A NEW SUBFAMILY AND GENUS OF FEATHER MITES
FROM HUMMINGBIRDS (ACARINA: PROCTOPHYLLODIDAE)\(^1\)

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ABSTRACT

Rhamphocaulinae, new subfamily, Rhamphocaulus, new genus, with
Proctophyllodes (Alloptes) aviculocaulis Trouessart (1886) as type species
and 2 new species, P. simuatus and P. vachoni, are described.

The New World Trochilidae, or hummingbirds, support a rich and
unique fauna of ectoparasitic feather mites. In the current study, based
primarily on specimens obtained through the examination of about 2,500
museum study skins and including information from approximately one-
sixth of the 319 trochilid species, we have found that the feather mite-
hummingbird associations are very broad. Although the tendency appears
for 1 mite species to be genus specific (sense Atyeo and Braasch 1966), a
parasitic species may occur on any number of host genera, species, and/or
subspecies. Rarely, 2 mite species of the same genus have been collected
from 1 hummingbird species, although never from the same individual bird.

Certain of the ectoparasitic species groups have evolved to such an ex-
tent that they can neither be assigned to an established genus nor to an
existing subfamily. Such is the case with 3 highly modified species of Pro-
tophyllodidae, Proctophyllodes (Alloptes) aviculocaulis Trouessart (1886)
and 2 new species, all from various species of hummingbirds. These mites
present a mosaic of characters used in the current definitions of the pro-
tophyllodid subfamilies. The resemblances to the Proctophyllodinae are
seen in the structures and formation of the male genital arch, the female
terminus bearing ensiform appendages as in species of Proctophyllodes
Robin, and in the well-developed ventral shields similar to species of Allo-
dectes Gaud and Berla. The 4-segmented legs are characteristic of the
Alloptinae and the fusion of the female pregenital apodeme with epi-
merites IV is characteristic of the Pteropectinae. Lastly, the ambulacra
are the same as those observed in the Proctophyllodinae and Pteropectinae.

In the sections to follow, the nomenclature for the chaetotaxy will fol-
low Atyeo and Gaud (1966) and the descriptions will follow the formats of
Park and Atyeo (1971) for the genera of the Pteropectinae. Necessarily a
few of the characters used for the diagnosis of the subfamily will be re-
peated in the generic description.

Rhamphocaulinae Park & Atyeo, new subfamily

Diagnosis: Proctophyllodid mites with well-developed shields; males
with idiosoma rounded, without terminal lamellae, with posterodorsal setae
displaced ventrally; females with pregenital apodeme and epimerites IV

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\(^1\)Research supported by the National Science Foundation (GB-15105).
joined in $\varnothing$-shape, terminus weakly cleft, with or without ensiform appendages.

Idiosoma with all setae present except internal vertical setae ($vi$); internal postanal setae ($pa$, $pa$), last pair of dorsal setae ($d_4$) and posterior 3 pairs of lateral setae ($L_{2-3}$) displaced ventrally. Idiosomal venter with well-developed shields; males with epimerites I essentially X-shaped, with deep groove posterior to genital arch formed by ventrolateral extensions of dorsal hysterosomal shield, with apex of genital organ sinuous; females with epimerites I joined at midlength, X-shaped. Legs with femorogenual articulations fused resulting in functional 4-segmented appendages; solenidia $s_1$ on genua I and III present; $s_1$ larger than $s_3$ on legs I; setae $ba$, $s$, $p$, $q$, absent on legs I-II; setae $va$, $ra$, $la$ approximate on tarsi I-II; setae $sR$ present on trochanters III; tarsi I-IV with 2 or 3 apophyses; ambulacra ovoid with triangular apotele and unguiform condylophores.

Type genus: Rhamphocaulus Park & Atyeo, new genus.

Rhamphocaulus, new genus

The species of Rhamphocaulus are unique among the Proctotrephidae in having the dorsal seta of genu I ($cG$) positioned near the apex of the segment and solenidium $s_1$ positioned near the base of the segment; in other known species of this family, the reverse is constant. Other unique features include the various apophyses on the tarsi, the sinuous apex of the male genital organ, and the ventral positioning of certain dorsal and terminal hysterosomal setae by the ingestion of the hysterosomal shields onto the venter. Setae $pa$, $L_{3-4}$ and $pa$ are ventral, arranged in an irregular line across the ventral idiosoma between the adanal discs and the subterminal, expanded setae $d_4$. In the type species, setae $L_3$ are adjacent to the anal setae ($a$), and, in the new species R. sinuatus and R. vachoni, setae $L_1$ are lateral and distant from the anal setae.

The ingestion of the dorsal hysterosomal shield into the ventral region, accounting for the juxtapositioning of the above mentioned setae, results in the formation of a deep groove or furrow between the genital arch and setae $pa$. The external rings of the adanal discs, normally in the same plane as the venter, are positioned along the sides of the furrow at right angles to the ventral surface; these relationships are usually not evident in slide preparation.

MALE

1. Epimerites I X-shaped.
2. Coxal fields I-IV with well-developed shields; fields III-IV closed.
3. Legs I-III subequal, legs IV enlarged; femorogenual articulations fused.
4. Hysterosomal lobes absent.
5. Supranal concavity absent.
6. Metapodosomal shields present.
7. Ventrolateral shields well developed, i.e., extensions of dorsal hysterosomal shield.
8. Pregenital apodeme n-shaped, formed by anteromesal coalition of epimerites IVa.
9. Genital arch moderately developed and situated between the levels of coxae III and IV.
10. Genital discs approximate and lateral to genital arch.
11. Anal shields present circumscribing adanal discs.
12. Adanal discs edentate, positioned along vertical sides of ventral furrow.
13. Setae α positioned anterior to adanal discs with distance between α not less than that between adanal discs.
14. Setae α and o in a trapezoidal arrangement; setae of coxae IV (o) anterolateral to setae associated with posterior portions of genital arch (c).
15. Setae d, spiculiform, and rarely bifurcate.
17. Solenidia ϕ of legs III longer than of legs IV.

**Female**

18. Epimerites I X-shaped.
19. Legs I IV subequal.
20. Ambulacra I-IV subequal.
21. Hysterosomal terminus articulated with anterior idiosoma, with or rarely without terminal appendages.
22. Supranal concavity indistinct or very small when distinct.
24. Setae l. setiform.
25. Solenidia ϕ of legs III longer than of legs IV.

**Male and Female**

26. Hysterosomal setae absent; vi. Setae l., d, and pai translocated to the venter.
27. Setae l, on humeral shield.
28. Solenidia α larger than α on legs I.
29. Setae wa approximate to ia and ra on legs I-11.
30. Setae cG and mG on legs I-II setiform. Setae cG positioned distal to c on genua I.
31. Solenidia α and setae sR present on legs III. Setae sR setiform.
32. Found on the Trochilidae.

Type species: *Proctophyllodes (Alloptes) aviculoeaulis* Trouessart, 1886.

Derivation: *Rhamphos*, curving beak, bill + *kaulos*, stem, stalk; masculine.

*Rhamphocaulus aviculoeaulis* (Trouessart), NEW COMBINATION

(Fig. 1-5)


The males of this species are differentiated from *Rhamphocaulus simiatus*, new species, by the adjacent positions of setae l and α, the subapical thickening of the genital organ (Fig. 3), and the large posterior setae d; the males of *R. simiatus* have setae l and α distant, lack a subapical thickening of the genital organ, and have setae d narrow (compare Fig. 1 and 11). Males and females of *R. aviculoeaulis* are generally larger than those of *R. simiatus*.

**Male** (lectotype). Length 425μ; width, 202μ. Propodosomal shield 140μ in length, 111μ in width; with lacunae; setae sce separated by 79μ, sei by 69μ. Hysterosomal shield 256μ in length, 152μ in width; with lacunae. Genital organ 85μ in length, distally aviculiform (beak-shaped). Adanal discs 25μ in diameter; distance between discs center-to-center, 29μ; adanal
Fig. 1-5. Rhamphocaulus aviculocautis (Trouessart): dorsal and ventral aspects of male (1, 2), enlarged male genital region (3), dorsal and ventral aspects of female (4, 5). Setae: a, anal; c, centrals; d, dorsal; h, humeral; l, laterals; pai, pai, external and internal postanals; sh, sub-humeral.
shield encircling discs and extended anteriorly. Setae l, 24μ in length, apically bifurcate; setae d, 35μ in length; setae a and l, separated by 7μ. Tarsi I-IV each with 3 obvious apophyses.

**Female** (Paralectotype). Length, 416μ; width, 216μ. Propodosomal shield 18μ in length, 147μ in width; with lacunae; setae see separated by 93μ, sci by 67μ. Hysterosomal shield 265μ in length, 162μ in width; with lacunae; terminal cleft 14μ in length. Terminal appendages 160μ in length. Setae d, 7μ in length; setae l, 97μ in length. Tarsi I-III each with 3 obvious apophyses; tars IV with 4.

**Type data.** From Eutoxeres aquila (Trochilidae): lectotype δ, 3 δ δ, 4 ♀ ♀ paralectotypes, New Granada. All types are in the Trouessart Collection, Paris.

**Remarks.** In the original description of Rhamphochaulus aviculocaulis, Trouessart (1886) stated that the apex of the male genital organ is shaped as the avicularia of certain Bryozoa; the comparison is excellent. He also stated that this tine species occurs on Phaethornis superciliosus longirostris (=P. longirostris); in many collections from species of Phaethornis, we have found only representatives of the 2 new species, R. sinuatus and R. vachoni.

We have examined numerous specimens of R. aviculocaulis from the following birds collected in various countries as listed.

**Trochilid Hosts**

- *Eutoxeres a. aquila* (Bourcier), 1847
- *Eutoxeres a. heterura* Gould, 1868
- *Ramphodon melius* (Dumont), 1818
- *Topaza p. pella* (L.), 1758
- *T. p. microcephala* Butler, 1926
- *New Granada*  (Ecuador)
- *Brazil*

**Rhamphochaulus vachoni** Park & Atyeo, new species  
(Fig. 6-10)

Rhamphochaulus vachoni is intermediate in certain differentiating characters between R. aviculocaulis and R. sinuatus: the apex of the male genital organ (compare Fig. 3, 8, 13), and the positions of setae a and l, (compare Fig. 2, 7, 19).

**Male** (holotype). Length, 424μ; width, 184μ. Propodosomal shield 128μ in length, 112μ in width; with lacunae; setae see separated by 75μ, sci by 56μ. Hysterosomal shield 276μ in length, 140μ in width; with lacunae. Genital organ 100μ in length, distally expanded. Adanal discs 20μ in diameter; distance between discs center-to-center, 28μ; anal shield encircling discs, extended anteriorly. Setae l, 23μ in length, simple; setae d, 60μ in length; setae a and l, separated by 25μ. Tarsi I, II, IV each with 2 obvious apophyses; tars III with 3 apophyses.

**Female** (paratype). Length, 450μ; width, 190μ. Propodosomal shield 134μ in length, 115μ in width; with lacunae; setae see separated by 78μ, sci by 47μ. Hysterosomal shield 280μ in length, 145μ in width; with lacunae; terminal cleft 10μ in length. Terminal appendages 130μ in length. Setae d, 65μ in length; setae l, 75μ in length. Tarsi I-II each with 2 obvious apophyses; tarsi III-IV each with 3 apophyses.

**Type data.** From Phaethornis superciliosus muelleri (Trochilidae):
Fig. 6-10. *Rhamphocaulus vachoni*, new species: dorsal and ventral aspects of male (6, 7), enlarged male genital region (8), dorsal and ventral aspects of female (9, 10). Setae: $a$, anal; $l$, lateral.
holotype δ, 6 δ δ, 8 ♂ ♀ paratypes, Belém, Pará, Brazil, 7 July 1964, P. S. Humphrey. The holotype and some paratypes are deposited at the United States National Museum; paratypes are deposited in the collections of the University of Georgia and J. Gaud.

Remarks. In addition to the type series, material was available from other species of hummingbirds as indicated below. The species is named in honor of Dr. Max Vachon who has been most generous in sending needed type material from the Trouessart collection.

TROCHILID HOSTS

*Phaethornis guy apicalis* (Tschudi), 1844
*P. superciliosus muelleri* Hellmayr, 1911
*P. yaraqui sanctijohannis* Hellmayr, 1911

*Rhamphocaulus sinuatua* Park & Atyeo, new species

(Fig. 11-18)

The 2 new species, *Rhamphocaulus sinuatua* and *R. vachoni*, are similar; both differ from *R. avicedaolacis* in having setae a and lₜ distant, and setae lₚ simple in the male. *R. avicedaolacis* has setae a and lₜ approximate, and has setae lₚ bifurcate in the male. The genital organ of each species is distinct (compare Fig. 3, 8, 13).

**MALE** (holotype). Length, 358μ; width, 140μ. Propodosomal shield 118μ in length, 105μ in width; with lacunae; setae see separated by 55μ, sei by 36μ. Hysterosomal shield 220μ in length, 125μ in width; with lacunae. Genital organ 76μ in length, distally not expanded. Adanal discs 20μ in diameter; distance between discs center-to-center, 26μ; adanal shield encircling discs, not extended anteromedially. Setae lₜ 18μ in length, simple; setae dₜ 270μ in length; setae a and lₚ separated by 23μ. Tarsi I-II each with 2 obvious apophyses; tarsi III-IV each with 3 apophyses.

**FEMALE** (paratype). Length, 420μ; width, 185μ. Propodosomal shield 132μ in length, 140μ in width; with lacunae; setae see separated by 60μ, sei by 41μ. Hysterosomal shield 250μ in length, 130μ in width; with lacunae; terminal cleft 10μ in length. Terminal appendages 103μ in length. Setae dₜ 58μ in length; setae lₚ 67μ in length. Tarsi I-II each with 2 obvious apophyses; tarsi III-IV each with 3 apophyses.

**Type data.** From *Camptolytus curvifrons* (Trochilidae): holotype δ, 2 δ δ, 2 ♂ ♂ paratypes, Presidio, Veracruz, Mexico, 22 April 1948, C. C. Lamb; paratypes collected 30 miles east of Huanchinango, Puebla, Mexico by C. C. Lamb as follows: 1 δ, 2 ♂ ♂, 30 October 1942; 2 δ δ, 1 ♂, November 8, 1942; 1 δ, 2 ♂ ♂, 13 November 1942. The holotype and some paratypes are deposited in the United States National Museum; other paratypes are deposited in the University of Georgia and J. Gaud collection.

Remarks. The females of this species are polymorphic; the idiosomal terminus may have well-developed terminal appendages with setae dₜ much longer than lₜ; the terminus may be almost rounded, lack terminal appendages, and have setae dₜ and lₜ very long (not illustrated); or the terminal appendages and setae may be of lengths intermediate between the 2 combinations of conditions (Fig. 16-18). This type of polymorphism
Fig. 11-18. *Rhaphoeaulus sinuatus*, new species: dorsal and ventral aspects of male (11, 12), enlarged male genital region (13), dorsal and ventral aspects of female (14, 15), dorsal aspects of female termini illustrating polymorphic development (16-18). *Setae*: $d_s$, dorsal; $l$, lateral; $pai$, internal postanal. Scales: *TL*, terminal lobes, female; *GO*, genital region, male.
is not unique among the feather mites and has been demonstrated in other species, e.g., *Proctophyllodes truncatus* (Atyco and Braasch, 1966).

**Trochilid Hosts**

- *Anthracothorax p. prevostii* (Lessson), 1832  
  Mexico
- *Campylomyzus curvipesxis* (Lichtenstein), 1830  
  Mexico
- *Leucocloris albicollis* (Vieillot), 1818  
  Brazil
- *Phaethornis s. superciliosus* (L.), 1766  
  British Honduras
- *P. s. longirostris* (DeLattre), 1843  
  New Granada
  *(fide Trouessart, 1889)*

**Literature Cited**


The Florida Entomologist 54(3) 1971