. Alaudidae: 2 ♂♂, 3 ♀♀, from *Galerida cristata*, Bulgaria.

Remarks. The females of this species may exhibit a distinct shortening of the terminal appendages and, at the same time, a lengthening of setae d_5 . In the allotype female, setae d_5 are three-quarters of the length of the appendages, while in a few of the paratypes, the appendages and terminal setae are approximately equal in length. The drawings are of the holotype and allotype.

HOSTS

Turdidae		
<i>Turdus viscivorus</i> L., 1758	Bulgaria	Atyeo & Vassilev, 1964 Present study
Alaudidae		
<i>Galerida cristata</i> (L.), 1758	Bulgaria	Atyeo & Vassilev, 1964 Present study

Proctophyllodes picae (Koch)

? *Acarus picae* Schrank, 1803, Fauna Boica, 3: 215. Type host: *Pica pica* (fide Oudemans, 1937).

Dermaleichus picae Koch, 1840, Deut. C.M.A., fasc. 38, no. 24. Type host: *Pica pica* (Corvidae).

Proctophyllodes picae, Canestrini, 1879, Atti dell Soc. Veneto-Trentina Sci. Nat. Padova, 6(1): 37.

Proctophyllodes picae, Canestrini, 1886, Prospetto dell' Acarofauna Italiana, 2: 302-303.

Proctophyllodes picae, Poppe, 1888, Abhandl. Naturwiss. Ver. Bremen, 10: 226-230.

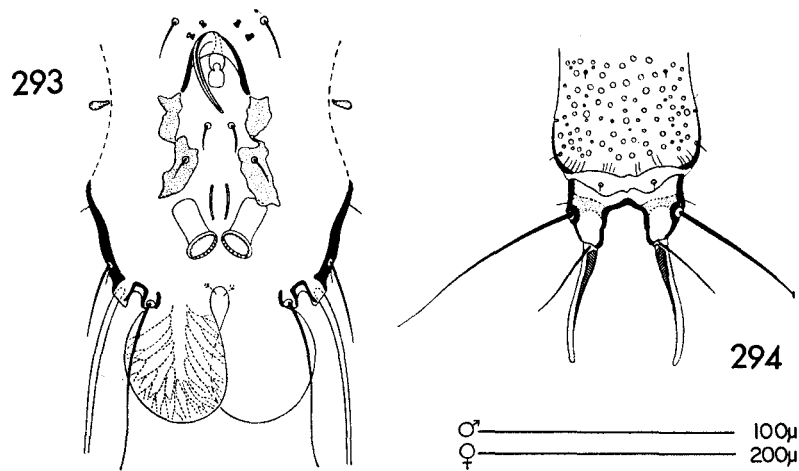
Proctophyllodes picae, Oudemans, 1897, Tijdschr. Entomol., 40: 255.

Proctophyllodes picae, Canestrini and Kramer, 1899, Tierreich, 7: 117.

Proctophyllodes picae (in part), Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 26-30, figs. 18-22.

Proctophyllodes aquaticus Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 76-79, figs. 67-72. Type host: *Anas acuta* (Anatidae) (New synonymy).

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FIGS. 293, 294. *Proctophyllodes picae* (Koch): male from *Pica pica* (293), female from (?) *Anas acuta* (294).

Proctophyllodes picae, Vitzthum, 1929, Tierwelt Mitteleuropas, 3(3): 100.

Proctophyllodes picae, Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37(2): 122.

Proctophyllodes picae, Vassilev, 1959a, Bulg. Acad. Sci., Proc. Zool. Inst., 8: 47, 50.

Proctophyllodes aquaticus, Vassilev, 1960, Bulg. Acad. Sci., Proc. Zool. Inst., 9: 434.

Proctophyllodes picae (in part), Fritsch, 1961, Z. Parasitenk., 21: 22-24, figs. 17c-d.

Proctophyllodes picae, Vassilev, 1962, Bulg. Acad. Sci., Bull. Dept. Biol. Sci., pp. 157-158.

Proctophyllodes picae, *P. leptocaulus*, and *P. hipposideros*, a triad of similar species, each occur on different families of birds. The former species from Corvidae has the rows of opisthogastric setae widely separated, and the latter species from Laniidae and Turdididae, have the rows of setae approximate.

MALE. Length, excluding lamellae, 301 μ ; width, 155 μ . Dorsal idiosoma: Propodosomal shield 76 μ in length, 88 μ in width; lateral margins incised anterior and posterior of external scapular setae or entire; without lacunae; without external vertical setae; distance between external scapular setae, 62 μ . Humeral shields weakly developed and not bearing setae l_1 at extreme anteromedial angles;

subhumeral setae spiculiform, 14.5 μ in length. Hysterosomal shield 162 μ in length, 92 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 37 μ in length. Lamellae 48 μ in length, 35 μ in width, ovoid, internal margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes weakly developed; epimerites I U-shaped with barely discernible connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level of anterior articulations of legs IV; genital organ extending to anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields separate and bearing posterior pair of setae. Adanal discs circular, each about 21 μ x 10 μ and bearing approximately 22 teeth; accessory glands absent.

FEMALE. Not available from type host.

Type material. From *Pica pica* (Corvidae), Germany; location of type unknown.

Material examined. Corvidae: 2 δ δ , from *Pica pica*, England. Anatidae: 1 δ , 3 f f , from (?) *Anas acuta*, Macedonia.

Remarks. Of the various illustrations in Vitzthum's (1922*b*) redescription of *Proctophyllodes picae*, there are none depicting *P. picae*. Species that are figured are from such avian families as Fringillidae, Alaudidae, and Turdidae. Fritsch (1961) included two species in *P. picae*, namely, *P. picae* and *P. leptocaulus*, the latter from Laniidae.

Slides from the Vitzthum collection identified by Vitzthum as *Proctophyllodes aquaticus*, new species, are undoubtedly specimens of *P. picae* with heavy lacunae. Presumably these slides represent the type series, but the type host, *Anas acuta*, is suspect and in the opinion of the present authors, should be deleted from the host list.

The material examined included specimens from *Pica pica* with or without moderate lacunae and specimens from (?) *Anas acuta* with heavy lacunae. The redescription and drawing of the male are from a specimen collected from *Pica pica* in England. The drawing of the female is of Vitzthum's material from (?) *Anas acuta*.

HOSTS

Corvidae

<i>Corvus corone sardonius</i> Kleinschmidt, 1903	Bulgaria	Vassilev, 1959 <i>a</i>
<i>Nucifraga caryocatactes</i> (L.), 1758	Bulgaria	Vassilev, 1960

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<i>Pica pica</i> (L.), 1758	Europe	Koch, 1840 Oudemans, 1897 Canestrini, 1886 Vitzthum, 1922 <i>b</i> , 1929 Vassilev, 1959 <i>a</i> , 1962 Fritsch, 1961 Present study
Anatidae (questionable record)	Fr. Morocco	Gaud, 1957
<i>Anas acuta</i> L., 1758	Macedonia	Vitzthum, 1922 <i>b</i>

Group X—the *anthi* group

As stated previously (p. 262), group IX and group X are quite arbitrarily separated. By necessity, the key for this group includes species from group IX in which the opisthogastric shields may be broadly connected.

Pertinent characters for species differentiation, males:

1. Length and structure of the genital organ.
2. Size of the terminal lamellae.
3. Length to diameter ratio of the adanal discs.
4. Development of the opisthogastric shield.

Pertinent characters for species differentiation, females:

1. Presence or absence of a supranal concavity.
2. Relative lengths of the terminal appendages and setae d_5 .

Key to the species of group X

1. Male without adanal accessory glands 2
 Male with adanal accessory glands *macedo*,* p. 280
2. Genital organ in repose not extending beyond tips of genital arch 3
 Genital organ in repose extending at least midway between tips of genital arch and anterior opisthogastric setae 6
3. Genital organ not minute and curved, extending beyond midpoint between apex and tips of genital arch 4
 Genital organ minute, curved and extending to a point midway between apex and tips of genital arch
 *ischnocaulus*, p. 294
4. Lamellae over 50 μ in length 5
 Lamellae under 35 μ in length *myadestis*,* n. sp., p. 269
5. Genital sheath basally with neck-like expansion; rigid portion of genital organ as long as distance between posterior opisthogastric setae *anthi*, p. 296

* See group IX.

- Genital sheath without neck-like expansion; rigid portion of genital organ less than distance between posterior and opisthogastric setae.....*motacillae*, p. 299
6. Lamellae ovoid and less than 60 μ in length..... 7
Lamellae reniform, about 85 μ in length.....
.....*sporophilae*, n. sp., p. 302
7. Female without supranal concavity..... 8
Female with circular supranal concavity.....*sialiae*,* n. sp., p. 285
8. Genital organ and seminal vesicle not disproportionately large 9
Genital organ and seminal vesicle disproportionately large
.....*gularis*,* n. sp., p. 283
9. Opisthogastric shields broadly joined; female with hysterosomal lobes freely articulated with anterior hysterosomal shield10
Opisthogastric shields weakly joined; female with hysterosomal lobes at least incompletely fused with anterior hysterosomal shield.....*tiaris*,* n. sp., p. 274
10. Hysterosomal cleft of female greater than 40 μ in length; anterior hysterosomal shield without dark, lateral margins.....*polyexnus*, n. sp., p. 304
Hysterosomal cleft of female less than 40 μ in length; hysterosomal shield with or without dark, lateral margins.... 11
11. Hysterosomal shield with dark lateral margins (except males from *Euphagus* species); hosts: Icteridae and Sturnidae.....*egglestoni*, p. 308
Hysterosomal shield without dark lateral margins; hosts: Fringillidae.....*emberizae*, p. 310

* See group IX.

Proctophyllodes ischnocaulus Gaud

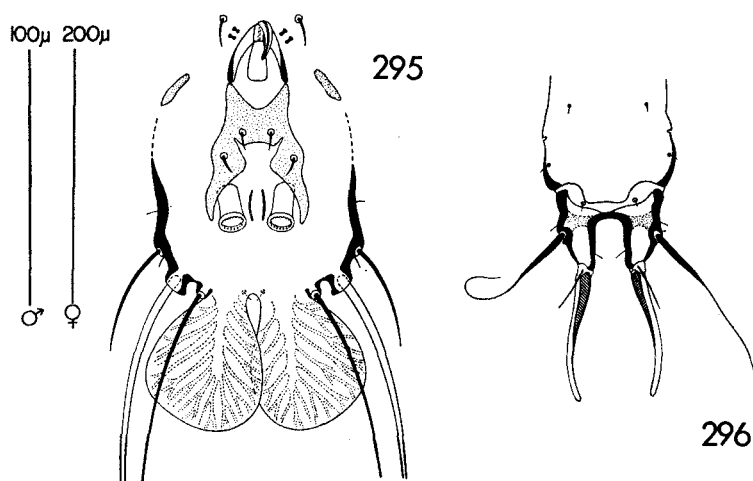
Proctophyllodes ischnocaulus Gaud, 1953, Ann. Parasitol. hum. comp., 28: 200, fig. 4(2). Type host: *Lamprotornis chalybaeus* (Sturnidae).

Proctophyllodes ischnocaulus, Gaud and Till, 1961, Publ. So. Afr. Inst. Med. Res., 11(L): 251.

The short, recurved genital organ of *Proctophyllodes ischnocaulus* is similar to that of *P. microcaulus*, however, the genital arch and opisthogastric region of each species is distinctive.

MALE (paratype). Length, excluding lamellae, 306 μ ; width, 143 μ . Dorsal idiosoma: Propodosomal shield 77 μ in length, 76 μ in width;

The Feather Mite Genus *Proctophyllodes*



FIGS. 295, 296. *Proctophyllodes ischnocaulus* Gaud: male from *Lamprotornis nitens* (295), paratype female (296).

lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 53μ . Humeral shields weakly developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.2μ in length, 2.8μ in width. Hysterosomal shield 169μ in length, 76μ in width; anterior margin straight; without lacunae; without ventrolateral extensions; supranal concavity 35μ in length. Lamellae 41μ in length, 35μ in width, ovoid, inner margins slightly overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs separate; genital arch to level midway between anterior and posterior articulations of legs IV; genital organ not extending to tips of genital arch; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields broadly joined and bearing two pairs of setae. Adanal discs circular, each about $17\mu \times 9\mu$ and bearing approximately 24 teeth; accessory glands absent.

FEMALE (paratype). Length, excluding terminal appendages, 451μ ; width, 171μ . *Dorsal idiosoma*: Propodosomal shield 97μ in length, 97μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 69μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 19.3μ in length, 4.1μ in width. Hysterosoma with lobes and with terminal

appendages; anterior shield 228 μ in length, 98 μ in width, with anterior margin straight, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 52 μ in length; setae d_4 inserted on conjunctiva and separated by 37 μ ; lobes normal; cleft parallel-sided, 38 μ in length, 21 μ in width; setae d_5 $\frac{1}{3}$ length of terminal appendages; setae l_5 longer than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Lamprotornis chalybaeus* (Sturnidae): holotype δ (Gaud), allotype φ (Gaud), 22 δ δ , 27 φ φ paratypes (Gaud), Banfora, Upper Volta, French West Africa, October, 1950, J. Gaud.

Material examined. Sturnidae: 1 δ , 4 φ φ (paratypes), from *Lamprotornis chalybaeus*, French West Africa; 13 δ δ , 7 φ φ , from *Lamprotornis nitens*, Union of South Africa.

Remarks. The genital organ and arch as illustrated are in repose; more often in prepared material, these structures are inverted, that is, the top of the genital arch is directed posteriorly and lies over the anterior opisthogastric setae. The drawing and redescription of the female is based on a paratype; the redescription of the male is based on a paratype, but the drawing is of a specimen from *Lamprotornis nitens*.

HOSTS

Sturnidae		
<i>Lamprotornis caudatus</i> (Müller), 1776	Fr. W. Africa	Gaud, 1953
<i>Lamprotornis chalcurus</i> Nordman, 1835	Fr. Cameroons	Gaud & Till, 1961
<i>Lamprotornis chalybaeus</i> Ehrenberg, 1828	Fr. W. Africa	Gaud, 1953 Present study
<i>Lamprotornis nitens</i> (L.), 1766	Un. So. Africa	Present study

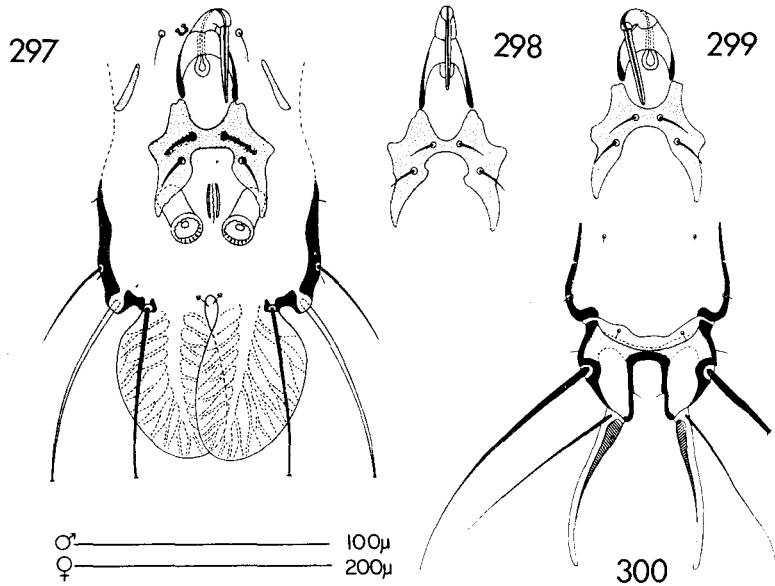
Proctophyllodes anthi Vitzthum

Proctophyllodes anthi Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 81-82, figs. 75, 76. Type host: *Anthus trivialis* (Motacillidae).

Proctophyllodes anthi, Dubinin, 1952, Trav. Inst. Zool. Acad. Sci. U.S.S.R., 12: 262.

Proctophyllodes anthi, Gaud, 1957, Bull. Soc. Sci. nat. Phys. Maroc, 37(2): 116-117.

The Feather Mite Genus *Proctophyllodes*



FIGS. 297-300. *Proctophyllodes anthi* Vitzthum: male (297) and female (300) from *Anthus spragueii*, males (298, 299) from *Anthus spinoletta*.

Proctophyllodes anthi, Vassilev, 1960, Bulg. Acad. Sci., Proc. Zool. Inst., 9: 433.

Proctophyllodes anthi, Fritsch, 1961, Z. Parasitenk., 21: 16-18, figs. 13a-c.

Proctophyllodes anthi, Lichard, 1962, Biología, 17(7): 534.

The appearance of the genital region is partially dependent upon mounting procedures. Pressure differentials produce slides which indicate the genital organ as slightly arched or flattened, thus producing varying levels to which the genital organ may extend. The structure of the genital sheath arising from a curved, necklike base on the genital arch is distinctive.

MALE. Length, excluding lamellae, 278; width, 134 μ . *Dorsal idiosoma*: Propodosomal shield 72 μ in length, 82 μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 57 μ . Humeral shields moderately developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 16 μ in length, 2.2 μ in width. Hysterosomal shield 165 μ in length, 82 μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 36 μ in length. Lamellae 58 μ in

length, 38μ in width, ovoid, with inner margins slightly overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions, epimerites without surface fields. Genital discs joined; genital arch to anterior articulations of legs IV; genital organ extending to level midway between tips of genital arch and anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields broadly joined and bearing two pairs of setae. Adanal discs circular, each about $27\mu \times 7\mu$ and bearing approximately 18 teeth; accessory glands absent.

FEMALE. Length, excluding terminal appendages, 440μ ; width, 167μ . *Dorsal idiosoma*: Propodosomal shield 91μ in length, 106μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 76μ . Humeral shields well developed and bearing setae l_1 at extreme antero-medial angles; subhumeral setae lanceolate, 19.5μ in length, 3.2μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 235μ in length, 92μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 63μ in length; setae d_4 inserted on conjunctiva and separated by 42μ ; lobes normal; cleft parallel-sided, 38μ in length, 28μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective, without lateral extensions; epimerites without surface fields.

Type material. From *Anthus trivialis* (Motacillidae), Europe (?); location of type unknown.

Material examined. Jyngidae: 15 ♂♂, 16 ♀♀, from *Jynx torquilla*, China. Motacillidae: 9 ♂♂, 5 ♀♀, from *Anthus hodgsoni*, Malaya; 5 ♂♂, 7 ♀♀, from *Anthus spinoletta*, Texas, Utah; 2 ♂♂, 2 ♀♀, from *Anthus spragueii*, Texas; 14 ♂♂, 25 ♀♀, from *Anthus trivialis*, Hungary, France; 1 ♂, 2 ♀♀, from *Macronyx capensis*, Transvaal. Alaudidae: 10 ♂♂, 32 ♀♀, from *Alauda arvensis*, Hungary.

Remarks. The basally enlarged genital sheath and distally rigid genital organ are reminiscent of the head of a long-billed bird; the genital organ can be held in various positions without distortion of any of the component parts. In the portions illustrated, the tip of the genital organ extends midway between the apex and tips of the genital arch (fig. 298), to the tips of the genital arch (fig. 297),

The Feather Mite Genus Proctophyllodes

and almost to the anterior opisthogastric setae (fig. 299). The redescription is based on specimens from *Jynx torquilla*. The larger illustrations of the male and female are based on specimens from *Anthus spragueii*, and the illustrations of the male genital regions are based on specimens from *Anthus spinoletta*.

HOSTS

Alaudidae		
<i>Alauda arvensis</i>	Vitzthum, 1992 <i>b</i>	Europe
L., 1758		Present study
Jynxidae		
<i>Jynx torquilla</i>	Europe	Vitzthum, 1922 <i>b</i>
	Asia	Present study
Motacillidae		
<i>Anthus hodgsoni</i>	Malaya	Present study
Richmond, 1907		
<i>Anthus pratensis</i>	Europe	Lichard, 1962
(L.), 1758		
<i>Anthus spinoletta</i>	Asia	Dubinín, 1952
(L.), 1758	United States	Present study
<i>Anthus spragueii</i>	United States	Present study
(Audubon), 1844		
<i>Anthus trivialis</i>	Europe	Vitzthum, 1922 <i>b</i>
(L.), 1758		Vassilev, 1960
		Fritsch, 1961
		Present study
<i>Macronyx capensis</i>	Un. So. Africa	Present study
(L.), 1766		
Fringillidae (Questionable record)		
<i>Emberiza hortulana</i> (L.), 1758	Europe	Vitzthum, 1922 <i>b</i>
	Fr. Cameroons	Gaud, 1957
Sylviidae (questionable record)		
<i>Sylvia borin</i>	Europe	Vitzthum, 1922 <i>b</i>
(Boddaert), 1783		
(= <i>S. simplex</i>)		

Proctophyllodes motacillae Gaud

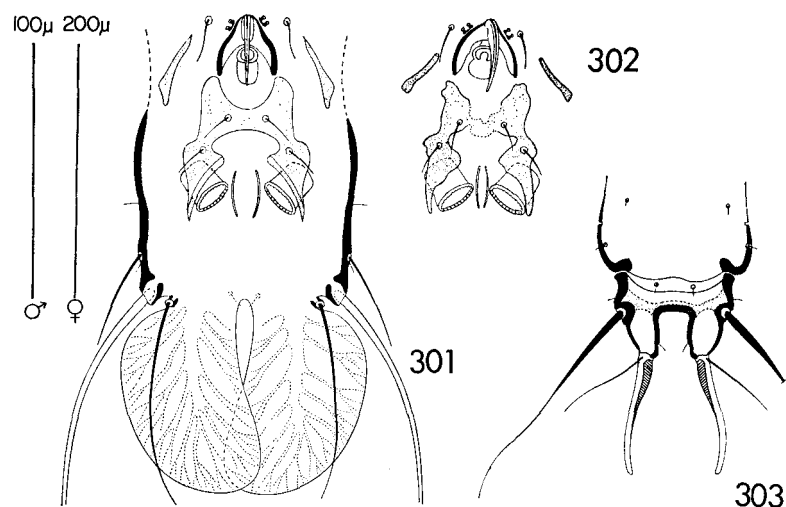
Proctophyllodes motacillae Gaud, 1953, Ann. Parasitol. hum. comp., 28: 200–201, fig. 3(3). Type host: *Motacilla aguimp* (Motacillidae).

Proctophyllodes motacillae, Gaud and Mouchet, 1957, Ann. Parasitol. hum. comp., 32(5–6): 511.

Proctophyllodes motacillae Fritsch, 1961, Z. Parasitenk., 21: 18–19, figs. 14a–d. Type host: *Motacilla alba* (Motacillidae). (New synonymy).

Proctophyllodes motacillae, Gaud and Till, 1961, Publ. So. Afr. Inst. Med. Res., 11(L): 251.

The short, delicate genital organ which extends slightly beyond



FIGS. 301-303. *Proctophyllodes motacillae* Gaud: male (301) and female (303) from *Motacilla alba*, male (302) from *Lanius excubitor*.

the tips of the genital arch, the united opisthogastric shield, the short adanal discs, and the oblong lamellae distinguish the males of *Proctophyllodes motacillae*. The related *P. emberizae* is similar, but has long adanal discs and ovoid lamellae.

MALE. Length, excluding lamellae, 298 μ ; width, 137 μ . *Dorsal idiosoma*: Propodosomal shield 75 μ in length, 90 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 63 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 15.9 μ in length, 2.8 μ in width. Hysterosomal shield 166 μ in length, 84 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 41 μ in length. Lamellae 76 μ in length, 48 μ in width, oblong, apices overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs joined; genital arch to level midway between legs III and IV; genital organ delicate, extending slightly beyond genital arch; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields broadly joined and bearing two pairs of setae. Adanal discs circular, each about 15 μ x 15 μ and bearing approximately 24 teeth; without accessory glands.

FEMALE. Length, excluding terminal appendages, 447 μ ;

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width, 160 μ . *Dorsal idiosoma*: Propodosomal shield 93 μ in length, 110 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 88 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 19.7 μ in length, 4.8 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 224 μ in length, 102 μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 54 μ in length; setae d_4 inserted on conjunctiva and separated by 27 μ ; lobes normal; cleft parallel-sided, 36 μ in length, 20 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages; setae l_5 about 2 times longer than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Motacilla aguimp* (Motacillidae): holotype δ (Gaud), allotype φ (Gaud), 1 δ , 4 φ paratypes (Gaud), Bambari, Oubangui-Chari, French Equatorial Africa, November, 1950, J. Gaud.

Material examined. Motacillidae: 5 δ δ , 10 φ φ , from *Motacilla alba*, French Morocco, Bulgaria. Laniidae: 4 δ δ , 1 φ , from *Lanius excubitor*, French Morocco.

Remarks. In slide preparations, when little pressure has been exerted on the specimen, the *genital arch* has a characteristic configuration (fig. 301). Conversely, with more pressure, the arch becomes rounded and the genital organ is forced from the midline (fig. 302). The males examined from *Motacilla alba* have the opistogastric shield with distinct margins; males from *Lanius excubitor* have the shield less sclerotized and the margins indistinct. The few specimens from *Lanius* are provisionally identified as *P. motacillae*. The genital organ is slightly longer and the seminal vesicle is differently shaped than the same structures in the typical *P. motacillae*. The redescription and drawings are based on the specimens from *Motacilla alba*; the insert of the male genital region is based on a specimen from *Lanius excubitor*.

HOSTS

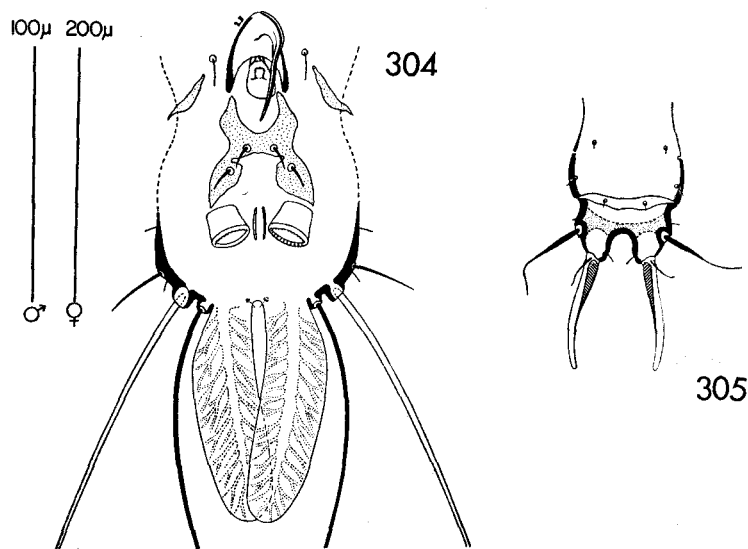
Motacillida		
<i>Motacilla aguimp</i>	Fr. Eq. Africa	Gaud, 1953
Dumont, 1821		Gaud & Till, 1961
<i>Motacilla alba</i> L.,	Fr. Morocco	Gaud, 1953
1758		Present study
	Europe	Fritsch, 1961
		Present study

<i>Motacilla cinerea</i> Tunstall, 1771	Europe	Fritsch, 1961
<i>Motacilla flava</i> L., 1758	Fr. Morocco	Gaud, 1953 Gaud & Till, 1961
	Fr. Cameroons	Gaud & Mouchet, 1957
Laniidae (provisional inclusion)		
<i>Lanius excubitor</i> L., 1758	Fr. Morocco	Present study

Proctophyllodes sporophilae, new species

The structures of the genital arch and genital organ of *Proctophyllodes sporophilae* are similar to those of *P. picae*, and the opisthogastric shield is similar to that of *P. ischnocaulus*. However, it is probable that this species is unique and not closely related to the aforementioned forms. The elongate lamellae are sufficient to distinguish this species from other members of the group.

MALE (holotype). Length, excluding lamellae, 278 μ ; width, 138 μ . Dorsal idiosoma: Propodosomal shield 80 μ in length, 77 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 55 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 11 μ in length, 3.5 μ in width. Hysterosomal shield 159 μ in length, 83 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions;



FIGS. 304, 305. *Proctophyllodes sporophilae*, new species: holotype male (304), allotype female (305).

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supranal concavity 48 μ in length. Lamellae 85 μ in length, 24 μ in width, linear with apices slightly overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs united; genital arch extending to level of trochanters III; genital organ extending to point midway between posterior limits of genital arch and anterior margin of opisthogastric shield; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields joined and bearing two pairs of setae. Adanal discs circular, each about 16 μ x 16 μ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 370 μ ; width, 152 μ . *Dorsal idiosoma*: Propodosomal shield 83 μ in length, 97 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 69 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 17 μ in length, 5.4 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 177 μ in length, 93 μ in width, with anterior margin strongly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 52 μ in length; setae d_4 inserted on conjunctiva and separated by 30 μ ; lobes normal; cleft divergent, 23 μ in length, 22 μ in width; setae d_5 $\frac{1}{2}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Sporophila torqueola* (Fringillidae), México: holotype δ (NU), 1 δ paratype, Balancan, Tabasco, April 25, 1961, E. Armstrong; allotype f (NU), 1 δ , 1 f paratypes, 1 mile southwest Valle Nacional, Oaxaca, March 27, 1961, Larry L. Wolf. Paratypes deposited: NU, USNM.

Additional material. Fringillidae: 1 δ , 2 f f , from *Sporophila americana corvina*, Tabasco, México.

Remarks. The host genus provides the trivial name *sporophilae*. Drawings are of the holotype and allotype.

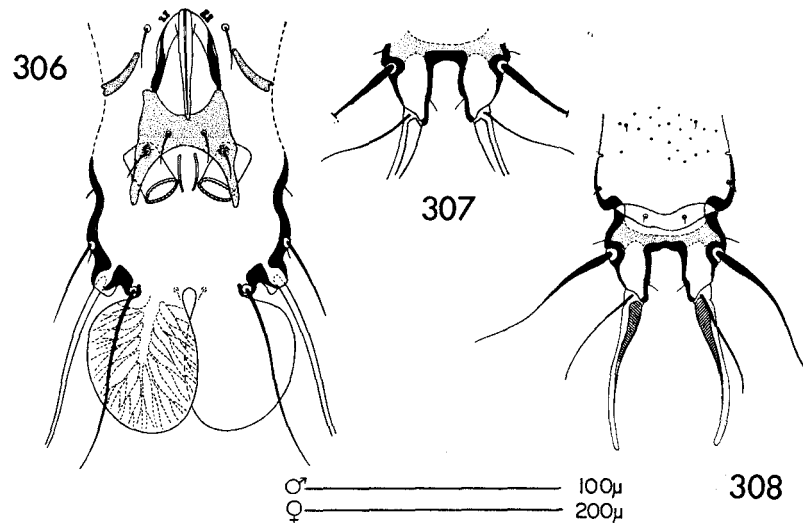
	HOSTS	
Fringillidae		
<i>Sporophila americana corvina</i> (Sclater), 1859	México	Present study
<i>Sporophila torqueola</i> (Bonaparte), 1850	México	Present study

The separation of the following two species—*Proctophyllodes polyxenus*, new species, and *P. egglestoni*—is provisional. In each species a line of demarcation between the opisthogastric setae delineates differential sclerotization of the opisthogastric shield; the anterior half invariably is darker than the posterior half of the shield. The anterior and posterior margins of the opisthogastric shield are strongly concave with only nominal variation in the configuration of the shield.

Illustrations of the males might suggest differences in the length and width of the genital organ. It should be emphasized that within a study series, undoubtedly influenced by mounting procedures, the genital organ may be flattened and hence appear widened, and it may approximate or exceed the level of the anterior opisthogastric setae.

Proctophyllodes polyxenus, new species

The new species, closely related to *Proctophyllodes egglestoni*, may be differentiated as follows: the hysterosomal cleft of the female is greater than 40μ in length, the adanal discs of the male have a length to diameter ratio of about 2:1, and neither sex has dark lateral hysterosomal margins. In the related *P. egglestoni*, the hysterosomal cleft is less than 40μ in length, the adanal discs have a length to diameter ratio of 3:2, and at least the lateral margins of the female hysterosomal shield has dark margins.



FIGS. 306-308. *Proctophyllodes polyxenus*, new species: holotype male (306), allotype female (307), paratype female (308).

The Feather Mite Genus Proctophyllodes

MALE (holotype). Length, excluding lamellae, 286 μ ; width, 132 μ . *Dorsal idiosoma*: Propodosomal shield 75 μ in length, 78 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 53 μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 16.3 μ in length, 2.5 μ in width. Hysterosomal shield 168 μ in length, 87 μ in width; anterior margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 43 μ in length. Lamellae 58 μ in length, 42 μ in width, ovoid, with inner margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective. Pregenital apodeme absent; genital discs joined; genital arch to level between legs III and IV; genital organ extending nearly to anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields broadly joined and bearing two pairs of setae. Adanal discs circular, each about 25 μ x 14 μ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 461 μ ; width, 160 μ . *Dorsal idiosoma*: Propodosomal shield 96 μ in length, 108 μ in width; lateral margins entire; without lacunae; with external vertical setae; distance between external scapular setae, 75 μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.6 μ in length, 5 μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 235 μ in length, 100 μ in width, with anterior margin concave, with small lacunae; without supranal concavity. Lobar region articulated with anterior shield; 76 μ in length; setae d_4 inserted on conjunctiva and separated by 28 μ ; lobes normal; cleft parallel-sided, 46 μ in length, 24 μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with strong connective; without lateral extensions; epimerites without surface fields.

Type material. From *Passerella iliaca* (Fringillidae): holotype δ (NU), allotype ♀ (NU), 1 ♀ , Lafayette, Tippecanoe County, Indiana, October 30, 1958, R. E. Mumford; paratypes: 1 ♀ , Columbia, Missouri, March 26, 1954, C. W. McLaughlin; 1 δ , 1 ♀ , Elmwood, Cass County, Nebraska, October 25, 1960, N. Braasch; 1 δ , 1 ♀ , 10 miles southeast College Station, Brazos County, Texas, W. B. Davis; 2 $\delta\delta$, 2 $\text{♀}\text{♀}$, 30 miles east, Dallas, Dallas County, Texas; 2 $\delta\delta$, 3 $\text{♀}\text{♀}$, 8 miles north, Dallas, Dallas County, Texas, February 21,

1940; 2 ♂♂, 11 ♀♀, Falls Church, Virginia, March 11, 1923, E. A. Chapin; 15 ♂♂, 21 ♀♀, Falls Church, Virginia, March 18, 1923, E. A. Chapin. Paratypes deposited: BMNH, Gaud, MU, NU, USNM.

Additional material. Fringillidae: 1 ♂, 4 ♀♀, from *Aimophila aestivalis*, Louisiana; 2 ♂♂, 3 ♀♀, from *Aimophila ruficeps*, Texas; 3 ♂♂, 4 ♀♀, from *Ammodramus bairdi*, North Dakota; 2 ♂♂, 5 ♀♀, from *Ammodramus savannarum*, Nebraska, Texas; 5 ♂♂, 6 ♀♀, from *Ammospiza caudacuta*, Georgia, Louisiana; 4 ♂♂, 4 ♀♀, from *Ammospiza maritima*, Mississippi, Texas; 4 ♂♂, 4 ♀♀, from *Ammospiza nigrescens*, Florida; 4 ♂♂, 6 ♀♀, from *Atlapetes pileatus*, México; 4 ♂♂, 4 ♀♀, from *Calcarius pictus*, Arkansas, Mississippi; 2 ♂♂, 3 ♀♀, from *Chlorura chlorura*, Louisiana; 1 ♂, 6 ♀♀, from *Chondestes grammacus*, Nebraska; 14 ♂♂, 26 ♀♀, from *Junco hyemalis*, Indiana, Missouri, Texas, Virginia; 4 ♂♂, 8 ♀♀, from *Junco oreganus*, Texas, Utah; 13 ♂♂, 19 ♀♀, from *Melospiza georgiana*, Indiana, Louisiana, Mississippi, Tennessee, Newfoundland; 9 ♂♂, 17 ♀♀, from *Melospiza melodia*, Texas, Virginia; 5 ♂♂, 7 ♀♀, from *Melospiza lincolni*, Texas, Utah; 7 ♂♂, 33 ♀♀, from *Passerculus sandwichensis*, Rhode Island, Texas, Utah; 2 ♂♂, 5 ♀♀, from *Passerherbulus caudacutus*, Texas; 11 ♂♂, 12 ♀♀, from *Pipilo erythrophthalmus*, Georgia, Indiana, Massachusetts, Nebraska, South Dakota; 2 ♂♂, 2 ♀♀, from *Pipilo fuscus*, México; 4 ♂♂, 4 ♀♀ from *Pyrrhuloxia sinuata*, México; 7 ♂♂, 6 ♀♀, from *Spizella arborea*, Tennessee, Utah; 3 ♂♂, 4 ♀♀, from *Spizella atrogularis*, México; 3 ♂♂, 3 ♀♀, from *Spizella pallida*, Texas; 15 ♂♂, 20 ♀♀, from *Spizella passerina*, Missouri, Utah, Virginia; 7 ♂♂, 14 ♀♀, from *Zonotrichia albicollis*, Nebraska, Texas; 11 ♂♂, 13 ♀♀ from *Zonotrichia querula*, Nebraska, Texas; 17 ♂♂, 23 ♀♀, from *Zonotrichia leucophrys*, Michigan, Texas. Motacillidae: 2 ♂♂, 4 ♀♀, from *Anthus spragueii*, Texas. Parulidae: 12 ♂♂, 8 ♀♀, from *Dendroica auduboni*, Colorado, Utah, México; 5 ♂♂, 3 ♀♀, from *Vermivora celata*, Texas; 1 ♂, from *Vermivora peregrina*, Louisiana; 2 ♂♂, 2 ♀♀, from *Vermivora ruficapilla*, Texas. Strigidae: 2 ♂♂, 3 ♀♀, from *Asio flammeus*, Texas; 1 ♂, 1 ♀, from *Bubo virginianus*, Texas; 2 ♂♂, 3 ♀♀, from *Speotyto cunicularia*, Texas. Thraupidae: 5 ♂♂, 5 ♀♀, from *Piranga ludoviciana*, Texas, México. Turdidae: 1 ♂, 4 ♀♀, from *Hylocichla guttata*, Texas; 4 ♂♂, 6 ♀♀, *Hylocichla ustulata*, Texas.

Remarks. The large number of hosts serve as the basis for the name *polyxenus*. However, due to the diverse group of hosts it is possible that the form defined as *Proctophyllodes polyxenus* may in

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fact represent a species complex rather than a species. The drawings are of the holotype, allotype, and a female paratype.

	HOSTS	
Strigidae (Questionable records)		
<i>Asio flammeus</i>	United States	Present study
(Pontoppidan), 1763		
<i>Bubo virginianus</i>	United States	Present study
(Gmelin), 1788		
<i>Speotyto cunicularia</i>	United States	Present study
(Molina), 1782		
Turdidae		
<i>Hylocichla guttata</i>	United States	Present study
(Pallas), 1814		
<i>Hylocichla ustulata</i>	United States	Present study
(Nuttall), 1840		
Motacillidae		
<i>Anthus spragueii</i>	United States	Present study
(Audubon), 1844		
Thraupidae		
<i>Piranga ludoviciana</i>	United States	Present study
(Wilson), 1811	México	Present study
Parulidae		
<i>Dendroica auduboni</i>	United States	Present study
(Townsend), 1837	México	Present study
<i>Vermivora celata</i>	United States	Present study
(Say), 1823		
<i>Vermivora peregrina</i>	United States	Present study
(Wilson), 1811		
<i>Vermivora ruficapilla</i>	United States	Present study
(Wilson), 1811		
Fringillidae		
<i>Aimophila aestivalis</i>	United States	Present study
(Lichtenstein), 1823		
<i>Aimophila ruficeps</i>	United States	Present study
(Cassin), 1852		
<i>Anmodramus bairdi</i>	United States	Present study
(Audubon), 1844		
<i>Anmodramus savannarum</i>	United States	Present study
(Gmelin), 1789		
<i>Ammospiza caudacuta</i>	United States	Present study
(Gmelin), 1788		
<i>Ammospiza maritima</i>	United States	Present study
(Wilson), 1811		
<i>Ammospiza nigrescens</i>	United States	Present study
(Ridgway), 1873		
<i>Atlapetes pileatus</i>	México	Present study
Wagler, 1831		
<i>Calcarius pictus</i>	United States	Present study
(Swainson), 1831 (1832)		
<i>Chlorura chlorura</i>	United States	Present study
(Audubon), 1839		
<i>Chondestes grammacus</i>	United States	Present study
(Say), 1823		
<i>Junco hyemalis</i> (L.), 1758	United States	Present study

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<i>Junco oreganus</i> (Townsend), 1837	United States	Present study
<i>Melospiza georgiana</i> (Latham), 1790	Newfoundland United States	Present study Present study
<i>Melospiza lincolni</i> (Audubon), 1834	United States	Present study
<i>Melospiza melodia</i> (Wilson), 1810	United States	Present study
<i>Passerculus sandwichensis</i> (Gmelin), 1789	United States	Present study
<i>Passerella iliaca</i> (Merrem), 1786	United States	Present study
<i>Passerherbulus caudacutus</i> (Latham), 1790	United States	Present study
<i>Pipilo erythrophthalmus</i> (L.), 1758	United States	Present study
<i>Pipilo fuscus</i> Swainson, 1827 (= <i>P. rutilus</i>)	México	Present study
<i>Pyrrhuloxia sinuata</i> (Bonaparte), 1837	México	Present study
<i>Spizella arborea</i> (Wilson), 1810	United States	Present study
<i>Spizella atrogularis</i> (Cabanis), 1851	United States	Present study
<i>Spizella pallida</i> (Swainson), 1831 (1832)	United States	Present study
<i>Spizella passerina</i> (Bechstein), 1798	United States	Present study
<i>Zonotrichia albicollis</i> (Gmelin), 1789	United States	Present study
<i>Zonotrichia querula</i> (Nuttall), 1840	United States	Present study
<i>Zonotrichia leucophrys</i> (Forster), 1772	United States	Present study

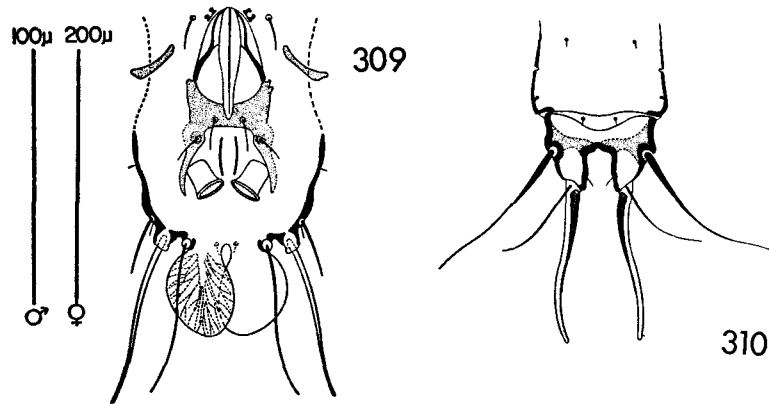
Proctophyllodes egglestoni Spory

Proctophyllodes egglestoni Spory, 1965, Ohio J. Sci., 65(2): 54-56, figs. 5-8. Type host: *Agelaius p. phoeniceus* (Icteridae).

The length of the hysterosomal cleft in females serves to distinguish *Proctophyllodes egglestoni* from *P. polyxenus*, new species. In the latter species, the length of the cleft exceeds 40 μ , while in *P. egglestoni* the cleft length is less than 40 μ .

MALE (holotype). Length, excluding lamellae, 270 μ ; width, 129 μ . Dorsal idiosoma: Propodosomal shield 70 μ in length, 74 μ in width, lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 52 μ . Humeral shields well developed and not bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 13 μ in length, 2.5 μ in width. Hysterosomal shield 158 μ in length, 78 μ in width; anterior

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FIGS. 309, 310. *Proctophyllodes egglestoni* Spory: holotype male (309), allotype female (310).

margin shallowly concave; without lacunae; without ventrolateral extensions; supranal concavity 35μ in length. Lamellae 35μ in length, 26μ in width, ovoid, with inner margins overlapping, with pinnate venation. *Ventral idiosoma*: Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields. Pregenital apodeme absent; genital discs weakly joined; genital arch to level midway between legs III and IV; genital organ extending to anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields broadly joined and bearing two pairs of setae. Adanal discs circular, each about $15\mu \times 11\mu$ and bearing approximately 20 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 430μ ; width, 189μ . *Dorsal idiosoma*: Propodosomal shield 88μ in length, 98μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 70μ . Humeral shields well developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.6μ in length, 3.2μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 211μ in length, 89μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 54μ in length; setae d_4 inserted on conjunctiva and separated by 23μ ; lobes normal; cleft parallel-sided, 30μ in length, 12μ in width; setae d_5 $\frac{3}{4}$ length of terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes well developed; epimerites I

U-shaped with weak connective; without lateral extensions; epimerites without surface fields.

Type material. From *Agelaius p. phoeniceus* (Icteridae), Ohio: holotype ♂ (USNM), 4 ♂♂ paratypes, Ohio State University farm pond area, Columbus, March 15, 1963, G. R. Spory; allotype ♀ (USNM), Delaware Reservoir Wildlife Area, Delaware, Delaware County, October 14, 1962, G. R. Spory; paratypes: 1 ♂, as holotype except March 13, 1963; 1 ♂, 4 ♀♀, as allotype except October 19, 1963; 4 ♀♀, as allotype except September 17, 1962. Paratypes deposited: Institute of Acarology, Wooster, Ohio.

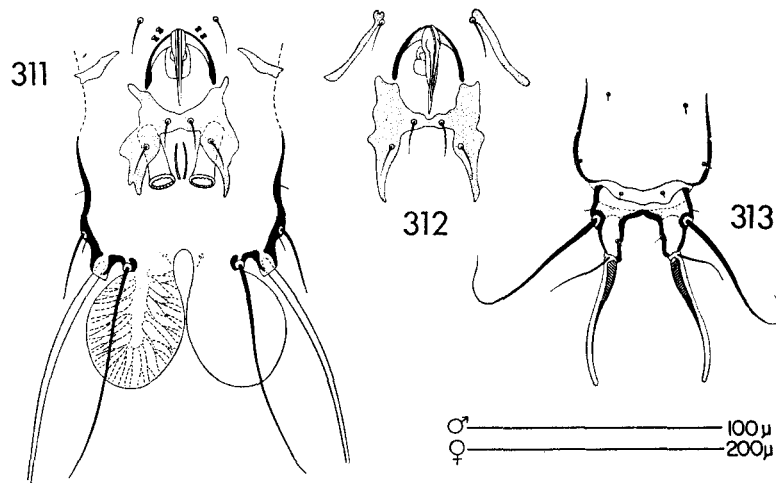
Material examined. Icteridae: 7 ♂♂, 24 ♀♀ (including holotype and allotype), from *Agelaius phoeniceus*, Iowa, Kansas, Nebraska; 1 ♂, from *Euphagus carolinus*, Texas; 11 ♂♂, 29 ♀♀ from *Euphagus cyanocephalus*, Idaho, Louisiana, Texas, Utah; 14 ♂♂, 16 ♀♀, from *Molothrus ater*, Michigan, Nebraska, Utah; 8 ♂♂, 17 ♀♀, from *Quiscalus quiscula*, Iowa, New Hampshire, South Dakota, Texas; 3 ♂♂, 5 ♀♀, from *Xanthocephalus xanthocephalus*, Nebraska, Utah. Sturnidae: 1 ♂, 1 ♀, *Sturnus vulgaris*, Kansas (questionable record).

Remarks. With the exception of mites from *Euphagus*, all females possess anterior hysterosomal shields with exceptionally dark bands on the lateral margins. Female mites from *Euphagus* may lack entirely the darkened bands, but some specimens display variability in the intensity of darkening. The drawings are of the holotype and allotype.

	HOSTS	
Icteridae		
<i>Agelaius phoeniceus</i> (L.), 1766	United States	Spory, 1965 Present study
<i>Euphagus carolinus</i> (Müller), 1776	United States	Present study
<i>Euphagus cyanocephalus</i> (Wagler), 1829	United States	Present study
<i>Molothrus ater</i> (Boddaert), 1783	United States	Present study
<i>Quiscalus quiscula</i> (L.), 1758	United States	Present study
<i>Xanthocephalus xanthocephalus</i> (Bonaparte), 1826	United States	Present study
Sturnidae (questionable record)		
<i>Sturnus vulgaris</i> L., 1758	United States	Present study

Proctophyllodes emberizae Atyeo and Vassilev

Proctophyllodes emberizae Atyeo and Vassilev, 1964, Bull. Uni. Nebraska St. Mus., 4(13): 273-275, fig. 1. Type host: *Emberiza melanocephala* (Fringillidae).



FIGS. 311-313. *Proctophyllodes emberizae* Atyeo and Vassilev: holotype male (311), paratype male (312), allotype female (313).

Proctophyllodes motacillae and *P. emberizae*, two similar species may be distinguished in the males by the relative sizes of the terminal lamellae and the lengths of the supranal concavities. In the former species, the lamellae are about $75\mu \times 50\mu$ and the supranal concavity, 40μ in length; in *P. emberizae*, the lamellae are $50\mu \times 40\mu$ and the supranal concavity, 30μ in length.

MALE (holotype). Length, excluding lamellae, 316μ ; width, 155μ . *Dorsal idiosoma:* Propodosomal shield 75μ in length, 88μ in width; lateral margins entire; without lacunae; without external vertical setae; distance between external scapular setae, 57μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae spiculiform, 15.2μ in length. Hysterosomal shield 175μ in length, 102μ in width; anterior margin strongly concave; without lacunae; without ventrolateral extensions; supranal concavity 29μ in length. Lamellae 50μ in length, 38μ in width, ovoid, internal margins approximate, with pinnate venation. *Ventral idiosoma:* Apodemes well developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface sclerites. Pregenital apodeme absent; genital discs separate; genital arch to level of anterior articulations of legs IV; genital organ extending midway between tips of genital arch and anterior opisthogastric setae; genital sheath not bifid distally. Opisthogastric setae in trapezoidal arrangement; opisthogastric shields broadly joined and bearing two pairs of setae. Adanal discs circular,

each about $23\mu \times 9\mu$ and bearing approximately 26 teeth; accessory glands absent.

FEMALE (allotype). Length, excluding terminal appendages, 471μ ; width, 163μ . *Dorsal idiosoma*: Propodosomal shield 100μ in length, 115μ in width; lateral margins weakly incised; without lacunae; without external vertical setae; distance between external scapular setae, 76μ . Humeral shields moderately developed and bearing setae l_1 at extreme anteromedial angles; subhumeral setae lanceolate, 20.7μ in length, 3.5μ in width. Hysterosoma with lobes and with terminal appendages; anterior shield 231μ in length, 108μ in width, with anterior margin shallowly concave, without lacunae; without supranal concavity. Lobar region articulated with anterior shield; 55μ in length; setae d_4 inserted on conjunctiva and separated by 32μ ; lobes normal; cleft parallel-sided or slightly divergent, 38μ in length, 29μ in width; setae d_5 $1/2$ length of terminal appendages; setae l_5 $1 1/2$ times longer than terminal appendages. Spermatheca as in *pinnatus*. *Ventral idiosoma*: Apodemes moderately developed; epimerites I U-shaped with weak connective, without lateral extensions; epimerites without surface fields.

Type material. From *Emberiza melanocephala* (Fringillidae): holotype ♂ (BAS), allotype ♀ (BAS), 10 ♂♂, 3 ♀♀ (BAS, NU), Ognyanovo, District of Pazardgik, Bulgaria, July 11, 1960, I. D. Vassilev.

Additional material. Fringillidae: 5 ♂♂, 13 ♀♀, from *Emberiza hortulana*, Bulgaria.

Remarks. The drawings are of the holotype, allotype, and a paratype male. The latter is included to illustrate the extreme development of epimerites IVa to include the insertions of setae c_1 .

HOSTS

Fringillidae

<i>Emberiza hortulana</i> (L.), 1758	Europe	Atyeo & Vassilev, 1964 Present study
<i>Emberiza melanocephala</i> Scopoli, 1769	Europe	Atyeo & Vassilev, 1964 Present study

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SPECIES INCORRECTLY PLACED IN *PROCTOPHYLLODES*

Synonymies are not intended to be complete for the following species. Only citations relevant to the immediate investigation are included.

Alloptes fenestralis (Trouessart)

Proctophyllodes fenestralis Trouessart, 1885, Bull. Soc. Etud. Sci. Angers, 14: 77–78. Type host: *Helianthea bonapartei* (Trochilidae).

Alloptes fenestralis, Canestrini and Kramer, 1899, Tierreich, 7: 110.

Alloptes fenestralis, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 53.

Vitzthum (1922b) agrees with Canestrini and Kramer (1899) that *Proctophyllodes fenestralis* should be assigned to the genus *Alloptes*. After examination of the type, the present authors believe that this species represents a new genus having affinities with *Pterodectes*. Until the description of the new taxon, *P. fenestralis* is retained provisionally in *Alloptes*.

Alloptes intermedius (Trouessart and Neumann)

Proctophyllodes intermedius Trouessart, 1888, In Poppe, 1888, Abhandl. Naturwiss. Ver. Bremen, 10: 227. Type host: *Elaeina martinica* (Tyrannidae). (*Nomen nudum*) (*non Proctophyllodes intermedius* Trouessart, 1855).

Pterodectes intermedius Trouessart and Neumann, 1888, Bull. sci. France Belg., 19: 369–370, pl. 25, fig. 10. Type host: *Elaeina martinica* (Tyrannidae).

Alloptes intermedius, Canestrini and Kramer, 1899, Tierreich, 7: 108.

Pterodectes intermedius (in part), Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 53–55.

Poppe (1888) lists "*Proctophyllodes intermedius* Tr. n. sp. in lit.—*Elaeina martinica* (Tyrannidea)." Trouessart and Neumann (1888), when describing the same species, place it in the genus *Pterodectes*. Vitzthum (1922b) believed that this species and *Proctophyllodes intermedius* Trouessart, 1885, from *Eurylaimus ochromelas* were synonymous, but a comparison of the hosts is sufficient to distinguish the two forms.

Gaud (personal communication) is of the opinion that the species

from *Elainea* is either a *Pterodectes* or an *Anisodiscus*, but until the type is examined, this species is retained in *Alloptes*.

?*Analges socialis* Giebel

Analges socialis Giebel, 1871, Z. ges. Naturwiss., 37: 498. Type host: *Motacilla alba* (Motacillidae) (*non Analges socialis* Robin, 1877).

Proctophyllodes socialis, Haller, 1878, Z. ges. Wiss. Zool., 30: 537.

Proctophyllodes socialis, Trouessart, 1885, Bull. Soc. Etud. Sci. Angers, 14: 77.

Proctophyllodes socialis, Poppe, 1888, Abhandl. Naturwiss. Ver. Bremen, 19: 228.

Analges socialis, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 46.

Analges socialis is not a species of *Proctophyllodes*. It is probable that the species is an Analgidae, but not an *Analges*.

Monojoubertia hemiphylla (Robin)

Proctophyllodes hemiphylus Robin (and Mégnin), 1877, J. Anat. Phys., 13: 639-641. Type host: *Emberiza calandra* (Fringillidae).

Alloptes hemiphylus, Canestrini, 1866, Prospetto dell'Acarofauna Italiana, 2: 292-293.

Alloptes hemiphylus, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 51-52.

Monojoubertia hemiphylla, Radford, 1953, Paristol., 43: 214.

Radford (1953) correctly included *Proctophyllodes hemiphylus* in the genus *Monojoubertia*.

Monojoubertia microphylla (Robin)

Proctophyllodes microphyllus Robin (and Mégnin), 1877, J. Anat. Phys., 13: 641-643. Type host: *Fringilla coelebs* (Fringillidae).

Alloptes microphyllus, Canestrini, 1886, Prospetto dell'Acarofauna Italiana, 2: 290.

Joubertia microphylla, Oudemans, 1905, Entomol. Ber., 1(24): 239-240.

Joubertia microphylla, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 52-53.

Monojoubertia microphylla, Radford, 1950, Union Intern. Sci. biol. int., Sér. C, no. 1, p. 171.

Although the name *Joubertia* was preoccupied, Oudemans (1905)

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recognized that *Proctophyllodes microphyllus* represented a new genus. Radford (1950) proposed the name *Monojoubertia* to replace *Joubertia*.

Montchadskiana buchholzi (Canestrini)

Dermaleichus buchholzi Canestrini, 1878, Atti del R. Istituto Veneto Sci. Lettre, Arti, ser. 5, 5: 64. Type host: *Limosa limosa* (Scolopacidae).

Proctophyllodes buchholzi, Canestrini, 1879, Atti della soc. Veneto-Trentina Sci. nat., 6(1): 37.

Pterolichus buchholzi, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 55.

Montchadskiana buchholzi, Dubinin, 1956, Fauna U.S.S.R., 6(7): 466-469.

Dermaleichus buchholzi, *D. vanelli*, and *D. colmbi* were described by Canestrini in 1878. In the following year, Canestrini placed these species in *Proctophyllodes*. Since 1879, each of these species have been shifted to numerous pterolichid genera (see Dubinin, 1956, for complete synonymy).

Montchadskiana vanelli (Canestrini)

Dermaleichus vanelli Canestrini, 1878, Atti del R. Istituto Veneto Sci. Lettre, Arti, ser. 5, 5: 62. Type host: *Vanellus vanellus* (Charadriidae).

Proctophyllodes vanelli, Canestrini, 1879, Atti della Soc. Veneto-Trentina Sci. nat., 6(1): 37.

Pterolichus vanelli, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 55.

Montchadskiana vanelli, Dubinin, 1956, Fauna U.S.S.R., 6(7): 506-509.

For a complete synonymy, see Dubinin, 1956.

Proctophyllodes affinis Trouessart

Proctophyllodes affinis Trouessart, 1888, In Poppe, 1888, Abhandlung. Naturwiss. Ver. Bremen, 10: 227. Type host: *Dendroica petechia aestiva* (Parulidae). (*Nomen nudum*).

Proctophyllodes affinis, Vitzthum, 1922b, Arch. Naturgeschichte, A, 88(5): 60.

"*Proctophyllodes affinis*, Tr. nov. sp. in lit.—*Dendroica aestiva*" constitutes the mention of this species in the literature. Vitzthum

(1922*b*) and the present authors can only repeat this entry. However, the present authors have seen slides prepared by Trouessart and identified as *Proctophyllodes affinis* from *Dendroica aestiva*; these specimens represent a new genus to be described in the near future.

Pterodectes bureschi (Vassilev)

Proctophyllodes bureschi Vassilev, 1958, Bulg. Acad. Sci. Proc. Sect. Biol. Med Sci., 4: 25–27, fig. 2. Type host: *Lullula arborea* (Alaudidae).

Pterodectes bureschi, Vassilev, 1959*b*, Comp. rend. Acad. bulg. Sci., 12(3): 224–225.

Vassilev (1959*b*) properly assigned this species to *Pterodectes*.

Pterodectes intermedius (Trouessart)

Proctophyllodes intermedius Trouessart, 1885, Bull. Soc. Etud. Sci. Angers, 14: 48. Type host: *Eurylaimus ochromelas* (Eurylaimidae).

Pterodectes intermedius (in part), Vitzthum, 1922*b*, Arch. Naturgeschichte, A, 88(5): 53–55.

Gaud (personal communication) believes that this species is neither a *Pterodectes* nor an *Alloptes*. Until the species has been critically evaluated, *P. intermedius* should be considered as an unassigned species.

Pterodectes minor (Berla), new combination

Proctophyllodes minor Berla, 1959, Rev. Brasil Biol., 19(2): 203–204, figs. 1–4. Type host: *Sclerurus scansor scansor* (Furnariidae).

The female of this species can easily be mistaken for a *Proctophyllodes* as epimerites I are U-shaped and the pregenital apodeme is not connected to epimerites III. However, the spermatheca is not similar to the spermathecae of *Proctophyllodes*.

The male has epimerites I Y-shaped and has an ensiform genital structure. The only similarity to *Proctophyllodes* is an extension of the terminal opisthosoma into two small lamellae. Although atypical in some characteristics, *Proctophyllodes minor* should be reassigned to the genus *Pterodectes*.

Pterodectes reticulifer Trouessart and Neumann

Pterodectes reticulifer Trouessart and Neumann, 1888, Bull. sci.

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France Belg., 19: 371, pl. 25, figs. 6, 7. Type host: *Eremophila alpestris* (Alaudidae).

Pterodectes reticulifer, Trouessart, 1899, Bull. Soc. Etud. Sci. Angers, 28: 186.

Proctophyllodes reticulifer, Canestrini and Kramer, 1899, Tierreich, 7: 119.

Pterodectes reticulifer, Vitzthum, 1922*b*, Arch. Naturgeschichte, A, 88(5): 62–63.

Canestrini and Kramer (1899) misinterpreted the illustration of Trouessart and Neumann (1888) in which setae d_5 of the male are expanded into leaflike structures. Except for this feature, which is not uncommon in the genus *Pterodectes*, the illustrations of the male and female are typical for *Pterodectes* species.

Pterodectes sakatai (Sugimoto)

Proctophyllodes sakatai Sugimoto, 1940, Bull. School Agric. Forest., Taihoku Imperial Univ., 1: 53, 56, pl. 6, figs. 1–3. Type host: *Dicrurus macrocercus harterti* (Dicruridae).

Pterodectes sakatai, Radford, 1953, Parasitol., 43(3, 4): 215.

This species was reassigned correctly by Radford (1953).

Pterodectes sialiarum (Stoll), new combination

Proctophyllodes sialiarum Stoll, 1893, Biol. Cent.-Am., 3: 42–43, pl. 21, figs. 3, 4. Type host: *Sialia sialis* (Turdidae).

Stoll's figures and description are of a *Pterodectes* species.

Pterodectes securiclatus Trouessart and Neumann

Pterodectes securiclatus Trouessart and Neumann, 1888, Bull. sci. France Belg., 19: 370. Type host: *Meliophetes leucostephus* (Melaphagidae).

Proctophyllodes securiclatus, Canestrini and Kramer, 1899, Tierreich, 7: 119.

Pterodectes securiclatus, Vitzthum, 1922*b*, Arch. Naturgeschichte, A, 88(5): 61–62.

Proctophyllodes securiclatus, Radford, 1953, Parasitol., 43(3, 4): 216.

Vitzthum (1922*b*), Gaud (personal communication), and the present authors concur that the species of Trouessart and Neumann is in fact a *Pterodectes*.

Ptiloxenus colymbi (Canestrini)

Dermaleichus colymbi Canestrini, 1878, Atti del R. Istituto Veneto Sci. Lettre, Arti, ser. 5, 5: 63.

Proctophyllodes colymbi, Canestrini, 1879, Atti della Soc. Veneto-Trentina Sci. nat., 6(1): 37.

Pterolichus colymbi, Vitzthum, 1922*b*, Arch. Naturgeschichte, A, 88(5): 55.

Ptiloxenus colymbi, Hull, 1934, Trans. N. Naturalists Union, 1: 202.

Ptiloxenus colymbi, Dubinin, 1956, Fauna U.S.S.R., 6(7): 530-533.

A redescription, illustrations, and a complete synonymy may be found in Dubinin (1956).

?*Trouessartia furcatus* (Koch)

Dermaleichus furcatus Koch, 1841, Deut. C.M.A., fasc. 33, no. 6.

Type host: *Mus musculus* (Muridae)

Proctophyllodes furcatus, Haller, 1878, Z. ges. Wiss. Zool., 30: 537.

Proctophyllodes furcatus, Vitzthum, 1922*b*, Arch. Naturgeschichte, A, 88(5): 25-26.

Trouessartia furcatus, Oudemans, 1937, Kritisch Hist. Overzicht Acarologie, 3: 2195-2196.

Vitzthum (1922*b*) questions Koch's record of a feather mite on a mouse, and Oudemans (1937) believes that it is an accidental occurrence of a *Trouessartia* species, probably *T. appendiculata* Berlese. The original figure of *Dermaleichus furcatus* is a proctophyllodid female, but a determination to even the generic level would be questionable.

HOST-PARASITE LIST

ORDER : ANSERIFORMES

Anatidae

Anas acuta L., 1758

Proctophyllodes picae (Koch)—Questionable record

ORDER : CHARADRIIFORMES

Scolopacidae

Calidris canutus (L.), 1758

Proctophyllodes megaphyllus Trouessart—Questionable record

Philohela minor Gmelin, 1789

Proctophyllodes scolopacinus (Koch)

Scolopax rusticola L., 1758

Proctophyllodes scolopacinus (Koch)

The Feather Mite Genus *Proctophyllodes*

ORDER : STRIGIFORMES

Strigidae

- Asio flammeus* (Pontoppidan), 1763
Proctophyllodes polyxenus, new species—Questionable record
Bubo virginianus (Gmelin), 1788
Proctophyllodes polyxenus, new species—Questionable record
Speotyto cunicularia (Molina), 1782
Proctophyllodes polyxenus, new species—Questionable record

ORDER : APODIFORMES

Apodidae

- Apus affinis* (J. E. Gray), 1830
Proctophyllodes stenophyllus, Gaud & Mouchet

Trochilidae

- Amazilia beryllina* (Lichtenstein), 1830
Proctophyllodes huitzilopochtlii, new species
Amazilia rutila (DeLattre), 1842
Proctophyllodes huitzilopochtlii, new species
Amazilia violiceps (Gould), 1859
Proctophyllodes huitzilopochtlii, new species
Chlorostilbon canivetii (Lesson), 1832
Proctophyllodes huitzilopochtlii, new species
Colibri thalassinis (Swainson), 1827
Proctophyllodes huitzilopochtlii, new species
Cyananthus latirostris Swainson, 1827
Proctophyllodes huitzilopochtlii, new species
Cyananthus sordidus (Gould), 1859
Proctophyllodes huitzilopochtlii, new species
Eugenes fulgens (Swainson), 1827
Proctophyllodes huitzilopochtlii, new species
Hylocharis leucotis (Vieillot), 1818
Proctophyllodes huitzilopochtlii, new species
Lampornis clemenciae (Lesson), 1830
Proctophyllodes huitzilopochtlii, new species
Selasphorus platycercus (Swainson), 1827
Proctophyllodes huitzilopochtlii, new species
Selasphorus rufus Gmelin, 1788
Proctophyllodes huitzilopochtlii, new species
Selasphorus sasin (Lesson), 1829
Proctophyllodes huitzilopochtlii, new species

ORDER : PICIFORMES

Jyngridae

Jynx torquilla
Proctophyllodes anthi Vitzthum

ORDER : PASSERIFORMES

Eurylaimidae

Psarisomus dalhousiae (Jameson), 1835
Proctophyllodes ceratophyllus, new species—Questionable record
Furnariidae

Xenops minutus (Sparrman), 1788
Proctophyllodes xenopsis, new species

Tyrannidae

Empidonax hammondii (Xantus), 1858
Proctophyllodes empidonis, new species
Empidonax wrighti Baird, 1858
Proctophyllodes empidonis, new species
Myiopagis viridicata (Vieillot)
Proctophyllodes occidentalis, new species—Questionable record
Nuttallornis borealis (Swainson), 1831
Proctophyllodes empidonis, new species
Pyrocephalus rubinus (Boddaert), 1825
Proctophyllodes empidonis, new species
Sayornis saya (Bonaparte), 1825
Proctophyllodes empidonis, new species

Pittidae

Pitta brachyura (L.), 1766
Proctophyllodes pittae, new species

Alaudidae

Alauda arvensis L., 1758
Proctophyllodes anthi Vitzthum
Proctophyllodes euryurus, new species
Eremophila alpestris (L.), 1758
Proctophyllodes microcaulus Gaud
Galerida cristata (L.), 1758
Proctophyllodes microcaulus Gaud
Proctophyllodes tenericaulus Atyeo & Vassilev
Galerida theklae (Brehm), 1858
Proctophyllodes microcaulus Gaud
Melanocorypha calandra (L.), 1766
Proctophyllodes microcaulus Gaud

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Dicruridae

- Dicrurus adsimilis* (Bechstein), 1794
 Proctophyllodes anaxiphus, new species
 Proctophyllodes orthocaulus Gaud
Dicrurus atripennis Swainson, 1837
 Proctophyllodes aphyllus Gaud & Mouchet
 Proctophyllodes orthocaulus Gaud
Dicrurus ludwigii (A. Smith), 1834
 Proctophyllodes dicruri, new species

Oriolidae

- Oriolus larvatus* Lichtenstein, 1823
 Proctophyllodes dasyxiphus, new species

Corvidae

- Aphelocoma coerulescens* (Bosc), 1795
 Proctophyllodes occidentalis, new species
Corvus corax L., 1758
 Proctophyllodes corvorum Vitzthum
Corvus corone corone L., 1758
 Proctophyllodes corvorum Vitzthum
 Proctophyllodes detruncatus Oudemans
Corvus corone cornix L., 1758
 Proctophyllodes corvorum Vitzthum
 Proctophyllodes detruncatus Oudemans
Corvus corone sardonius Kleinschmidt, 1903
 Proctophyllodes corvorum Vitzthum
 Proctophyllodes picae (Koch)
Corvus frugilegus L., 1758
 Proctophyllodes corvorum Vitzthum
Corvus monedula L., 1758
 Proctophyllodes corvorum Vitzthum
Cyanocitta cristata (L.), 1758
 Proctophyllodes occidentalis, new species
Cyanocitta stelleri (Gmelin), 1788
 Proctophyllodes occidentalis, new species
Garrulus glandarius (L.), 1758
 Proctophyllodes glandarinus (Koch)
Nucifraga caryocatactes (L.), 1758
 Proctophyllodes picae (Koch)
Pica pica (L.), 1758
 Proctophyllodes corvorum Vitzthum
 Proctophyllodes picae (Koch)

Paridae

- Parus ater* L., 1758
 Proctophyllodes ateri Fritsch
Parus atricapillus L., 1766
 Proctophyllodes ateri Fritsch
Parus bicolor L., 1766
 Proctophyllodes pari, new species
Parus caeruleus L., 1758
 Proctophyllodes stylifer (Buchholz)
Parus carolinensis Audubon, 1834
 Proctophyllodes ateri Fritsch,
Parus major L., 1758
 Proctophyllodes stylifer (Buchholz)
Parus palustris L., 1758
 Proctophyllodes stylifer (Buchholz)

Sittidae

- Sitta canadensis* L., 1766
 Proctophyllodes canadensis, new species
Sitta europaea L., 1758
 Proctophyllodes vitzthumi Fritsch

Certhiidae

- Certhia brachydactyla* C. L. Brehm, 1820
 Proctophyllodes clavatus Fritsch

Timaliidae

- Alcippe poiocephala* (Jerdon)
 Proctophyllodes curtiphyllus, new species
Garrulax erythrocephalus (Vigors), 1832
 Proctophyllodes mcclurei, new species
Macronus ptilosus Jardine & Shelby, 1835
 Proctophyllodes stachyris, new species
Malacopteron cinereum Eyton, 1839
 Proctophyllodes curtiphyllus, new species
Minla cyanouroptera (Hodgson)
 Proctophyllodes minlae, new species
Stachyris chrysaea Blyth
 Proctophyllodes cotyledon Trouessart
Stachyris poliocephala (Temminck), 1836
 Proctophyllodes stachyris, new species

Pycnonotidae

- Chlorocichla simplex* (Hartlaub), 1855
 Proctophyllodes mecistocaulus Gaud & Mouchet
 Proctophyllodes pachycaulus Gaud & Mouchet

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Pycnonotus barbatus (Des Fontaines), 1789
 Proctophyllodes stenophyllus Gaud & Mouchet
Pycnonotus goiavier (Scopoli), 1786
 Proctophyllodes stenophyllus Gaud & Mouchet
Pycnonotus xanthopygos (Ehrenberg), 1833
 Proctophyllodes stenophyllus Gaud & Mouchet
Thesclocichla leucopleura (Cassin), 1856
 Proctophyllodes stenophyllus Gaud & Mouchet

Cinclidae

Cinclus cinclus (L.), 1758
 Proctophyllodes paspalevi Vassilev
Cinclus mexicanus Swainson, 1827
 Proctophyllodes paspalevi Vassilev

Troglodytidae

Thryomanes bewickii (Audubon), 1827
 Proctophyllodes troglodytis, new species
Thryothorus ludovicianus (Latham), 1790
 Proctophyllodes troglodytis, new species

Mimidae

Toxostoma redivivum (Gambel), 1845
 Proctophyllodes cotyledon Trouessart

Turdidae

Catharus aurantirostris (Hartlaub), 1851
 Proctophyllodes cathari, new species
Cercotriches galactotes (Temminck), 1820
 Proctophyllodes doleophyes Gaud
 Proctophyllodes hipposideros Gaud
Copsychus saularis (L.), 1758
 Proctophyllodes cotyledon Trouessart
Enicurus ruficapillus Temminck, 1832
 Proctophyllodes cotyledon Trouessart
Erithacus rubecula (L.), 1758
 Proctophyllodes rubeculinus (Koch)
Hylocichla guttata (Pallas), 1814
 Proctophyllodes hylocichlae, new species
 Proctophyllodes polyxenus, new species
Hylocichla ustulata (Nuttall), 1840
 Proctophyllodes hylocichlae, new species
 Proctophyllodes polyxenus, new species
Luscinia cyane (Pallas), 1776
 Proctophyllodes rubeculinus (Koch)

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- Luscinia megarhynchos* C. L. Brehm, 1831
Proctophyllodes doleophyes Gaud
- Luscinia svecica* (L.), 1758
Proctophyllodes caulifer Trouessart
- Muscisylvia leucura* (Hodgson)
Proctophyllodes cotyledon Trouessart
Proctophyllodes pennifer Trouessart & Neumann
- Myadestes obscurus* Lafresnaye, 1839
Proctophyllodes myadestis, new species
- Myadestes townsendi* (Audubon), 1838
Proctophyllodes vesca, new species
- Oenanthe hispanica* (L.), 1758
Proctophyllodes hipposideros Gaud
- Oenanthe moesta* (Lichtenstein), 1823
Proctophyllodes hipposideros Gaud
- Oenanthe rufa* (Brisson)
Proctophyllodes hipposideros Gaud
- Phoenicurus moussieri* (Olph-Galliard), 1852
Proctophyllodes cotyledon Gaud
- Phoenicurus ochruros* (Gmelin), 1774
Proctophyllodes cotyledon Trouessart
- Phoenicurus phoenicurus* (L.), 1758
Proctophyllodes hipposideros Gaud
- Saxicola rubetra* (L.), 1758
Proctophyllodes cotyledon Trouessart
Proctophyllodes hipposideros Gaud
- Saxicola torquata* (L.), 1766
Proctophyllodes cotyledon Trouessart
Proctophyllodes hipposideros Gaud
- Sialia currucoides* (Bechstein), 1798
Proctophyllodes vesca, new species
- Sialia mexicana* Swainson, 1831 (1832)
Proctophyllodes sialiae, new species
- Sialia sialis* (L.), 1758
Proctophyllodes vesca, new species
- Tarsiger cyanurus* (Pallas), 1773
Proctophyllodes cotyledon Trouessart
- Turdus iliacus* L., 1766
Proctophyllodes musicus Vitzthum
- Turdus merula* L., 1758
Proctophyllodes euryurus, new species
Proctophyllodes musicus Vitzthum

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- Proctophyllodes weigoldi* Vitzthum
Turdus migratorius L., 1766
Proctophyllodes musicus Vitzthum
Turdus musicus L., 1758
Proctophyllodes euryurus, new species
Proctophyllodes musicus Vitzthum
Turdus naumanni Temminck, 1820
Proctophyllodes musicus Vitzthum
Turdus obscurus Gmelin, 1789
Proctophyllodes weigoldi Vitzthum
Turdus philomelos C. L. Brehm, 1831
Proctophyllodes muscius Vitzthum
Turdus pilaris L., 1758
Proctophyllodes musicus Vitzthum
Turdus rufiventris Vieillot, 1818
Proctophyllodes weigoldi Vitzthum
Turdus torquatus L., 1758
Proctophyllodes musicus Vitzthum
Turdus viscivorus L., 1758
Proctophyllodes musicus Vitzthum
Proctophyllodes tenericaulus Atyeo & Vassilev

Sylviidae

- Acrocephalus palustris* (Bechstein), 1798
Proctophyllodes vassilevi, new species
Acrocephalus schoenobaenus (L.), 1758
Proctophyllodes clavatus Fritsch
Acrocephalus scirpaceus (Hermann), 1804
Proctophyllodes clavatus Fritsch
Proctophyllodes vassilevi, new species
Cisticola natalensis (A. Smith), 1843
Proctophyllodes legaci Gaud
Eremomela scotops Sundevall, 1850
Proctophyllodes ceratophyllus, new species
Hippolais polyglotta (Vieillot), 1817
Proctophyllodes doleophyes Gaud
Locustella luscinioides (Savi), 1824
Proctophyllodes clavatus Fritsch
Phylloscopus sibilatrix (Bechstein), 1793
Proctophyllodes doleophyes Gaud
Phylloscopus trochilis (L.), 1758
Proctophyllodes reguli Gaud

- Regulus calendula* (L.), 1766
 Proctophyllodes breviquadratus, new species
Regulus ignicapillus (Temminck), 1820
 Proctophyllodes reguli Gaud
Regulus regulus (L.), 1758
 Proctophyllodes reguli Gaud
Regulus satrapa Lichtenstein, 1823
 Proctophyllodes reguli Gaud
Sylvia atricapilla (L.), 1758
 Proctophyllodes sylviae Gaud
Sylvia borin (Boddaert), 1783 (= *Sylvia simplex*)
 Proctophyllodes anthi Vitzthum
Sylvia curruca (L.), 1758
 Proctophyllodes clavatus Fritsch
Sylvia melanocephala (Gmelin), 1789
 Proctophyllodes sylviae Gaud
Sylvia nisoria (Bechstein), 1795
 Proctophyllodes clavatus Fritsch

Muscicapidae

- Batis capensis* (L.), 1766
 Proctophyllodes batis, new species
Ficedula hypoleuca (Pallas), 1764
 Proctophyllodes doleophyes Gaud
Melaenornis pammelaina (Stanley), 1814
 Proctophyllodes dicruri, new species
Muscicapa adusta (Boie), 1828
 Proctophyllodes cotyledon Trouessart
Muscicapa grandis (Blyth)
 Proctophyllodes cotyledon Trouessart
Muscicapa striata (Pallas), 1764
 Proctophyllodes acanthicaulus Gaud
 Proctophyllodes doleophyes Gaud
Muscicapa sundara (Hodgson)
 Proctophyllodes elegans, new species
Parisoma plumbeum (Hartlaub), 1858
 Proctophyllodes parisomae, new species
Parisoma subcaeruleum (Vieillot), 1817
 Proctophyllodes pachycaulus Gaud & Mouchet
Pedilorchynchus comitatus (Cassin)
 Proctophyllodes pachynotus Gaud & Mouchet
Platysteira cyanea (Müller)
 Proctophyllodes rhynchocaulus Gaud & Mouchet

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- Rhipidura javanica* (Sparman), 1788
 Proctophyllodes cotyledon Trouessart
Tchitreia mutata L.
 Proctophyllodes rubeculinus (Koch) (Provisional identification)
Terpsiphone paradisi (L.), 1758
 Proctophyllodes rubeculinus (Koch) (Provisional identification)
Terpsiphone viridis (Müller), 1776
 Proctophyllodes rubeculinus (Koch) (Provisional identification)

Prunellidae

- Prunella collaris* (Scopoli), 1769
 Proctophyllodes megaphyllus Trouessart
Prunella modularis (L.), 1758
 Proctophyllodes megaphyllus Trouessart

Motacillidae

- Anthus cervinus* (Pallas), 1811
 Proctophyllodes arcticus Dubinin
Anthus hodgsoni Richmond, 1907
 Proctophyllodes anthi Vitzthum
Anthus pratensis (L.), 1758
 Proctophyllodes anthi Vitzthum
Anthus spinoletta (L.), 1758
 Proctophyllodes anthi Vitzthum
Anthus spragueii (Audubon), 1844
 Proctophyllodes anthi Vitzthum
 Proctophyllodes polyxenus, new species
Anthus trivialis (L.), 1758
 Proctophyllodes anthi Vitzthum
 Proctophyllodes poublani Gaud
Dendronanthus indicus (Gmelin), 1789
 Proctophyllodes macedo Vitzthum
Macronyx capensis (L.), 1766
 Proctophyllodes anthi Vitzthum
Macronyx croceus (Vieillot), 1816
 Proctophyllodes tchagrae, new species
Motacilla aguimp Dumont, 1821
 Proctophyllodes motacillae Gaud
Motacilla alba L., 1758
 Proctophyllodes motacillae Gaud
Motacilla capensis L., 1766
 Proctophyllodes capensis, new species
Motacilla cinerea Tunstall, 1771
 Proctophyllodes motacillae Gaud

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Motacilla flava L., 1758

Proctophyllodes macedo Vitzthum

Proctophyllodes motacillae Gaud

Bombycillidae

Bombycilla cedrorum Vieillot, 1808

Proctophyllodes glandarinus (Koch)

Bombycilla garrulus (L.), 1758

Proctophyllodes glandarinus (Koch)

Laniidae

Corvinella melanoleuca (Jardine), 1831

Proctophyllodes corvinellae, new species

Lanius bucephalus Temminck & Schlegel, 1847

Proctophyllodes leptocaulus Gaud

Lanius collaris L., 1758

Proctophyllodes corvinellae, new species

Lanius collurio L., 1758

Proctophyllodes leptocaulus Gaud

Lanius excubitor L., 1758

Proctophyllodes motacillae Gaud

Proctophyllodes polyandrius Vitzthum

Lanius ludovicianus L., 1766

Proctophyllodes ludovicianus, new species

Lanius minor Gmelin, 1788

Proctophyllodes leptocaulus Gaud

Lanius senator L., 1758

Proctophyllodes leptocaulus Gaud

Tchagra senegala (L.), 1766

Proctophyllodes tchagrae, new species

Cyclarhidae

Cyclarhis gujanensis (Gmelin), 1789

Proctophyllodes cyclarhis, new species

Sturnidae

Lamprotornis caudatus (Müller), 1776

Proctophyllodes ischnocaulus Gaud

Lamprotornis chalcurus Nordmann, 1835

Proctophyllodes ischnocaulus Gaud

Lamprotornis chalybaeus Ehrenberg, 1828

Proctophyllodes ischnocaulus Gaud

Lamprotornis nitens (L.), 1766

Proctophyllodes ischnocaulus Gaud

Picathartes oreas Reichenow

Proctophyllodes anisogamus Gaud & Mouchet

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Sturnus vulgaris L., 1758

Proctophyllodes egglestoni Spory

Nectariniidae

Anthreptes malacensis (Scopoli), 1786

Proctophyllodes capitatus, new species

Chalcomitra amethystina (Shaw), 1811

Proctophyllodes legaci Gaud

Chalcomitra fuliginosa Shaw

Proctophyllodes legaci Gaud

Chalcomitra senegalensis (L.), 1766

Proctophyllodes ischnocaulus Gaud

Proctophyllodes legaci Gaud

Nectarinia famosa (L.), 1766

Proctophyllodes legaci Gaud

Nectarinia pulchella (L.), 1766

Proctophyllodes legaci Gaud

Zosteropidae

Zosterops albogularis

Proctophyllodes ceratophyllus, new species

Zosterops conspicillata Kittlitz

Proctophyllodes ceratophyllus, new species

Zosterops pallidus Swainson, 1838

Proctophyllodes ceratophyllus, new species

Vireonidae

Vireo flavifrons Vieillot, 1807 (1808)

Proctophyllodes dendroicae, new species

Proctophyllodes quadratus, new species

Proctophyllodes stoddardi, new species

Vireo gilvus (Vieillot), 1807 (1808)

Proctophyllodes quadratus, new species

Vireo huttoni Cassin, 1851

Proctophyllodes neopinnatus, new species

Vireo olivaceus (L.), 1766

Proctophyllodes stoddardi, new species

Vireo solitarius (Wilson), 1810

Proctophyllodes breviquadratus, new species

Parulidae

Coereba flaveola (L.), 1758

Proctophyllodes coerebae, new species

Dendroica auduboni (Townsend), 1837

Proctophyllodes polyxenus, new species

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- Dendroica caerulescens* (Gmelin), 1789
 Proctophyllodes breviquadratus, new species
Dendroica castanea (Wilson), 1810
 Proctophyllodes dendroicae, new species
Dendroica chrysoparia Sclater & Salvin, 1860
 Proctophyllodes quadrisetosus, new species
Dendroica coronata (L.), 1766
 Proctophyllodes quadrisetosus, new species
Dendroica fusca (Müller), 1766
 Proctophyllodes breviquadratus, new species
Dendroica magnolia (Wilson), 1811
 Proctophyllodes breviquadratus, new species
Dendroica petechia (L.), 1766
 Proctophyllodes dendroicae, new species
Dendroica pinus (Wilson), 1811
 Proctophyllodes dendroicae, new species
Dendroica striata (Forster), 1772
 Proctophyllodes longiquadratus, new species
Dendroica tigrina (Gmelin), 1789
 Proctophyllodes dendroicae, new species
Dendroica virens (Gmelin), 1789
 Proctophyllodes quadrisetosus, new species
Mniotilta varia (L.), 1766
 Proctophyllodes breviquadratus, new species
Myioborus miniatus (Swainson), 1827
 Proctophyllodes quadratus, new species
Seiurus aurocapillus (L.), 1766
 Proctophyllodes breviquadratus, new species
Setophaga picta Swainson, 1829
 Proctophyllodes quadratus, new species
Vermivora celata (Say), 1823
 Proctophyllodes polyxenus, new species
Vermivora chrysoptera (L.), 1766
 Proctophyllodes breviquadratus, new species
Vermivora peregrina (Wilson), 1811
 Proctophyllodes polyxenus, new species
 Proctophyllodes quadratus, new species
Vermivora ruficapilla (Wilson), 1811
 Proctophyllodes polyxenus, new species
Wilsonia canadensis (L.), 1766
 Proctophyllodes breviquadratus, new species

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Wilsonia pusilla (Wilson), 1811
Proctophyllodes breviquadratus, new species

Icteridae

Agelaius phoeniceus (L.), 1766
Proctophyllodes egglestoni Spory
Amblycercus holosericeus (W. Deppe), 1830
Proctophyllodes thraupis, new species
Cacicus cela (L.), 1758
Proctophyllodes icteri, new species
Cassidix mexicanus (Gmelin), 1788
Proctophyllodes mexicanus, new species
Dolichonyx oryzivorus (L.), 1758
Proctophyllodes pullizonatus, new species
Euphagus carolinus (Müller), 1776
Proctophyllodes egglestoni Spory
Proctophyllodes mexicanus, new species
Euphagus cyanocephalus (Wagler), 1829
Proctophyllodes egglestoni Spory
Gymnomystax mexicanus (L.), 1766
Proctophyllodes gymnomystacis, new species
Gymnostinops montezuma (Lesson), 1830
Proctophyllodes attenuatus Trouessart
Icterus cucullatus Swainson, 1827
Proctophyllodes icteri, new species
Icterus dominicensis L., 1766
Proctophyllodes longiphyllus, new species
Icterus galbula (L.), 1758
Proctophyllodes longiphyllus, new species
Proctophyllodes pheuctici, new species
Icterus gularis (Wagler), 1829 (= *Psarocolius gularis*)
Proctophyllodes gularis, new species
Icterus graduacauda Lesson, 1839
Proctophyllodes icteri, new species
Icterus mesomelas (Wagler), 1829
Proctophyllodes icteri, new species
Icterus parisorum Bonaparte, 1837
Proctophyllodes icteri, new species
Icterus pustulatus (Wagler), 1829
Proctophyllodes icteri, new species
Icterus spurius (L.), 1766
Proctophyllodes icteri, new species

- Leistes militaris* (L.), 1758
 Proctophyllodes trisetosus Ewing and Stover
Molothrus ater (Boddaert), 1783
 Proctophyllodes egglestoni Spory
Psomocolax oryzivorus (Gmelin), 1788
 Proctophyllodes psomocolacis, new species
Quiscalus quiscula (L.), 1758
 Proctophyllodes egglestoni Spory
 Proctophyllodes mexicanus, new species
Sturnella magna (L.), 1758
 Proctophyllodes trisetosus Ewing & Stover
Sturnella neglecta Audubon, 1844
 Proctophyllodes trisetosus Ewing & Stover
Xanthocephalus xanthocephalus (Bonaparte), 1826
 Proctophyllodes egglestoni Spory
Zarhynchus wagleri (Gray & Mitchell), 1844
 Proctophyllodes attenuatus Trouessart

Thraupidae

- Chlorophanes spiza* (L.), 1758
 Proctophyllodes thraupis, new species
Cyanerpes cyaneus (L.), 1766
 Proctophyllodes cyanerpis, new species
Diglossa baritula Wagler, 1832
 Proctophyllodes diglossae, new species
Habia gutturalis (Sclater), 1854
 Proctophyllodes habiae, new species
Habia rubica (Vieillot), 1817
 Proctophyllodes habiae, new species
Piranga leucoptera (Trudeau), 1839
 Proctophyllodes diglossae, new species
Piranga ludoviciana (Wilson), 1811
 Proctophyllodes polyxenus, new species
Poecilothraupis lunulatus (DuBus), 1839
 Proctophyllodes megathraupis, new species
Tanagra affinis Lesson, 1842
 Proctophyllodes thraupis, new species
Tanagra lauta Bangs & Penard, 1919
 Proctophyllodes thraupis, new species
Tanagra musica (Gmelin)
 Proctophyllodes tanagrae, new species
 Proctophyllodes thraupis, new species

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Thraupis abbas (W. Deppe), 1830
Proctophyllodes thraupis, new species

Ploceidae

Euplectes axillaris (Smith), 1838
Proctophyllodes ornatus, new species
Passer domesticus (L.), 1758
Proctophyllodes orientalis Gaud
Proctophyllodes truncatus Robin
Passer griseus (Vieillot), 1817
Proctophyllodes africanus Gaud
Proctophyllodes curtiglandarinus, new species
Passer hispaniolensis (Temminck), 1820
Proctophyllodes truncatus Robin
Passer melanurus (Müller), 1776
Proctophyllodes curtiglandarinus, new species
Passer montanus (L.), 1758
Proctophyllodes orientalis Gaud
Proctophyllodes truncatus Robin
Petronia superciliaris (Blyth), 1845
Proctophyllodes petroniae, new species

Fringillidae

Acanthis species
Proctophyllodes glandarinus (Koch)
Acanthis cannabina (L.), 1758
Proctophyllodes glandarinus (Koch)
Proctophyllodes pinnatus (Nitzsch)
Acanthis flammea (L.), 1758
Proctophyllodes glandarinus (Koch)
Acanthis flavirostris (L.), 1758
Proctophyllodes glandarinus (Koch)
Acanthis hornemanni (Holboell), 1843
Proctophyllodes pinnatus (Nitzsch)
Aimophila aestivalis (Lichtenstein), 1823
Proctophyllodes polyxenus, new species
Aimophila ruficeps (Cassin), 1852
Proctophyllodes pinnatus (Nitzsch)
Proctophyllodes polyxenus, new species
Ammodramus bairdii (Audubon), 1844
Proctophyllodes polyxenus, new species
Ammodramus savannarum (Gmelin), 1789
Proctophyllodes polyxenus, new species

- Ammospiza caudacuta* (Gmelin), 1788
 Proctophyllodes polyxenus, new species
Ammospiza maritima (Wilson), 1811
 Proctophyllodes polyxenus, new species
Ammospiza nigrescens (Ridgway), 1873
 Proctophyllodes polyxenus, new species
Atlapetes pileatus Wagler, 1831
 Proctophyllodes polyxenus, new species
Calamospiza melanocorys Stejneger, 1885
 Proctophyllodes calamospizae, new species
Calcarius lapponicus (L.), 1758
 Proctophyllodes megaphyllus Trouessart
Calcarius pictus (Swainson), 1831 (1832)
 Proctophyllodes polyxenus, new species
Carduelis carduelis (L.), 1758
 Proctophyllodes glandarinus (Koch)
 Proctophyllodes pinnatus (Nitzsch)
Carduelis chloris (L.), 1758 (= *Chloris chloris*)
 Proctophyllodes glandarinus (Koch)
 Proctophyllodes pinnatus (Nitzsch)
Carduelis sinica (L.), 1766
 Proctophyllodes pinnatus (Nitzsch)
Carduelis spinus (L.), 1758
 Proctophyllodes pinnatus (Nitzsch)
Carpodacus cassinii Baird, 1854
 Proctophyllodes vegetans Trouessart
Carpodacus erythrinus (Pallas), 1770
 Proctophyllodes vegetans Trouessart
Carpodacus mexicanus (Müller), 1766
 Proctophyllodes pinnatus (Nitzsch)
 Proctophyllodes vegetans Trouessart
Carpodacus purpureus (Gmelin), 1789
 Proctophyllodes polyxenus, new species
Caryothraustes poliogaster (DuBus), 1847
 Proctophyllodes lordocaulus, new species
Chlorura chlorura (Audubon), 1839
 Proctophyllodes chlorurae, new species
 Proctophyllodes polyxenus, new species
Chondestes grammacus (Say), 1823
 Proctophyllodes polyxenus, new species
Coccothraustes species
 Proctophyllodes glandarinus (Koch)

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- Coccothraustes coccothraustes* (L.), 1758
 Proctophyllodes glandarinus (Koch)
 Proctophyllodes pinnatus (Nitzsch)
Cyanocompsa parellina (Bonaparte), 1850
 Proctophyllodes longiphyllus, new species
Emberiza calandra L., 1758
 Proctophyllodes miliariae Gaud
Emberiza cirrus L., 1766
 Proctophyllodes miliariae Gaud
Emberiza citrinella L., 1758
 Proctophyllodes glandarinus (Koch)
 Proctophyllodes miliariae Gaud
Emberiza hortulana (L.), 1758
 Proctophyllodes anthi Vitzthum—Questionable record
 Proctophyllodes emberizae Atyeo & Vassilev
 Proctophyllodes glandarinus (Koch)
 Proctophyllodes miliariae Gaud
Emberiza melanocephala Scopoli, 1769
 Proctophyllodes emberizae Atyeo & Vassilev
Emberiza schoeniclus (L.), 1758
 Proctophyllodes schoenicli, new species
Eophona migratoria Hartert, 1903
 Proctophyllodes glandarinus (Koch)
Fringilla coelebs L., 1758
 Proctophyllodes pinnatus (Nitzsch)
Fringilla montifringilla L., 1758
 Proctophyllodes glandarinus (Koch)
Fringillaria capensis (L.), 1766
 Proctophyllodes capensis, new species
Hesperiphona abeillei (Lesson), 1839
 Proctophyllodes glandarinus (Koch)
Hesperiphona vespertina (Cooper), 1825
 Proctophyllodes glandarinus (Koch)
Hypochoera species
 Proctophyllodes africanus Gaud
Junco aikeni Ridgway, 1873
 Proctophyllodes neopinnatus, new species
Junco caniceps (Woodhouse), 1852
 Proctophyllodes neopinnatus, new species
Junco hyemalis (L.), 1758
 Proctophyllodes polyxenus, new species

- Junco oreganus* (Townsend), 1837
 Proctophyllodes polyxenus, new species
Junco phaeonotus Wagler, 1831
 Proctophyllodes paramegaphyllus, new species
Leucosticte atrata Ridgway, 1874
 Proctophyllodes neopinnatus, new species
Leucosticte tephrocotis (Swainson), 1831 (1832)
 Proctophyllodes neopinnatus, new species
Loxia curvirostra L., 1758
 Proctophyllodes glandarinus (Koch)
 Proctophyllodes neopinnatus, new species
Loxia leucoptera Gmelin, 1789
 Proctophyllodes neopinnatus, new species
Melopyrrha nigra (L.), 1758
 Proctophyllodes melopyrrhae, new species
Melospiza georgiana (Latham), 1790
 Proctophyllodes polyxenus, new species
Melospiza melodia (Wilson), 1810
 Proctophyllodes polyxenus, new species
Melospiza lincolni (Audubon), 1834
 Proctophyllodes polyxenus, new species
Passerculus sandwichensis (Gmelin), 1789
 Proctophyllodes polyxenus, new species
Passerella iliaca (Merrem), 1786
 Proctophyllodes polyxenus, new species
Passerherbulus caudacutus (Latham), 1790
 Proctophyllodes polyxenus, new species
Pheucticus melanocephalus (Swainson), 1827
 Proctophyllodes pheuctici, new species
Pinicola enucleator (L.), 1758
 Proctophyllodes glandarinus (Koch)
Pipilo erythrophthalmus (L.), 1758
 Proctophyllodes polyxenus, new species
Pipilo fuscus Swainson, 1827 (= *Pipilo rutilus*)
 Proctophyllodes polyxenus, new species
Plectrophenax nivalis (L.), 1758
 Proctophyllodes megaphyllus Trouessart
Pselliophorus tibialis (Lawrence), 1864
 Proctophyllodes melopyrrhae, new species
Pyrrhula nipalensis Hodgson, 1836
 Proctophyllodes capensis, new species

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- Pyrrhula pyrrhula* (L.), 1758
 Proctophyllodes glandarinus (Koch)
 Proctophyllodes stylifer (Buchholz)—Questionable record
- Pyrruloxia sinuata* (Bonaparte), 1837
 Proctophyllodes polyxenus, new species
- Richmondena cardinalis* (L.), 1758
 Proctophyllodes longiphyllus, new species
- Saltator coerulescens* Vieillot, 1817
 Proctophyllodes saltatoris, new species
- Saltator maximus* (Müller), 1776
 Proctophyllodes saltatoris, new species
- Serinus canaria* (L.), 1758
 Proctophyllodes pinnatus (Nitzsch)
- Serinus canicollis* (Swainson), 1838
 Proctophyllodes serini, new species
- Serinus serinus* (L.), 1766
 Proctophyllodes pinnatus (Nitzsch)
 Proctophyllodes serini, new species
- Spinus notatus* (DuBois), 1874
 Proctophyllodes spini, new species
- Spinus pinus* (Wilson), 1810
 Proctophyllodes spini, new species
- Spinus psaltria* (Say), 1823
 Proctophyllodes spini, new species
- Spinus tristis* (L.), 1758
 Proctophyllodes spini, new species
- Spiza americana* (Gmelin), 1789
 Proctophyllodes tricetratus, new species
- Spizella arborea* (Wilson), 1810
 Proctophyllodes polyxenus, new species
- Spizella atrogularis* (Cabanis), 1851
 Proctophyllodes polyxenus, new species
- Spizella pallida* (Swainson), 1831 (1832)
 Proctophyllodes polyxenus, new species
- Spizella passerina* (Bechstein), 1798
 Proctophyllodes polyxenus, new species
- Sporophila americana corvina* (Sclater), 1859
 Proctophyllodes sporophilae, new species
- Sporophila torqueola* (Bonaparte), 1850
 Proctophyllodes sporophilae, new species
- Tiaris olivacea* (L.), 1766
 Proctophyllodes tiaris, new species

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Zonotrichia albicollis (Gmelin), 1789

Proctophyllodes polyxenus, new species

Zonotrichia leucophrys (Forster), 1772

Proctophyllodes polyxenus, new species

Zonotrichia querula (Nuttall), 1840

Proctophyllodes polyxenus, new species

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