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THE SUBFAMILY LEEUWENHOEKINAE IN THE NEOTROPICS (ACARINA: TROMBICULIDAE)

by

Jack T. Reed¹ and James M. Brennan²

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ABSTRACT

Neotropical representatives of the subfamily Leeuwenhoekinae are reviewed. The genus *Odontacarus* comprises 66 percent of the chiggers examined, and 82 percent of this genus were identified as *O. tubicularis* (Brennan). The following genera are redescribed: *Albeckia* Veracammen-Grandjean and Watkins, *Leeuwenhoekia* Oudemans, *Odontacarus* Ewing, *Sasia- carus* Brennan and Jones, *Wagenaaria* Brennan, and *Whartonia* Ewing. New taxa are: *Odontacarus comosus comosus*, *O. c. novemsetus*, *O. dienteslargus*, *O. pugnosus*, *O. schoenesetosus*, *O. sunniacea*, *O. tiptoni*, *O. tuberculohirsutus*, *O. vanderhammeni*, *O. vergrandi*, *Sasacarus furmani panamensis*, and *Whartonia angulascuta*. *Odontacarus fieldi* Brennan and Jones, 1961, and *O. cayolargoensis* Brennan, 1959, are synonymized under *O. tubicularis* Brennan, 1952. Keys to genera and species are provided.

INTRODUCTION

The larval trombiculid mites of the subfamily Leeuwenhoekinae are parasitic on small mammals, reptiles, amphibians, and occasionally birds. The subfamily is worldwide in distribution. Nine genera and subgenera are endemic to the neotropical region.

Since erection of *Leeuwenhoekinae* in 1944, revisionary works have been restricted either to discrete geographical areas other than the neotropics or to discussions on the generic level only. A study of more than 15,000 chiggers from Venezuela has emphasized the need for a comprehensive review of the *leeuwenhoekinae* chigger fauna of the neotropical region.

This paper is based on examination of more than 1,700 larvae, mostly off small mammals. Eight genera and subgenera and 28 species (12 of them new) are represented. Supraspecific taxa are redescribed primarily on the basis of neotropical representatives; and specific redescriptions, with 3 exceptions, are based on type material. Figures are included if illustrations accompanying earlier descriptions are considered inadequate. The genus *Hannemania* Oudemans, 1911, is not discussed.

Measurements, in addition to the standard measurements, include AMN—length of accessory branch on anterosubmedian scutal setae; AMB—the distance between the 2 anterosubmedian scutal setae; the distance between the 2 setae on coxa I; and the total length of the cheliceral blades. The length of the nasus is measured from the point of attachment of the projection to the scutum, and the length of the idiosoma is measured from the posterior margin of the cheliceral bases to the posterior margin of the idiosoma. A genuala formula indicates the number of genualae per genu for legs I, II, and III, respectively (i.e. 2+, 1+, 1). The + indicates presence of a microgenuala. A similar formula is used to indicate the number of tibiae and microtibiale on legs I, II, and III. All measurements are in micrometers.

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SYSTEMATIC SECTION

Subfamily Leeuwenhoekinae Womersley
Leeuwenhoekinae Womersley, 1944:102 [Type genus: Leeuwenhoekia Oudemans, 1912, original designation].
Leeuwenhoekinae: Hsu and Wen, 1963:47.

Diagnosis: Larvae lacking palpotarsal subterminala, with 2 anterosubmedian scutal setae, bisetose coxa I, leg segmentation 6-6-6*, and microgenuala II present.

Redescription: Larvae parasitic on small mammals, reptiles, amphibians, and occasionally birds. Scutum with 2 each, anterosubmedian setae, anterolateral and posterolateral setae; nasus present or absent. Palpotarsus lacking subterminala. Eyes present. Leg segmentation 6-6-6; coxa I bisetose; genu I, II, and III each with 4 branched setae; leg I usually lacking parasubterminala; microgenuala II present. Tracheae and spiracles present or absent.

Key to the Genera

1. Nasus present, spiracles and tracheae present .......................................................... 2
   Nasus lacking, spiracles and tracheae present or absent ........................................ 3

2(1). Cheliceral blades with tricuspidd cap only .......................................................... Leeuwenhoekia
          Cheliceral blades with dorsal and/or ventral rows of teeth ................................ Wagenaria

3(1). Tracheae and spiracles present .......................................................... 4
          Tracheae and spiracles present .......................................................... 4

4(3). Cheliceral blades with tricuspidd cap only, basal inner margin of palpotibial claw denticate .......................................................... Sasacarus
          Cheliceral blades with dorsal and/or ventral rows of teeth, palpotibial claw not denticate at base .......................................................... 5

5(4). Microgenuala and microtibiala stubby or clubbed, cheliceral teeth ventral only ...... Albeckia
          Microgenuala and microtibiala spiniform, cheliceral teeth dorsal and ventral .......... Whartonia

Remarks: The subfamily was originally erected for Leeuwenhoekia verduni, 2 other species placed in that genus by Oudemans (1912), and 5 species placed in the genus by Womersley (1944). Womersley (1945) elevated the subfamily to full familial rank on the basis of tracheae and spiracles and included the type genus and 6 other genera. Familial rank was questioned by Wharton (1947) who considered the group as a trombiculid subfamily only. The group has recently been interpreted by Vercammen-Grandjean, et al. (1973, chart) as a family having over 27 genera and subgenera, including 7 genera containing species identified from areas of the neotropics.

Genus Leeuwenhoekia Oudemans

Diagnosis: Larvae with spiracles and tracheae; nasus present, cheliceral blades with dorsal apical tooth only; subterminala and parasubterminala absent from leg I. Leeuwenhoekia can be distinguished from the closely related genus Comatacarus Ewing, 1942, primarily by possession of tracheae and spiracles.

Redescription: Larvae neotropical, parasitic on small rodents and marsupials. Cheliceral blades with tricuspidd cap only; palpotibial claw 5 pronged; palpal formula variable; galeala branched. Tracheae and spiracles present; scutum with broadly rounded posterior margin, sensillae probably flagelliform. Two genuala I, genuala II and III; 2 tibiala I and II and tibiala III; coxa I bisetose; coxae II and III unisetose; mastisetae lacking; onychotriches present. Dor sal and ventral setae moderately branched; 2 sternals present.

*One North American species of the genus Comatacarus has leg segmentation 7-6-6, the femur and telefemur fused.
Key to *Leeuwenhoekia* species

1. Sensillary bases anterior to posterolateral scutal setae, dorsal setae not bilaterally flattened ........................................... *verduni*
2. Sensillary bases posterior to posterolateral scutal setae, dorsal setae bilaterally flattened ................................................................................. *vercammenni*

*Leeuwenhoekia verduni* (Oudemans)

(Fig. 1)

[Holotype, larva; ex *Didelphis opossum*, South Brazil; Rijksmuseum van Natuurlijke Historie, Leiden].

*Leeuwenhoekia verduni*: Oudemans, 1911:138;  

Diagnosis: L. *verduni* differs from *L. vercammeni* in slender form of, and fewer idiosomal setae, and tuberculate setal bases. Other differences may be noted from the following redescription.

Redescription: Unassisted redescription of the holotype is restricted by its poor state of preservation (see remarks below). Descriptive information from Oudemans (1912) and Fuller (1952) is therefore included and parenthetically identified. *Idiosoma*: Broad ovoid, engorged; length and width 520 and 540; eyes 2/2 in ocular plates, anterior 17, posterior 10 μm in diameter. Body setae generally densely branched with short setules, setal bases tuberculate. DF may be considered 2 (humerals) 4-2-4-4-4-2 or 4-4-4-4-4-2. VF, 2 ventrals, 10-10-2 pre-anals, 2 para-anals, 4 postanals plus 6 similar to dorsals. Spiracles present, tracheae visible to posterior margin of idiosoma. *Gnathosoma*: Palpal formula BBN₆NN (Fuller), palpal claw pentafurcate (Oudemans), or trifurcate (Fuller). Palpotarsus with 5 branched setae, 1 nude seta and tarsala (Oudemans, Fuller). Galeala with 3 branches; cheliceral blades obscured but apparently with minute tricuspid cap. *Scutum*: Shaped as figured by Oudemans (1912, Fig. R-3); sparsely punctate, PL stout but nonclavate; anterior margin relatively straight, posterior margin broadly rounded medially. AW-61, PW-84, SB-38, ASB-ca. 23, PSB-ca. 20, AMB-10, PL-84 (Fuller). *Legs*: Specialized setae as figured; coxal punctae small, sparse; tarsal claws with small barbs; empodium slender, lacking barbs. Leg index 818.

Distribution: Known only by the type specimen, South Brazil; E. A. Göldi, collector.

Specimens Examined: Holotype only.

Other Records: None.

Remarks: The holotype, labeled apparently in Oudemans's handwriting, was observed to be in extremely poor condition, due perhaps to some attempt to remount the specimen. Only 2 legs remain attached to the idiosoma (3 others are widely separated in the medium), the palp are missing, only 3 dorsal setae remain, and only a partial posterolateral scutal seta remains on an anteriorly tipped scutum. The disputed furcation of the palpotibial claw, pentafurcate (Oudemans 1912:76) vs. trifurcate (Fuller 1952:237) cannot be resolved, nor can the number and kind of palpotarsal setae be verified. Both Oudemans and Fuller reported 5 branched setae and 1 nude seta plus a tarsala on the palpotarsus. Assuming that no nude palpotarsal setae other than the tarsala exist within the subfamily, Vercammen-Grandjean et al. (1973:61) reported 6 branched setae plus a tarsala (Vercammen-Grandjean, 1973, personal correspondence). Since phase contrast microscopy was not available to Fuller or Oudemans, the number of setae on the palpotarsus may be in doubt. The difference in number of these setae reported for *L. verduni* and *L. vercammeni* Brennan and Dalmat (5 branched and 1 nude as opposed to 7 branched) is therefore not considered grounds to place the 2 species in separate genera.

*Leeuwenhoekia vercammeni* Brennan and Dalmat

(Fig. 2)

[Holotype, larva; ex *Heteromys d. desmarestianus*, Guatemala; Field Museum of Natural History, Chicago].

Diagnosis: *L. vercammeni* is easily distinguished from *L. verduni* by the bilaterally flattened dorsal setae, atuberculate setal bases, and more numerous idiosomal setae.

Redescription: *Idiosoma*: Broad ovoid, engorged. Length and width of holotype 723 and 482. Eyes apparently single, 12 μm in diameter. Body setae somewhat bilaterally flattened, moderately branched, setal bases atuberculate; dorsal setae total about 87. Dorsal formula of para-type approximately 13-12-10-3-12-4-13-10-4-4-2.
Fig. 1. *Leeuwenhoekia verduni*. A, leg segments showing specialized setae; B, dorsal setae; C, ventral aspect of idiosoma showing condition of holotype.

Ventral formula 2 sternals, 24 pre-ans, 36 post-ans. Spiracles present; portions of tracheae visible to posterior idiosomal margin. *Gnathosoma*: Cheliceral bases moderately punctate, palpal formula B/B/NNB; palpotarsus 7B plus farsala; galeala basally stout, with long branches; claw long, pentafurcate. Cheliceral blades 39 μm long, apically curved, with minute tricuspid cap. *Scutum*: Shaped as originally figured (Brennan and Dalmat, 1960:184, Fig. 1); AL's and PL's stout, with long apparently caduceous setules. Measurements of holotype (measurements of one paratype given in parentheses): AW-98 (100), PW-93 (96), SB-38 (49), ASB-33, PSB-24, AP-27 (31), AM-38 (45), AL- (ca. 56), PL- (58+). *Legs*: Coxae and specialized setae as originally figured. Genuala formula 2+,1+,1. Tibiala formula 2+,2,1. Branched setae per leg segment listed sequentially for legs I, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,6,5; genu 5,4,4;
Leeuwenhoekinae

Fig. 2. Leeuwenhoekia vercammeni A, dorsal setae; B, palpus and cheliceral blades, ventral aspect.

tibia 8,6,6; tarsur 27,18,17. Leg index (paratype) 885.

Distribution: Known only from the holotype and 2 paratypes, Yepocapa, Dept. Chimaltenango, Guatemala.


Other Records: None.

Remarks: Although only 3 specimens of the species are available for study, the close relationship of L. vercammeni to L. verduni is indicated by the form of cheliceral blades, stout scutal setae, and the presence of onychotriches.

Genus Albeckia Vercammen-Grandjean and Watkins


Diagnosis: Leeuwenhoekia larvae lacking nasus; tracheae and spiracles present. Cheliceral teeth ventral only.

Redescription: Palpal tarsus 4B plus tarsala; palpal claw pentafurcate. Tricuspid cap on cheliceral blades with ventral row of teeth. Scutum lacking nasus; anterior margin sinuate, lateral margins concave, posterior margin broadly convex; sensillae flagelliform. Onychotriches present.

Albeckia albecki Vercammen-Grandjean and Watkins

Albeckia albecki Vercammen-Grandjean and Watkins, 1966:74 [Holotype, larva, ex Antrozous pallidus pacificus, Solano Co., California; Rocky Mountain Laboratory, Hamilton, Montana].

Diagnosis: See generic diagnosis.

Redescription: (Based on paratype: Holotype data in parentheses from original description) Idiosoma: Ovoid. Length and width of paratype 665 and 427. Eyes 2/2 in plates; anterior 15, posterior 14 in diameter. Dorsal setae 43 to 60 μm, anterior rows irregularly placed, arranged approximately: 2 humerals (65 μm) - 6-6-6-6-8-10-6-4-2. Setae densely branched, branches long and slender. Two sternals plus 30 slender pre-anals (including first postanals), plus 26 postanals shorter but similar to dorsals. Anus at fifth row of setae. Spiracles large; tracheae visible to posterior third of idiosoma. Gnathosoma: Cheliceral bases sparsely punctate. Blades 38-40 μm long with tricuspid cap and row of teeth anteroventrally. Palpal formula B/B/BBB; femoral, genital, and dorsoptibial densely branched, ventroptibial and lateropptibial sparsely branched, branches long. Tibial claws pentafurcate. Tarsus 4B plus tarsala. Galealae sparsely branched. Scutum: Shaped as originally figured. Anterior margin sinuate, lateral margins concave, posterior margin broadly rounded. Scutal setae similar to dorsals, sensillae flagelliform; apical half sparsely branched, branches long, bases slightly anterior to PL’s. Measurements of paratype (measurements of holotype and 9 paratypes in parentheses—from original description) AW-74 (69), PW-85 (80), SB-32 (29), ASB-30 (28), PSB-18 (18), AP-25 (23), AMB-10 (10), AM-49 (44), AL-48 (44), PL-64 (63), S- (66). Legs: All leg segments with few punctate. Genuala formula 1+,1+,1; Tibiala formula 3+,2,1; micrtobialae and microgenualae stubby. Tarsala I (11 μm), spiniform microtarsala laterad of tarsala; sub- and parasubterminalae absent. Tarsala II (18 μm) plus laterodistal spiniform microtarsala. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus 23,17,15. Distance between coxa I setae 34. Leg index 822.

Distribution: Venezuela and California.

Specimens Examined: Holotype and one paratype, ex Antrozous pallidus pacificus, Solano Co., California, Jan 1965; 1 larva, ex Eptesicus montosus, Venezuela, Distrito Federal, 4 km NNW Caracas (Los Venados), 1,559 m, 25 Jul 1965; and 7, ex Histiotus sp. A, Venezuela, Distrito Federal, 5 km NNE Caracas (Pico Avila), 2,101 m, 23 Aug 1965.

Other Records: 38 paratypes, Antrozous pallidus pacificus, Solano Co., California, Jan

Remarks: One paratype examined showed a small angulate projection on the scutum which appears to be a rudimentary nasus. According to Vercammen-Grandjean and Watkins (1966:76), this occurred on "several specimens in the type series of forty." The scuta of the Venezuela specimens did not possess this projection and were rounded laterally instead of possessing "broadly recessed" lateral margins. In all other respects, the Venezuela specimens compared well with the type material examined.

Genus Odontacarus Ewing


Diagnosis: Differs from other leeunwenoekine genera by possessing nasus, spiracles, tracheae, and dorsal and ventral rows of teeth on cheliceral blades.

Redescription: Larvae worldwide, parasitic on mammals, reptiles, and birds. Cheliceral blade 30-100 μm long with a row each of dorsal and ventral teeth, or a row of ventral teeth only (subgenus Tarsalacarus). Palpotibial claw with 3 to 4 prongs. Palpal formula B/B/B^NN^BB. Palpal tarsus 7B plus tarsala. Tracheae and spiracles present. Scutum subpentagonal with broadly rounded to bluntly angulate posterior margin. Sensillae flagelliform. Coxa I bisetose, coxa II variable, coxa III unisetose. Mastitarsala III usually present. Genus I, II, and III with 4 branched setae. Femora I, II, and III with 6, 5, and 4 branched setae, respectively.

Key to Subgenera and Species

1. Tarsala III present, cheliceral blades with row of ventral teeth only (subgenus Tarsalacarus) ........................................ 16
   Tarsala III lacking, cheliceral blades with dorsal row and ventral row of teeth (subgenus Odontacarus) ........................................ 2

2(1). Distance between anterosubmedian scutal setae bases less than or equal to 11 μm; tarsus I shorter than 75 μm ......................................................... 3
   Distance between anterosubmedian scutal setae bases greater than 11 μm; tarsus I longer than or equal to 75 μm ......................................................... 6

3(2). One genuala I; dorsal setae broad, with dorsal and ventral barbs obviously differentiated ........................................ sunnianae n. sp.
   Two genualae I; dorsal setae not broader than thick ........................................ 4

4(3). Sensillae with long branches apically ........................................ 5
   Sensillae with short barbs, full length ............................................. tubercularis

5(4). Host, lizards; onychotriches present; legs slender; dorsal setae slider with oppressed barbs ........................................ australis
   Host, rodents and lagomorphs; onychotriches lacking; legs not slender; dorsal setae with stout, obvious barbs ........................................ mastigophorus

6(2). Cheliceral blades longer than 65 μm ........................................ 7
   Cheliceral blades shorter than 65 μm ........................................ 9

7(6). About 80 dorsal setae, stout with stout branches; posteromedian dorsal setae short, sparsely barbed; posterolateral scutal setae > anterolateral scutal setae > anterosubmedian scutal setae ...................................... munchichensis
   About 100 to 200 dorsal setae; relatively slender, posteromedian dorsal setae similar to lateral setae ........................................ 8

8(7). Nine branched setae on tibia I, 33 branched setae on tarsus I; sensillar bases considerably posterior to bases of posterolateral scutal setae ................................ schoenesetosus n. sp.
Eight branched setae on tibia I, 23 branched setae on tarsus I; sensillar bases slightly posterior to bases of posterolateral scutal setae. dienteslargus n. sp.

9(6). Genuala II and III present .......................................................... kofordi
Genuala II and III lacking ................................................................. 10

10(9). Accessory branch on anterosubmedian scutal setae shorter than 20 μm; distance between anterosubmedian scutal setae less than 16 μm ........................................... 11
Accessory branch on anterosubmedian scutal setae longer than 20 μm; distance between anterosubmedian scutal setae more than 16 μm ........................................... 14

11(10). Branched tibial setae for legs I, II, and III 9, 7, 7 ........................................... 12
Branched tibial setae for legs I, II, and III 8, 6, 6, or 9, 6, 6 ........................................... 13

12(11). Coxa II bisetose; about 60 slender ventral setae (pre-anals) .................... tiptoni n. sp.
Coxa II unisetose; about 36 slender ventral setae (pre-anals) ............... vergrandi n. sp.

13(11). Tibia I with 8 branched setae ...................................................... comosus comosus n. ssp.
Tibia I with 9 branched setae ...................................................... comosus novemsetus n. ssp.

14(10). About 130 ventral setae; anterosubmedian scutal setae much shorter than anterolateral scutal setae ........................................... vanderhammeni n. sp.
About 70 ventral setae; anterosubmedian and anterolateral scutal setae subequal ........................................... 15

15(14). Nasus nearly as broad as long; dorsal setae with short appressed setules ... pugnosus n. sp.
Nasus considerably longer than broad; dorsal setae with long, flexible setules .......... tuberculohirsutus n. sp.

16(1). Palpal and dorsal setae heavily branched .................................. bakeri
Palpal and dorsal setae sparsely branched .................................. chiapanensis

Subgenus Odontacarus (Ewing)


Diagnosis: Larvae with dorsal and ventral rows of teeth on cheliceral blades; genuala III lacking; palpotibial claw trifurcate.

Redescription: Larvae of medium to large size. Cheliceral blades 30-100 μm long with dorsal and ventral rows of teeth. Palpotibial claws trifurcate. Palpal formula variable, B/B/BB.

BNN Flagellum usually with small barbs. Tar-sala III lacking. Mastitarsala present, usually barbed. Dorsal setae usually with 4 rows of branches.

Odontacarus (O.) australis (Ewing) (Fig. 3)

Trombicula australis Ewing, 1929b:10 [Holotype, larva; ex Tropiduras peruvianus, Lima, Peru: Rocky Mountain Laboratory, Hamilton, Montana];

Odontacarus australis Ewing, 1931:6; Brennan, 1959:2; Brennan and Jones, 1961a:176.

Diagnosis: Differs from other members of the genus by the asymmetricaly branched sensillae, length and form of idiosomal setae, length and slenderness of the legs, and onychotriches.

Redescription (Based on holotype. Data from Venezuela specimen parenthetically included): Idiosoma: Ovoid. Length and width of holotype, 538 and 314. Eyes 2/2 in plates; anterior 13, posterior 12 μm in diameter. Dorsal setae 34-44 μm (26-38 μm) tapering basally, setules delicate; arranged approximately: 2 (humerals, 59 μm)-8-5-7-8-10 plus 12 posterior setae and 5 lateral setae per side, not continuous with dorsal rows. Lateral setae longest, mid-dorsals shortest. Two sternals plus 50 ventrals, 32-39 μm, longer posterolaterally; pre-anals and first postanal row with longer setules. Posterior ventrals similar to dorsals. Anus at fourth row of ventral setae. Spiracles large, adjacent to anterior margin of coxa I. Tracheae broad, visible to posterior margin of idiosoma. Gnathosoma: Cheliceral bases moderately punctate, posterior punctae larger. Blades narrow, 47 μm long, curved apically with 5 dorsal and 3 or more ven-
Fig. 3. *Odontacarus australis* A, scutum of holotype; B, palpal tibia and tarsus; C, palpus and cheliceral blade, dorsal aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

tae large. Distance between coxae I setae 49 μm. Legs long and slender; tarsal claws with onychotriches, empodia possibly with few. Specialized setae as figured. Branched setae per leg segment for legs I, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus ?,17,15. Mastitarsala III barbed. Leg index 1130.

*Distribution*: Peru, Lima, and Venezuela, Zulia district.

*Specimens Examined*: Holotype, ex *Tropidurus peruvianus*, Lima, Peru, Apr 1928, and 12 larvae, ex 5 unidentified lizards, Venezuela Zulia, 34 km NNE Paraguaípoa (Cojoro), 15 m, 19 Jun 1968.

*Other Material*: None.
Remarks: Although Brennan (1959), described the palpal claw as trifurcate, Venezuela specimens clearly show 1 large and 3 smaller prongs.

Odontacarus (O.) kofordi Brennan and Jones

Odontacarus kofordi Brennan and Jones, 1961a: 175 [Holotype, larva; ex Chinchillula sahamae, Puno, Peru; Rocky Mountain Laboratory, Hamilton, Montana].

Diagnosis: Differs from O. tubercularis and other species with tuberculate setal bases primarily by the form and number of idiosomal setae and the subequal anterior and posterior eyes.

Redescription: Idiosoma: Ovoid. Length and width of holotype: 576 and 316. Eyes 2/2, in plates, subequal, about 15 μm in diameter. Dorsal and ventral setal bases tuberculate; setae 32-58 μm, longer anterolaterally. Setae thick with stout setules, as figured. Total dorsal setae about 90, in uneven rows; humerals 62 μm long. Two sternals and 38 slender pre-anals and post-anals, plus about 20 posteriorly similar to dorsals. Anus at third row of ventrals. Spiracles large, adjacent to anterodistal margin of Coxa I. Tracheae visible to posterior margin of idiosoma.

Gnathosoma: Cheliceral bases densely punctate. Blades 44 μm long, with 5-6 small teeth dorsally and 5-6 irregularly spaced ventrally. Palpal formula B/B/BBB; femoral, genual, and dorso-tibial setae densely branched, latero- and ventro-tibial with about 6 branches. Palpal tarsala 12 μm; branched tarsal setae long with long setules. Palpotibial claw trifurcate, axial prong largest. Galeala with few barbs. Scutum: Shaped as originally figured, anterior margin nearly straight, posterior margin bluntly angulate. Scutal setae similar to dorsals. Sensillae sparsely barbed full length; bases slightly anterior to PL's. Measurements of holotype: AS-80, PW-113, SB-28, ASB-38, PSB-29, AP-33, AMB-13, AM-55, AL-56, PL-60, S-85. Nasus 12 x 26. Legs: Coxa I moderately punctate, coxa II densely punctate, coxa III moderately to densely punctate, other leg segments sparsely punctate. Distance between coxa I setae 47. Parasubterminalia I lacking. Femur I and II, genu III and tibia III with 1 or 2 long, plumose setae. Specialized setae as originally figured. Gemula formula 2 +1,1; tibiala formula 2+2,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus 22,17,15. Leg index 970.

Distribution: Puno, Peru.

Specimens Examined: Holotype and 1 paratype, ex Chinchillula sahamae, Puno, Peru, May 1951.

Other Material: 14 paratypes ex Chinchillula sahamae, Abrocoma cinerea, Punomys lemnimus, and Neotomys ebriosus, Puno, Peru, May 1951 (Brennan and Jones, 1961a:175).

Odontacarus (O.) mastigophorus Brennan and Dalmat

Odontacarus mastigophorus Brennan and Dalmat, 1960:184 [Holotype, larva; unidentified bird, Acatenango, Guatemala; Rocky Mountain Laboratory, Hamilton, Montana].

Diagnosis: Separates from other Odontacarus ssp. by possessing a mastitibiala III and by the differentiated dorsal and ventral setules of the dorsal setae.

Redescription: Idiosoma: Ovoid. Length and width of holotype 189 and 163. Eyes 2/2 in plates, anterior 10, posterior 7 μm in diameter. Setal bases normal. Dorsal setae with 2 rows of broad setules dorsally and 2 rows of widely spaced thornlike setules ventrally; 25 to 33 μm long, longer posterolaterally; humerals 38; arranged approximately 2 (humerals)-8-6-10-8+6 posterior setae and 4 anterolateral setae not continuous with dorsal rows. Two sternals, 22 slender pre-anals, (26-29 μm) and 6 postanals similar to dorsals. Anus at third row of ventral setae. Spiracles prominent, adjacent to anterodistal margin of coxa I. Trachea visible to coxa III region (variable among specimens examined). Gnathosoma: Cheliceral bases moderately punctate. Blades 36 μm long with 5 dorsal teeth and a few small ventral teeth. Palpal formula B/B/BBB, all setae sparsely branched. Palpal tarsala 6 μm; tarsi with at least 5 long, sparsely branched setae. Tibial claws trifurcate, axial prong longest. Galealae with several barbs. Scutum: Shaped as originally figured, with slightly sinuate anterior margin and broadly rounded posterior margin; lightly punctate medially. Scutal setae uniformly branched. Sensillae with long branches apically; bases even with or slightly posterior to PL's. Measurements of holotype: AW-58, PW-71, SB-21, ASB-26, PSB-22, AP-21 to 23, AMB-8, AM-25, AL-32, PL-36, S-51. Nasus 6 x 15. Legs: Coxae apparently apunctate, other leg segments sparsely punctate. Distance between coxa I setae 32. Specialized setae as originally figured. Parasubterminalia I lacking. Gemula formula 1+,0+,0. Tibiala formula 2+,2,0. Microsetae on genu and tibia stubby. Mastitibialae and mastitarsalae III with 1 or 2 barbs. Branched setae per leg segment for legs I, II, and III:
Coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,5; tarsus 20,16,13. Claws with pair of onychotriches per claw, empodium nude.

**Distribution:** Guatemala: Finca Armenia, Aldea Los Plantes and Acatenango, Dept. Chimaltenango.

**Specimens Examined:** Holotype and 1 paratype, ex bird, Dept. Chimaltenango, Mar 1951; 4 paratypes ex Sylvilagus floridanus chiapensis, Chimaltenango, Feb 1951.

**Other Material:** Two paratypes and 23 specimens, ex *Sylvilagus floridanus chiapensis*, and 1 ex unidentified wood rat, Dept. Chimaltenango, Guatemala.

**Remarks:** The original description lists 5 branched setae on the palpotarsus. The genus typically has 7. Since none of the 6 specimens observed showed the tarsus clearly, assignment of the species to the genus is not questioned. The difference in the dorsal and ventral setules of the dorsal setae is obvious and diagnostic.

*Odontacarus (O.) munchiquensis* Brennan

*Odontacarus (O.) munchiquensis* Brennan, 1968: 679 [Holotype, larva; ex *Oryzomys albigerulus*, Dept. Cauca, Colombia; Rocky Mountain Laboratory, Hamilton, Montana].

**Diagnosis:** Diffs from *O. tuberculohirsutus* n. sp. and other hirsute, tuberculate *Odontacarus* species primarily by the sparsely branched posteromedian body setae.

**Redescription:** Idiosoma: Broad ovoid. Length and width of holotype: 490 and 407 (idiosoma split—hence measurements inaccurate). Eyes 2/2 in plates; anterior 14, posterior 11 μm in diameter. Setal bases tuberculate. About 90 dorsal setae in uneven rows, 49-102 μm, longer laterally; becoming stouter and with thicker branches posteromedially. Venter with 2 sternals, 44 slender pre-anals, 38-58 μm, plus 28 stout posterior setae similar to dorsals. Spiracle prominent, adjacent to anterior margin of Coxa I. Tracheae traceable to area of Coxa III. 

*Gnathosoma:* Cheliceral bases densely punctate. Blades 70 μm long with 8 teeth in dorsal row and about 19 in ventral row. Palpal formula B/B/BBB, latero- and ventrotibial setae with few branches, others moderately branched. Palpotarsal setae long, sparsely to moderately branched; tarsale III 13-15 μm long. Tibial claws trifurcate, axial prong largest. Galeala with 1 or 2 barbs (broken on holotype). 

**Scutum:** Moderately punctate, punctae large. Shaped as originally figured; anterior margin mildly sinuate, posterior margin bluntly angulate. Scutal setae similar to dorsals. AM's apparently lacking accessory branch. Sensillae delicately barbed entire length; bases posterior to PL's. Measurements of holotype: AW-93, PW-116, SB-38, ASB-40, PSB-25, AP-30, AMB-15, AM-64, AL-76, PL-99, S-108. Nasus 12 x 19 (basally). Legs: All leg segments moderately punctate. Distance between coxa I setae, 41. Parasubterminala I absent. Specialized setae as originally figured. Genuala formula 2+,0+,0; tibiala formula 2+, 2+. Microsetae spineform. Branched setae densely branched or plumose. Mastitarsala III barbed, broken on holotype. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus 27,17,14. Leg index 980.

**Distribution:** Colombia, Dept. Cuaca.

**Material Examined:** Holotype, ex *Oryzomys albigerulus*, Pena del Perro, Dept. Cuaca, Colombia, May 1967.

**Other Material:** 10 paratypes, ex 4 *Thomasonmys cinereiventer*, same area as holotype.

**Remarks:** The stubs of mastisetae on tarsi III are evident on the holotype, and one is long enough to show a few indistinct barbs. The original description listed mastitarsala III as absent. The galeala, although appearing nude, shows nubbins which indicate broken setules.

*Odontacarus (O.) tubercularius* (Brennan)

*Acomatacarus tubercularius* Brennan, 1952:145 [Holotype, larva; ex *Heteromys anomalus anomalus*, Aragua, Venezuela; Rocky Mountain Laboratory, Hamilton, Montana].


*O. tubercularius* fieldi: Brennan and Jones, 1961: 105, NEW SYNONYM: [Holotype, larva; ex *Zygodontomys cherriei*, [= *Z. brevicauda*] Fort Kobbe, Canal Zone; Rocky Mountain Laboratory, Hamilton, Montana]. Brennan and Yunker, 1966:224.


**Diagnosis:** *Odontacarus tubercularius* differs from all other neotropical species of the nominate subgenus by the following combinations of characters. Distance between coxa I setae less than
40, AMB \leq 10, 2 genuenae I, sensillae with short barbs along entire length.

Redescription: Idiosoma: Ellipsoidal. Length and width of holotype (unengorged): 192 and 162. Eyes 2/2 in plates; anterior 12, posterior 10 μm in diameter (paratype). All setae with tuberculate bases. Dorsal setae 40-77 μm, longer laterally and posteriorly; with 4 rows of barbs, (fewer barbs ventrally on inner curve of setae). Venter with 2 sternals, approximately 24 slender pre-anales 24-28 μm long, plus about 12 post-anales similar to dorsals. Spiracles at anterior margin of coxae I. Tracheae not visible in holotype, but visible in some specimens to posterior margin of idiosoma. Gnathosoma: Cheliceral bases moderately punctate. Blades 43-47 μm long, with 6-8 dorsal and about 7 ventral teeth, widely spaced. Palpal formula B/B/BNN; branched setae sparsely barbed, ventrotibial and laterotibial occasionally barbted. Tarsalae 11 μm. Branched tarsal setae sparsely branched. Tibial claws trifurcate, axial prong largest. Galeaeae with few barbs. Scutum: Shaped as originally figured, posterior margin broadly rounded. Punctae moderate. Scutal setae similar to dorsals. Sensillae sparsely barbed full length, bases slightly posterior to PL's. Measurements of holotype: AW-62, PW-81, SB-29, ASB-30, PSB-23, AP-24, AMB-11, AL-50, PL-72, S-90. Nasus 10 x 19. Legs: Coxae sparsely, finely punctate. Leg segments sparsely punctate. Specialized setae variable, similar to those figured for O. cayalargoensis, (Brennan, 1959:3, Fig. 1); genual formula 2+1,1; 2+1,1-0, or 2+2,0-0; tibiala formula 2+2,1. Branched setae plumose, less densely branched on distal leg segments. Distance between coxa I setae 36-37 μm. Parasubterminala I lacking. Branched setae per segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,8,6; tarsus ?,17,14 (23,17,14 on other Venezuelan specimens). Leg index (paratype) 710.

Distribution: United States (Florida and Texas), Panamà, Surinam, Trinidad, and Venezuela.

Material Examined: Holotype and 3 para- types, ex Heteromys anomalus anomalus, Aragua, Venezuela, summer 1950; plus more than 1,200 larvae from Venezuela with the following frequency of infected hosts: 37, ex 4 Monodelphis breviceauata; 1, ex Marmosa sp. A; 81, ex 13 M. fusca; 52, ex 13 M. robinsoni; 42, ex 10 Didelphis marsupialis; 1, ex Saccopeterus bilineata; 1, ex Microcycteris microtis; 5, ex Carollia breviceauata; 3, ex 1 Vampyrops helleri; 8, ex 1 Vampyressa pusilla; 1 ex Stylilatus floridanus; 6, ex 1 Sciurus granatensis; 255, ex 40 Heteromys anomalus; 207, ex 40 Ornizomys albigularis; 3, ex 3 O. concolor; 1 ex O. fulvescens; 2, ex 0. minutus; 3, ex 1 Nectomys alflorum; 1, ex Thomas- omys lugens; 14, ex 3 Akodon urichi; 36, ex 8 Zygodontomys breviceauata; 114, ex 28 Sigmodon hispidus; 46, ex 9 Sigmodomys alstoni; 1, ex Rattus norvegicus; 9, ex 1 R. rattus; 29, ex 3 Agouti paca; 2, ex 2 Dasyprocta aguti; 77, ex 22 Proechi- myx semispinosus; 3, ex 1 Mazama americana.

Above collections were made during 1965-
1968, in every month except September, from nearly every Venezuelan state. Other material examined includes 89 specimens from the following locations and hosts. UNITED STATES OF AMERICA: 6, ex Liomys irroratus, Brownsville, and Cameron Co., Texas, Oct 1960, and Nov 1962; 8, ex Sigmodon hispidus, Monroe Co., Florida, Jan 1945. PANAMA: 2 larvae, ex Didel- phis marsupialis; 4, ex 2 Liomys adspersus; 1, ex Zygodontomys breviceauata; 21, ex 17 Sigmodon hispidus; 1, ex Proechimys semispinosus; 1, ex Felis pardalis; 3, ex Neomorphus geoffroyi sal- vini; 2, ex Odontophorus erythorhops; collected from Canal Zone, Bocas del Isla, Darién, and Cerro Campana, Dec 1960; Feb, Mar, Sep, and Oct 1961 and Feb 1962. SURINAM: 5 larvae, ex Proechimys guyannensis, Utikykj; 4 ex Da- syprocta sp., "Surinam" 1961 and Jan 1970. TRINIDAD: 6 larvae, ex Rattus sp.; 1, ex Proe- chimys guyannensis, 1, ex D. aguti; Cumaca and Aripa Cave, May 1954, Apr 1960, and May 1965.

Other Records: Neomorphus geoffroyi sal- vini, Odontophorus erythrops, Didelphis marsu- pialis, Proechimys semispinosus, Liomys adspersus, Sciurus granatensis, Sigmodon hispidus, Zygo- donotomys micratinus, and Felis pardalis from Canal Zone, Darién, Panamá, (Brennan and Yunker 1966:224); Zygodontomys cherriei, and Sigmodon hispidus, Canal Zone (Brennan and Jones 1961:105); Proechimys guyannensis and Nectomys squamipes, Cumaca, Trinidad (Brennan and Jones, 1960:496); Philander opossum, Nectomys squamipes melanius, and Proechimys guyannensis, Coroial, Surinam (Brennan and Lukoschus 1971:44); Sigmodon hispidus, Key Largo, Florida (Brennan, 1959); Liomys irrorato- tus, Peromyscus leucopus, and Sigmodon hispi- dus, Cameron Co., Texas (Loomis and Crossley, 1963): Heteromys gaumeri, Ototylomys phyllotis, Peromyscus yucatanicus, and Sigmodon hispidus, Campeche and Yucatán, México (Loomis, 1969).

Remarks: Odontacarus fieldi and O. cayo- laragoensis were originally separated on the basis of the genual configuration of legs I and II. Examination of 56 specimens from Panamá, topotypes for O. fieldi, showed only 16 (29 percent)
with a typical O. fieldi configuration of 2.0-0.0 gnathosoma on legs I, II, and III, respectively. Twenty-three specimens (41 percent) lacked a gnathosoma II on I leg and 7 specimens possessed gnathosoma II on both legs. In addition, 8 specimens had both gnathosoma II and III, and 2 possessed both gnathosoma III but lacked 1 of the gnathosoma II. Comparison of the holotypes of O. fieldi and O. cayalargoensis with the comparison microscope showed setae and scutal characteristics to be identical, with slight differences in the thickness of the dorsal setae.

The synonymy of O. tuberculatus to O. cayalargoensis and O. fieldi was suspected when approximately 160 specimens from Venezuela could not be assigned with certainty to any one of the 3 species. Two hundred eighty-five specimens were found to possess both gnathosoma II and III, and over 900 specimens lacked gnathosoma II, including 3 specimens which lacked gnathosoma III on one side only. Three specimens lacked both gnathosoma II and III.

Other characteristics differed considerably. The length of setae, as indicated by the length of the posteralateral scutal setae, varied from 55 to 65 μm for those with gnathosoma III, and from 60 to 88 μm for those lacking gnathosoma III. Numbers of idiosomal setae differed slightly as indicated by a variation of 22 to 34 pre-anal setae. Stoutness of idiosomal setae was as variable as their length. No correlation was determined from distributional, host, or seasonal data.

Odontacarus (O.) comosus comosus n. ssp.

(Fig. 4)

Type Data: Holotype and 3 paratypes, RML #53639 ex Thomasomyus hyphophilus, Venezuela, Táchira, 41 km SW San Cristóbal (Buena Vista), 2,350 m, 23 Mar 1968; other paratypes. One larva each, RML #’s 52993, 55977, 55983, and 56007; 2 each, RML #’s 52962, 53629, 53642, and 56006; 3 each, RML #’s 52963, 52964, 53659, 53664, and 55930 ex T. hyphophilus, Venezuela, Táchira, 41 km SW San Cristóbal (Buena Vista), 2,350 to 2,420 m, 5-27 Mar 1968. N. E. Peterson, F. Brown, and J. Matson, collectors.

Holotype and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Differs from closely related O. munchinquensis, Brennan, by the undifferentiated posterior setae, shorter cheliceral blades, and scutal shape.

Description: Idiosoma: Broad ovoid. Length and width of holotype (unengorged) 283 and 228. Eyes 2/2 in plates. Anterior I5, posterior 14 μm in diameter. Dorsal and ventral setal bases tuberculate. Dorsal setae 45-101 μm, with 4 rows of setules; arranged approximately: 2 humerals (93 μm) -13-10-9-8-8 + 14 posterior and 8 long lateral setae not continuous with dorsal rows. Dorsal setae 45-101 μm, longer laterally and posteriorly. Venter with 2 sternals and 50 slender, long branched pre-anals and para-anals in uneven rows, 1 pair of slender postanals, plus 10 posterior setae similar to dorsals. Anus at fourth row of ventral setae. Spiracles very large, adjacent to anterior margin of coxa I. Tracheae visible to posterior margin of idiosoma. Gnathosoma: Cheliceral bases moderately punctate. Blades 43-54 μm long, with 5 to 6 dorsal teeth and about 8 ventral teeth. Palpal formula B/B/B/BB; genual and femoral setae moderately barbed, dorsotibial densely barbed. Laterotibial setae usually with 1 barb, ventrotibial with 3 to 6. Palpal tarsalae 13 μm; branched tarsalae long, moderately branched. Tibial claws trifurcate, alar proxi largest. Galeaiae sparsely barbed. Scutum: Moderately punctate. Shaped as figured, with posterior margin broadly rounded to bluntly angulate. AM’s with accessory branch, AL’s apparently with 2 rows of setules, other setae similar to dorsals. Sensillae sparsely barbed, bases slightly posterior to PL’s. Measurements of holotype: AW-80, PW-111, SB-34, ASB-41, PSB-23, AP-32, AMB-13, AM-60, AMA-12, AL-73, PL-55, S-101+. Nasus 12 x 23. Legs: Coxae II and III, densely punctate, coxa I moderately punctate, leg segments moderately punctate. Distance between coxa I setae 47. Parabrunsternal I lacking, matitarasa on leg III barbed. Specialized setae as figured. Branched setae plumose; Femur I and II with moderately long plumose setae. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 5,5,4; genu 4,4,4; tibia 8,6,6; tarsala 29-30,18,15. Leg index 900.

Distribution: Venezuela, Táchira state.

Specimens Examined: Types plus: One larva ex Marmosa dryas, 1, ex M. impavida, 1, ex Orzyomys albicollaris, 2, ex O. minutus, 2, ex Rhhipidomys venustus, and 2, ex unidentified bird, Venezuela, Táchira, 52 km SW San Cristóbal (Buena Vista), 2,370-2,420 m, 23-29 Mar 1968.

Remarks: Variation was noted in the number of dorsal setae, which varied from 60-70; length of scutal setae; and the number of barbs on the ventrotibial and laterotibial palpal setae. The name was derived from the Latin comosus, long hair, referring to the long dorsal setae.
Fig. 4. *Odontacarus comosus comosus*, new subspecies. A, scutum; B, palpus and cheliceral blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

*Odontacarus (O.) comosus novemsetus* n. ssp.  
(Fig. 5)

**Type Data**: Holotype and 3 paratypes, RML #48752, ex *Oryzomys albigularis*, Venezuela, Miranda, 5 km NNE Caracas (Pico Avila), 2,172 m, 28 Aug 1965. Other paratypes: 1 larva, RML #48899, ex Marmosa fuscata Venezuela, Distrito Federal, 31 km WSW Caracas, 1,780 m, 21 Dec 1965; 1, RML #48746, ex *Heteromys anomalus* and 1 each, RML #48715 and 48748; 2 each, RML #48729 and 48762, and 3, RML #48753, ex *O. albigularis*, Venezuela, Miranda, 5 km NNE Caracas (Pico Avila), 2,124-2,172 m, 25 Aug-Nov 1965; 2, RML #48888, ex *O. albigularis*, Venezuela, Miranda, 31 km WSW Caracas (Alto No Leon), 1,950 m, 20 Dec 1965. N. E. Peterson, collector.

Holotype and Paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

**Diagnosis**: Differs from the nominate subspecies primarily by having 9 branched setae on tibia I and 6 on tibia II and III.

**Description**: Idiosoma: Broad ovoid. Length and width of holotype (unengorged) 288 and
230. Eyes 2/2 in plates, anterior 14, posterior 13 \( \mu \text{m} \) in diameter. Dorsal and ventral setal bases large tuberculate. Dorsal setae 55-91 \( \mu \text{m} \), with 4 rows of setules: arranged approximately: 2 humerals (86 \( \mu \text{m} \))-10-8-8-8+16 posterior and 10 long lateral setae not continuous with dorsal rows, longer laterally and posteriorly. Venter with 2 sternals and 50 slender, long-branched pre-anals and para-anals in uneven rows; 1 pair of slender postanals and 6-10 posterior setae similar to dorsals. Anus at fourth row of ventral setae. Spiracles very large, adjacent to anterior margin of coxa I. Tracheae convolutant, visible to posterior margin of idiosoma. Gnathosoma: Cheliceral bases punctate. Blades 53 \( \mu \text{m} \) long, with 6 dorsal teeth and 9-10 ventral teeth. Palpal formula B B: BBB; genual, femoral, and dorsotibial setae moderately branched, branches short; laterotibial setae nude or with 1-2 barbs. Ventrotibial with 3-4 barbs.

Fig. 5. *Odontacarus comosus novemsetus*, new subspecies. A, scutum; B, palpus and cheliceral blade, ventral aspect; C, palpal tarsus and tibia, dorsal aspect; D, anterolateral dorsal seta—left, ventral aspect, right, dorsal aspect; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

**Distribution:** Venezuela, Distrito Federal and Miranda.

**Specimens Examined:** Type specimens.

**Remarks:** Variations were less obvious in *O. c. novemsetus* than in the nominate subspecies. The variational overlap noticed in the diagnostic characters separating the 2 subspecies was the presence of 7 branched tibial setae on 1 leg of a single specimen. The name refers to the 9 branched tibia I setae.

**Odontacarus (O.) dienteslargus** n. sp.  
(Fig. 6)

**Type Data:** Holotype, RML.#53661, and 23 paratypes: 3 each-RML.#53211 and 56006; 2 each-RML.#s 52964, 53629, and 55989, 4-RML.# 55984 and 1 each-RML.#s 52962, 56001, 55939, 53685, 53639, 53637, and 53230, ex *Thomasonym hyophilus*, Venezuela, Táchira, 41 km SW San Cristóbal (Buena Vista), 2,355 to 2,423 m, 2-25 Mar 1968. N. E. Peterson, F. Brown, and J. Matson, collectors.

Holotype and Paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

**Diagnosis:** Differs from the closely related *O. munchiquensis* primarily in having PL > AM > AL, little variation in dorsal setae from anterior to posterior, and fewer ventral teeth on the cheliceral blades.

**Description:** Idiosoma: Broad ovoid to circular, length and width of holotype 257 and 228. Eyes 2/2; anterior 15, posterior 13 μm in diameter; plate present. About 130 dorsal setae, 36-86 μm long, midlateralis longest, arranged in uneven rows. Setae stout, with 4 rows of stout barbs, posterior setae stoutest. Two sternalis plus about 90 ventralis, 35-70 μm in uneven rows; pre-anals slender with long setules, postanals like dorsals. Anus located approximately at fourth row of setae. Spiracles large, tracheae visible to coxa III. *Gnathosoma:* Cheliceral bases densely punctate; cheliceral blade length 74; 6-8 dorsal teeth; 12-13 ventral teeth, posterior teeth largest. Palpal formula B/B/BBB, femoral and genital setae moderately branched, with long branches; dorso-tibial densely branched with short branches; laterotibial with 1-2 barbs, ventrotibial with 3-4 branches. Palptibial claws trifurcate, axial prong longest. Palpotarsus 7B; tarsala 18 μm. Galeala sparsely branched. Scutum: Subpentagonal; moderately punctate; anterior and lateral margins slightly sinuate; apex of posterior margin bluntly angulate. Scutal setae similar to dorsals, AL's less stout than AM's and PL's. AM's lacking accessory branches. Proximal 2/3 of sensillae barbed, sensillar bases slightly posterior to PL's. Measurements of holotype: AW-99, PW-118, SB-47, ASB-43, PSB-27, AP-26, AMB-15, AM-77, AL-65, PL-77, S-116. Nasus 12 x 20. Legs: Coxae and leg segments moderately punctate. Distance between coxa I setae 37. Specialized setae as figured. Leg III with barbed mastitar-sala. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1, trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus 23,17,16. Leg index 931. Onychotriches absent.

**Distribution:** Venezuela: Mérida and Táchira.

**Specimens Examined:** Type specimens plus the following Venezuela material. Three larvae, ex *Cryptotis thomasi*, 2, ex *Oryzomys albigerarius*, 1, ex *Chilomys instans* and 2, ex *Akodon bogotensis*, Táchira, 41 km SW San Cristóbal (Buena Vista), 2395-2410 m, 13 to 18 Mar 1968; 4, ex *Thomasonym laniger*, Mérida, 3 km W Timotes (Paramito), 3230 m, 16 Feb 1966.

**Remarks:** No significant variations were noted. The name refers to the cheliceral blades.

**Odontacarus (O.) pugnosus** n. sp.  
(Fig. 7)

**Type Data:** Holotype, RML.#51863 and 2 paratypes, RML.#s 51854 and 52769, ex *Thomasonym laniger*, Venezuela, Mérida, 7-9 km SE Tabay, 3160-3785 m, 11-23 Mar 1966. Other paratypes: 2, RML.#51866 and 1 each, RML.#s 49054, 49053, 51867, 52814, and 49052, ex *Oryzomys minutus*, Venezuela, Mérida, 7-9 km SE
Fig. 6. Odontacarus dienteslargus, new species. A, scutum; B, palpus and cheliceral blade, ventral aspect; C, palpal claw and tarsus, dorsal aspect; D, coxae and leg segments showing specialized setae; E, anterolateral dorsal seta; F, antersubmedian ventral seta.

Tabay (La Coromoto), 3190-3370 m, 15-17 May 1966. N. E. Peterson, collector.

Holotypes and paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: O. pugnosus differs from O. tuberculohirsutus in having appressed, short branches on the dorsal setae and the broad, short scutal nasus.

Description: Idiosoma: Ovoid; length and width of holotype: 388 and 278. Eyes 2/2 in
Fig. 7. *Odontacarus pugnosus*, new species. A, scutum; B, anterosubmedian ventral seta; C, anterosubmedian dorsal seta.

plates; anterior and posterior eyes subequal, 25 μm in diameter. About 180-200 stout, moderately branched dorsal setae, 96-101 μm long, anterolaterals longest. Humerals not distinguished from dorsal setae. Ventral setae slender, with long setules; 2 sternal plus about 130 ventrals in uneven rows, 57-81 μm long, becoming stouter posteriorly; posterior setae similar to dorsals. All setal bases large, tuberculate. Spiracles large, adjacent to anterodistal margin of coxa I; tracheae obvious, visible to posterior margin of idiosoma. **Gnathosoma:** Similar to that of *O. tuberculohirsutus*. Cheliceral bases densely punctate; blades 62 μm long, with 5-6 dorsal and 9-10 ventral teeth. Palpal formula B/B/BNB; femoral, genual and dorsotibial setae densely branched, laterotibial claws slender, trifurcate; para-axial prongs small. Palpotarsus 19 μm long; branched setae long, moderately branched. Galealae sparsely barbed. **Scutum:** moderately punctate; nearly quadrate, with broadly rounded to bluntly angulate posterior margin. Lateral scutal setae similar to dorsals; AM's with prominent, nude accessory branch. Sensillae long, with few minute barbs; bases slightly posterior to PL's. Measurements of holotype: AW-96, PW-117, SB-40, ASB-60, PSB-36, AP-43, AMB-18, AM-67, AMA-24, AL-106, PL-117, S-121. Nasus 20 x 25 μm. **Legs:** Coxae densely punctate; other segments moderately punctate. Distance between setae of coxae I: about 62. Specialized setae similar to those figured for *O. tuberculohirsutus*, but with mastatarsala III stouter and with numerous branches. Femur I and II, genu II and III, and tibia III with long, plumose setae. Branched setae per segment for legs I, II, and III: coxa 2,2,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8, 7,7; tarsus 38,29,24. Leg index 1280.

**Distribution:** Venezuela: Mérida state.

**Specimens Examined:** Type material.

**Remarks:** The name refers to the short, broad nasus.

*Odontacarus* (*O.*) *schoenesetosus* n. sp. (Fig. 8)

**Type Data:** Holotype and one paratype, RML#49029, ex *Thomasomys vestitus*, Venezuela, Trujillo, 15 km E Trujillo (Hda. Misisi),
Fig. 8. *Odontacarus schoenesetosus*, new species. A, scutum; B, palpal tibia and tarsus, dorsal aspect; C, palpus and cheliceral blade, ventral aspect; D, anterosubmedian ventral seta; E, anterosubmedian dorsal seta—top, dorsal aspect, bottom, ventral aspect; F, coxae and leg segments showing specialized setae.

2250 m, 29 Jan 1966. Other paratypes: 1, RML #49040 and 8, RML#52813, ex *T. laniger*, Venezuela, Mérida, 3 km W Timotes (Paramito), 3206-3230 m, 14 and 16 Feb 1966; 1 RML#48918 and 6, RML#48920, ex *T. lugens*, Venezuela, Trujillo, 15 km E Trujillo (Hda Misisi), 2350 to 2360 m, 25 and 26 Jan 1966; 11, RML#52808, ex *Lonchorhina aurita*, Venezuela, Trujillo, 25 km N Valera (Quebrada Seca), 131 m, 21 Oct 1965; 1, ex *Artibeus jamaicensis*, Venezuela, Trujillo,
25 km NW Valera (Agua Santa), 90 m, 22 Oct 1965. N. E. Peterson, collector.

Holotype and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

**Diagnosis:** Cheliceral blades longer than 80 μm; scutum wide, with posteriorlateral setae far anterad of the sensillar bases, and with deeply sinuate anterior margin.

**Description:** Idiosoma: Broad ovoid to circular; length and width of holotype (enlarged): 288 and 283. Eyes 2/2 in a plate, anterior 18, posterior 17 μm in diameter. Approximately 150-200 dorsal setae in uneven rows, longer laterally and posteriorly, 38-86 μm long. Setal bases large, tuberculate. Setae stout, with 4 rows of short, stout barbs. Venter with two sternals plus about 100 ventral setae, 42 to 56 μm. Anterior ventrals slender with long branches; posterior ventrals similar to dorsals; bases tuberculate. Anus at about the fifth row of ventral setae. 


**Legs:** Coxae and leg segments moderately punctate. Distance between coxa 1 setae 48. Parasubterminala I lacking. Mastitarsala III barbed. Specialized setae as figured. Branched setae plumose; femur I and II, tibia III, and genu III with very long, plumose setae. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,7,7; tarsus 33,22,19. Tarsal claws nude. Leg index 1183.

**Distribution:** Venezuela: Trujillo and Mérida states.

**Specimens Examined:** Type specimens.

**Remarks:** Variation noted in the species including 10 rather than 9 branched setae on tibia 1, malformed cheliceral blades on one specimen, and very long cheliceral blades on another. The average length of the cheliceral blades is 84 μm.

**Odontacarus (O.) sunnianae** n. sp. (Fig. 9)

**Type Data:** Holotype and 6 paratypes, RML #53550 and 14 paratypes as follows: 3 each RML #53581 and 53555, 2 each RML #53582 and 53583, 1 each RML #53584 and 53579, ex Proechynys semispinosus, Venezuela, Lara, 10 km N El Tocuyo (Caserio Boro), 518 m, 15 July 1965; 2 RML #53270, ex P. semispinosus, Venezuela, Falcón, 84 km NW Carora (Cerro Socopo) 1285 m, 13 May 1968. F. Brown, J. Madsen, A. L. and M. D. Tuttle, and N. E. Peterson, collectors.

Holotype and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

**Diagnosis:** Distinguished from other species of the genus by short, broad dorsal setae and a single genuala I.

**Description:** Idiosoma: Broad ovoid (enlarged); length and width of holotype, 157 and 138. Eyes 2/2 in indistinct plate; anterior 11 μm posterior 9 μm in diameter. Dorsal setae 28-52 μm, longer laterally and posteriorly, with 2 rows of setules dorsally. Approximate dorsal formula: 2 humerals (52 μm)-8-8-10-8-6. Venter with 2 sternals plus about 42 ventral setae; pre-anals slender, with delicate barbs, becoming stouter laterally, 26-41 μm long. Post-anals similar to dorsals. Anus located between rows 2 and 3. Spiracles large and conspicuous, adjacent to anterodistal margin of coxa I; tracheae visible for short distance only. 

Gnathosoma: Cheliceral bases moderately punctate, punctae indistinct; cheliceral blades 38 μm long, teeth small, numbering 5-6 dorsally and 5-6 ventrally. Palpal formula B/B/BBB; dorsothibal and ventrotibial setae with 1 or 2 barbs. Palpotarsalae about 8 μm long. Palpotibial claw trifurcate, axial prong largest. Galealae sparsely branched. Scutum: Small, sparsely punctate, subpentagonal; posterior margin broadly rounded to bluntly angulate. Scutal setae densely branched; laterals broadly curved, with fewer setules on inner side. Sensillae heavily barbed, branches more numerous and longer apically; sensillar bases even with PL's. Measurements of holotype: AW-65, PW-82, SB-23, ASB-27, PSB-18, AP-23, AMB-10, AM-42+, AL-42, PL-51, S-62. Nasus 9 x 12. Legs: Coxae and leg...
segments with a few scattered punctae. Distance between coxa I setae 27-28. Legs short; parasubterminala on leg I lacking; mastitarsala III present, nude, apparently fragile. Tarsal claws with a pair of minute onychotriches visible in some specimens. Specialized setae as figured. Branched setae per leg segment for legs I, II, and III; coxa 2,1,1; trochanter 1,1,1; femur 5,5,4; genu 4,4,4; tibia 8,6,6; tarsus 22,16,14. Leg index 790. Onychotriches lacking.

**Distribution:** Venezuela: Barinas, Falcón, Lara and Miranda states.

**Specimens Examined:** Type specimens plus the following Venezuela material. One larva, ex *Didelphis marsupialis*, Miranda, 3 km NE Caracas (Quebrada Chacaito), 1150 m, 15 May 1967; 1, ex *Marmosa fuscata*, Aragua, 12 km N Maracay, 30 Mar 1960; 1, ex *Scituris granatensis* and 2, ex *Proechimys semispinosus*, Barinas, Altamira, 600 and 794 m, 2 and 4 Jan 1968. 2, ex *Oryzomys albipudis*, Miranda, 1 km N Caracas (Quebrada Chacaito), 1150-1175 m, 18 May 1967; 2, ex *Sigmodon hispidus*, Lara, 10 km N El Tocuyo (Caserio Boro), 518 and 537 m, 15 and 17 July 1968.

**Remarks:** In addition to the type series and other records listed above, 2 specimens, ex *Proechimys semispinosus*, Falcón, Urama, 19 km NW Urama, 25 m, 26 Oct 1966, are considered here as a form of *O. sunnianae*. *O. sunnianae* was named for the wife of the senior author.

**Odontacarus (O.) tiptoni** n. sp. (Fig. 10)

**Type Data:** Holotype and 7 paratypes, RML #49029, and 9 paratypes RML #48925, ex Thom-
Fig. 10. *Odontacarus tiptoni*, new species. A, scutum; B, palpus and clerical blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.

*asomys vestitus*; Other paratypes: 1 RML# 48909, ex Marmosa dryas; 1 RML#48898, ex *Oryzomys albicularis*; 1 RML#49032, *O. ex minutus*; and 1, RML#48918, ex *Thomasomys lugens*; Venezuela, Trujillo, 15 km E Trujillo, 2350-2360 m, 19 to 29 Jan 1966. N. E. Peterson, collector. Holotype and paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Distinguished from the closely related *O. schoenesetosus* n. sp. by the following
combination of characters: AM, AL, and PL subequal. Two coxa II setae, short accessory branch on AM, and the stout, idiosomal setae.

**Description: Idiosoma:** Broad ovoid; length and width of holotype, 230 and 192. Eyes 2/2, in indistinct plates; anterior 18, posterior 13 μm in diameter. About 110 dorsal setae in uneven rows, 44-90 μm, becoming longer laterally and posteriorly. Numeral not distinguishable. Setal bases tuberculate; setae stout with 4 rows of setules. Two sternals plus about 60 slender pre-anals and 20 posterior ventral setae in uneven rows. Pre-anals more slender with longer setules, 40-70 μm long; postanal and lateral ventral setae similar to dorsals. Anus at fourth row of ventral setae. Spiracles large and conspicuous, adjacent to anterodistal margin of coxa I. Tracheae obvious, traceable throughout the idiosoma. Gnathosoma: Cheliceral bases densely punctate, punctae large and obvious; cheliceral blade length 50 μm; teeth small, about 7 dorsal, and about 10 ventral. Palpal formula B/B/BBB; the latero- and ventrotibial setae with 1 to several barbs; other setae densely branched. Palpolar- sala about 11 μm long; branched tarsal setae long, moderately branched. Tibial claws triruncate, and proximal largest. Galea moderately branched. *Scutum:* Moderately punctate, sub-pentagonal, anterior margin slightly sinuate, posterior margin broadly rounded. Setae similar to dorsals. Sensillae lightly barbed along entire length, accessory branch present. Sensillae bases slightly posterior to PLs. Measurements of holotype: AW-93, PW-133, SB-47, ASB-43, PSB-33, AP-32, AMB-14, AM-83, AM-A-12, AL-78, PL-84, S-95+ (AM, AL, and PL variabile). Nasus 13 x 27. Legs: Coxae and leg segments moderately punctate. Distance between coxa I setae 50. Mastitarsala III barbed. Parasubterminalia I lacking. Specialized setae as figured. Femur I and II, genu and tibia III with long, densely plumose setae. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,7,7; tarsus 34,21,19. Leg index 1147. Onychochotriches lacking.

**Distribution:** Venezuela: Trujillo state.

**Specimens Examined:** Type specimens.

**Remarks:** Named for Dr. Vernon J. Tipton, Department of Zoology, Brigham Young University.

**Odontacarus (O.) tuberculohirsutus** n. sp. (Fig. 11)

**Type Data:** Holotype and 8 paratypes, RML #49049, and 29 paratypes: 3, RML #49045, 7, RML #51851, 6, RML #51850, 5, RML #48116, 2, RML #49041, 1 each, RML #8 49046, 52774, 52771, 51861, 51549, 49042, ex *Thomasonysyms laniger*, Venezuela, Mérida, 7-9 km SE Tabay, 3160 to 3785 m, 11-23 Mar 1966, N. E. Peterson, collector.

Holotype and paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

**Diagnosis:** *O. tuberculohirsutus* differs from other *Odontacarus* species by the combination of large, tuberculate setal bases, number and form of body setae, and large accessory branches on anteromedian scutal setae.

**Description: Idiosoma:** Ovoid; length and width of holotype: 451 and 336. Eyes 2/2 in plates; anterior 20, posterior 17 μm in diameter. About 200 slender dorsal setae, 60-105 μm, densely barbed, basal branches 6-8 μm. Posterior setae stouter, with short appressed barbs; lateroposterior setae longest. Numerals not distinguished from dorsal setae. Ventral setae 45-85 μm; 2 sternals, plus about 130 ventrals in uneven rows. All setal bases large, tuberculate. Spiracles large, adjacent to anterodistal margin of coxa I; tracheae obvious, visible to posterior margin of idiosoma. Gnathosoma: Cheliceral bases densely punctate; blades 64 μm long, with 5-6 dorsal teeth and 9-10 ventral teeth. Palpal formula B/B/BNB; femoral, genual and dorsotibial setae densely branched, laterotibial with an occasional barb, ventrotibial 3-4 branched. Palpotorial claws triruncate. Palpolar setae 17 μm; branched tarsal setae long, moderately branched. Galealae sparsely barbed. *Scutum:* Moderately punctate, pentagonal; lateral margins sinuate, posterior margins sunken, with striations encroaching to raised portion of scutum. Scutal setae stout, AM’s with prominent, nude accessory branch. AM’s and AL’s sparsely branched, with short appressed barbs. posterior setae densely branched with longer branches. Sensillae slender, with few minute barbs; bases slightly posterior to PL’s. Measurements of holotype: AW-103, PW-138, SB-35, ASB-62, PSB-42, AP-45, AMB-19, AM-82, AMA-24, AL-105, PL-107, S-135. Nasus 18 x 50 μm. Legs: Coxae densely punctate, leg segments moderately punctate. Distance between setae of coxa I, 57-65. Specialized setae as figured. Branched setae per leg segment, sequentially for legs I, II, and III: coxa 2,2,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,8,8; tarsus 40, 30, 28. Femur I and II, genu III and tibia III with 1-3 very long, plumose setae. Leg index 1245.

**Distribution:** Venezuela; Mérida state.
Fig. 11. *Odontacarus tuberculohirsutus*, new species. A, scutum; B, palpus and cheliceral blade, ventral aspect; C, palpal genu, tibia and tarsus, dorsal aspect; D, anterosubmedian ventral seta; E, anterosubmedian dorsal seta; F, coxae and leg segments showing specialized setae.
Specimens Examined: Type material, plus the following other Venezuela material: 5, ex *Oryzomys minutus*, Mérida, 4 km W Timotes (Paramito), 3294 m, 16 Sept 1966; 10, ex *O. minutus* and 3, ex *Akodon bogotensis*, Mérida, 7-9 km SE Tabay (Le Coromoto and Laguna Verde) 3160-3785 m, 11-21 Mar 1966.

Remarks: Coxa II occasionally possesses 3 instead of 2 setae, and the degree of striation on the posterior margin of the scutum varies considerably among specimens. None of the material examined appeared to be engorged. The name was chosen in reference to the large, tuberculate setal bases and the large number of idiosomal setae.

*Odontacarus* (*O.*) *vanderhammeni* n. sp.

**Type Data:** Holotype and 2 paratypes, RML #49039, ex *Oryzomys minutus*, Venezuela, Mé-

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Fig. 12. *Odontacarus vanderhammeni*, new species. A, scutum; B, palpus and cheliceral blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian ventral setal; E, middorsal seta; F, coxae and leg segments showing specialized setae.
rida, 4 km N Timotes (Paramito), 3294 m, 11 Feb 1966; other paratypes: 1 each, RML #48915 and 48902, ex O. albigatoris, 1 each, RML #s 48931 and 48918, ex Thomasonys lugens, and 1 RML #48909, ex Marmosa dryas, Venezuela, Trujillo, 14 and 15 km E Trujillo (hda. Misisín), 2220-2360 m, 20 and 24 Jan 1966. N. E. Peterson, collector.

Holotypes and paratypes: Rocky Mountain Laboratory. Other paratypes: Field Museum of Natural History, Chicago, Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Separates from other species with tuberculate setal bases by the following combination of characters: Sparsely barbed and tapered dorsal setae, angulate posterior scutal margin, moderately long accessory branches on anterogsubmedian scutal setae, and unisetos coxa II.

Description: Idiosoma: Ovoid; length and width of holotype (engorged) 578 and 418. Eyes 2/2 in obscure plates; anterior 16, posterior 14 μm in diameter. Approximately 100 dorsal setae, in uneven rows, 41-75 μm long, laterally and posteriorly. Two humerals 80 μm long. Dorsal setae stout, tapered, sparsely branched with few closely appressed barbs on ventral side of setae. Venter with 2 sternal plus about 60 slender ventral setae, 38-65 μm long, and about 14 posterior setae similar to dorsals. Anterior ventrals with long branches, becoming gradually stouter until 2-3 rows posterad of anus. Anus at about fifth row of ventral setae. Gnathosoma: Cheliceral bases densely punctate. Blades 43 μm long with 6 dorsal and 7-8 ventral teeth. Palpal formula B/B/B/BBB; femoral and genual setae densely branched with long branches, dorsotibial moderately branched, laterotibial and ventrotibial with few barbs. Palpotarsae 14 μm; branched tarsal setae moderately branched. Tibial claws trifurcate, axial prong largest. Galealae moderately branched. Scutum: Moderately punctate, shaped as figured; anterior margin mildly sinuate, posterior margin angulate. Anterior setae more densely branched than posteralateral setae, AM with moderately long accessory branch. Sensillae sparsely barbed, bases markedly posterior to PL's. Measurement of holotype: AW-85, PW-109, SB-34, ASB-46, PSB-39, AP-33, AMB-18, AM-75, AMA-23, AL-74, PL-84, S-120. Nasus 13 x 20. Legs: Coxae moderately punctate, other leg segments sparsely punctate. Distance between coxa I setae 41 μm. Femur I and II, genu and tibia III with long plumose setae, other branched setae densely to moderately branched. Branched setae per segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,6,6 (9,7,7 in one specimen); tarsus 40+,23,18. Leg index 1111.

Distribution: Venezuela, Trujillo and Mérida states.

Specimens Examined: Type specimens.

Remarks: Named for Dr. L. van der Hammen, Rijksmuseum van Natuurlijke Historie, Leiden, the Netherlands.

Odontacarus (O.) vergrandi n. sp. (Fig. 13)

Type Data: Holotype and 9 paratypes, RML #52811, ex Thomasonys laniger, Venezuela, Mérida, 3 km W Timotes (near Paramito), 3147 m, 15 Feb 1966; other paratypes: 2, RML #52813, ex T. laniger, 1, RML #52812 and 3, RML #52810, ex Orzyomys minutus, Venezuela, Mérida 3 and 4 km W Timotes (near Paramito), 3140 to 3230 m, 15 and 16 Feb 1966; 4, RML #52808, ex Lonchorina aurita, Venezuela, Trujillo, 25 km N Valera (Quebrada Seca), 131 m, 21 Oct 1965. N. E. Peterson, collector.

Holotype and paratypes: Rocky Mountain Laboratory. Paratypes: Field Museum of Natural History, Chicago, and Bernice P. Bishop Museum, Honolulu, Hawaii.

Diagnosis: Differs from O. comosus comosus, n. sp. by the slightly different shape of scutum, more and stouter idiosomal setae, and the branched setae of tibia I, II, and III numbering 9-7-7, respectively.

Description: Idiosoma: Broad ovoid. Length and width of holotype (unengorged) 285 and 252. Eyes 2/2 in plates; anterior 16 posterior 14 μm in diameter. Dorsal and ventral setal bases large, tuberculate. Dorsal setae 45 to 96 μm, longer laterally and posteriorly with 4 rows of setules. Total dorsal setae about 110 in uneven rows. Humerals not distinguishable. Ven
ter with two sternals and 35 slender pre-anals (40-50 μm), plus about 20 postanal and laterals similar to dorsals. Anus at fourth row of ventral setae. Spiracles prominent, adjacent to anterior margin of coxa I. Tracheae convol
tant, visible throughout idiosoma. Gnathosoma: Cheliceral bases moderately punctate; blades 54 μm long with 7 dorsal and 6-7 ventral teeth, widely spaced. Palpal formula B/B/B/BBB; latero- and ventrotibial sparsely branched, others moderately branched. Palpal tarsala about 12 μm; branched tarsal setae long and slender with long branches. Tibial claws trifurcate, axial prong largest. Galealae with few barbs. Scu-
Fig. 13. *Odontacarus vergrandi*, new species. A, scutum; B, palpus and cheliceral blade, ventral aspect; C, palpal tibia and dtarsus, dorsal aspect; D, anterosubmedian dorsal seta—left, dorsal aspect, right, ventral aspect; E, anterolateral dorsal seta; F, anterosubmedian ventral seta; G, coxae and leg segments showing specialized setae.

Nasus 12 x 21. Legs: Coxa I sparsely punctate, punctae coarse; coxae II and III moderately punctate, punctae fine. Leg segments sparsely punctate. Distance between coxa I setae 45-47. Parasubterminalia I lacking. Femur I, II, and III, genu II, and tibia III each with 1 or 2 long, plumose setae. Mastitarsala III minutely barbed. Branched setae per leg segment for legs I, II, and III: coxa 2,1,1; trochanter 1,1,1; femur 6,5, 4; genu 4,4,4; tibia 9,7,7; tarsus 30,20,16-17. Leg index 1060.

Distribution: Venezuela, Mérida and Trujillo states.

Specimens Examined: Type specimens.

Remarks: Named for Dr. P. H. Verhammen-Grandjean, G. W. Hooper Foundation, University of California Medical Center, San Francisco.

Subgenus Tarsalacarus Verhammen-Grandjean

Odontacarus (Tarsalacarus) Verhammen-Grandjean, 1968:121 [Type species: Acomatacarus bakeri (Hoffmann), original designation].

Diagnosis: Larvae with tarsala III; cheliceral blades with ventral row of teeth only.

Redescription: Larvae possessing cheliceral blades with ventral row of teeth only. Palptibial claws quadrifurcate on neotropical species. Palpal formula B/B/BBB. Tarsala III present, mastitarsala III lacking. Coxa III with blunt projection on anteromedian margin.

Odontacarus (Tarsalacarus) bakeri (Hoffmann)

(Fig. 14)


Odontacarus bakeri, Brennan 1959:1; Brennan and Dalmat 1960:184; Wharton and Fuller 1952:97.

Diagnosis: Differs from other members of the genus by the subquadrate scutal shape, long-branched scutal and idiosomal setae, densely branched galcal setae, and tarsala III

Redescription (Based on a specimen determined by Hoffmann, see remarks below. Data from original description parenthetically included). Idiosoma: Broad ovoid; length and width (engorged) 911 and 625 (type series: 426-790 and 220-373, Hoffmann, 1951). Eyes 2/2; anterior 16, posterior 12 μm in diameter. Setal bases apunctate. Dorsal setae 42-65 μm (variable), arranged approximately 2-10-11-12-2-15-12-8+24. Venter with two sternals, 34 preanalns, and about 70 postanalns. Amus at about fifth row of ventrala. Spiracles prominent, adjacent to anterodistal margin of coxa I. Tracheae obvious to posterior margin of idiosoma, not densely convoluted as original figures indicate. Gnathosoma: Cheliceral bases moderately punctate; blades about 45 μm long, with 1 apical dorsal tooth and 4 or 5 small ventral teeth. Palpal formula B/B/B, all setae moderately to densely branched. Palptibial claws quadrifurcate; branched palpotarsal setae long, heavily branched. Tarsala 8 μm. Galealae densely branched. Scutum: Shaped as figured, sparsely punctate, punctae indistinct. Posterior margin broadly rounded, anterior margin mildly sinuate; PL's on lateral extension of scutum. Scutal setae similar to dorsals. Sensilla minutely barbed along basal fourth; bases slightly posterior to PL's. Measurements: AW=80, PW=93, SB=28, ASB=39, PSB=26, AP=32, AM=11, AL=48, PL=77, S=80. Nasus 7 x 16. Legs: Coxae moderately punctate. Distance between coxae I setae 47 μm. Parasubterminala I absent. Specialized setae as figured. Mastitarsa III absent. Branched setae per leg segment: coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,6,6; tarsus 28,16,15. Leg index 1060.

Distribution: Distrito Federal, México, and Jalapa, Guatemala.

Specimens Examined: 1 larva, ex Peromyscus truei gratus, Distrito Federal, México, Mar 1951; 4, ex Reithrodontomys sp., and 5, ex Peromyscus guatemalensis, Jalapa, Guatemala, Mar 1952.


Remarks: The type material was unavailable at the time of writing, hence the redescription is based on a specimen identified by Dr. Hoffmann as O. bakeri. Considerable variation is apparent in the specimens examined. Length of setae varied from 35-52 in one specimen to 42-65 in another, and the number of dorsal setae in the series RML#31460 varied from 60± to 90± total.

Contradictions between these findings and the original description include the number of branched tibial and tarsal setae (8,6,6 and 25, 14,16, respectively, in original description) and minute barbs on the sensilla which were described as nude.
Fig. 14. Odontacarus (Tarsalacarus) bakeri. A, scutum; B, anterosubmedian ventral seta; C, anterolateral dorsal seta; D, coxae and leg segments showing specialized setae.

Odontacarus (Tarsalacarus) chiapanensis
(Hoffmann)
(Fig. 15)

Acomatacarus chiapanensis Hoffmann, 1948:179
[Holotype, larva; ex undetermined rodent, “Tepeizcuintle,” Chiapas, México; Hoffmann collection, Ciudad, México]; Greenberg, 1952: 482.


Diagnosis: Separated from O. bakeri by fewer dorsal setae and the sparsely branched palpal setae.

Description (based on Panama specimens [see remarks]): Idiosoma: Ovoid; Length and width, 245-535 and 192-324 (Type material 519-618 and 330-357, Hoffmann, 1948). Eyes 2/2 in plates; anterior 12, posterior 9 μm in diameter. Setal bases normal. Dorsal setae 34-50 μm, longer laterally and posteriorly; arranged approximately: 2 humerals (60 μm)-8-4-6-6-6-2 plus
5 lateral setae not continuous with dorsal rows (original description [6,4,2]-6-10-8-6-6). Venter with 2 sternals, 28 slender pre-anals (26-34 \( \mu m \)) and 22 postanals similar to dorsals. Anus at fourth row of ventral setae. \textit{Gnathosoma}: Cheliceral bases moderately punctate posteriorly; blades 43 \( \mu m \) long with a single apical dorsal tooth and a row of 5 or 6 ventral teeth. Palpal formula B/B/BBB; genital setae moderately branched, laterotibial nude or with few branches, others sparsely branched. Palpal tarsala 7 \( \mu m \) long; branched tarsal setae sparsely branched.

Distance between coxa I setae, 38 μm. Parasubterminala I lacking (see remarks). Specialized setae as figured. Mastisetae lacking. Branched setae per leg segment for legs I, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 9,6,6; tarsus 25,16,15. Leg index 810.

**Distribution:** Chiapas and Yucatán Peninsula, México; Bocas del Toro, Panamá.

**Material Examined:** 8 larvae, ex *Proechimys semispinosus*, Bocas del Toro, Panamá, Jan and Apr 1960.

**Other Material:** Holotype and paratypes, ex unidentified rodent, “Tepczcininte,” Chiapas, México (Hoffmann, 1948:182). Also reported off *Ototylomys phyllostis* and *Peromyscus yucatanicus*, Yucatán Peninsula, México (Loomis, 1969: 5), and *Proechimys semispinosus*, Bocas del Toro, Panamá (Brennan and Yunker, 1966:224).

**Remarks:** Type specimens were unavailable at the time of writing; however, the presence of a quadrifurcate palpal claw had been observed earlier by Brennan (unpublished notes) while examining a paratype. Other differences from the original description include the branched galeal and palpal laterotibial setae noted by Greenberg (1952:482). The “single branched parasubterminala” on leg I as noted by Greenberg was found to be 1- or 2-branched and therefore is not considered here as a parasubterminala in the strict sense.

**Genus Sasacarus** Brennan and Jones

*Sasacarus* Brennan and Jones, 1959:8 [Type species: *Chatia furmani* Hoffmann, 1954, original designation]; Vercammen-Grandjean, et al., 1973:64.

**Diagnosis:** Larvae possessing spiracles and tracheae, 2 sternal setae, anterolateral projections of the scutum, and empodia on leg tarsi.

**Redescription:** Larvae parasitic on small rodents. Cheliceral blades with tricusp cap only. Palpotibial claw with one large prong, several small outer prongs and dorsal and ventral rows of slender prongs. Palpotarsus 7B plus tarsala. Galealae branched. Spiracles and tracheae present. Scutum with anterolateral projections; posterolaterals far forward. Sensillae nude. Two genuale I, a genuale II and III. Coxae I bisetose, coxae II and III unisetose. Matisetae absent. Femora I, II, and III with 6, 7, and 5 branched setae, respectively. Onychotriches present.

**Key to Subspecies**

1. Scutal setae very stout, PL's about 60 μm .................................................. *S. furmani panamensis*
2. Scutal setae not obviously stout, PL's about 45 μm ........................................ *S. furmani furmani*

**Remarks:** *Sasacarus* closely resembles the genus *Chatia*, subgenus *Shunsemmia* Jameson and Toshioka, in the number of branched setae on the femora of the males, the form of the palpal setae (femoral and genual setae plumose) and the genual configuration 2+, 1+, 1 for legs I, II, and III. Vercammen-Grandjean, et al., group *Sasacarus* with the genus *Chatia* on the basis of the branched femoral setae and consider it a valid generic entity. Addition of *S. f. panamensis* n. ssp. supports the generic status.

*Sasacarus furmani furmani* (Hoffmann)

*Chatia furmani* Hoffmann, 1954:17 [Holotype, larva; ex *Batomys musculus musculus*, Oaxaca, México; Rocky Mountain Laboratory, Hamilton, Montana].

*Sasacarus furmani*, Brennan and Jones, 1959:8; Brennan and Yunker, 1966:224.

**Diagnosis:** Differs from the Panama subspecies by the shorter more slender dorsal setae and branched setae on legs.

**Redescription:** *Idiosoma*: Ovoid. Length and width of holotype 568 and 408 (idiosoma ruptured, measurements approximate). Eyes single, 14 μm in diameter. Dorsal setae 35-54 μm, longer anterolaterally, sparsely barbed ventrally and densely barbed dorsally; arranged in uneven rows approximately: 11-9-12-2 (lateral) -10-2 (lateral) -10 plus 24 posteriorly. Two sternals and 56 ventral, 25-38 μm, longest laterally, in uneven rows; anterior setae shorter and somewhat more slender than posterior setae. Anus between fourth and fifth rows of ventral setae. Spiracles large, adjacent to anterior margin of coxa I. Tracheae traceable to posterior third of idiosoma. *Gnathosoma*: Cheliceral bases apparently apunctate; blades 39 μm long with tricuspid cap only. Palpal formula B/B BBB, moderately to densely branched. Tarsi 7B plus tarsala, setae long, moderately branched. Tibial claws forming a cupped shape, with 1 large prong, 7 or 8 smaller prongs outer and dorsally, becoming more slender proximally, plus row of 6 slender prongs ventrally. Galealae moderately branched with long slender branches. *Scutum:
Shaped as originally figured by Hoffmann; sparsely punctate. PL's far anterior, AL's on anterolateral extractions of scutum. Anterior margin sinuate, posterior margin broadly rounded. Setae similar to dorsals, densely branched. Sessillae nude. Measurements of holotype: AW-82, PW-84, SB-41, ASB-36, PSB-21, AP-15, AMB-9, AM-27, AL-34, PL-44, S-60. Legs: Coxae and leg segments with few punctae. Distance between coxa I setae 44 μm. Specialized setae as figured for Sasacarus furmani panamensis n. ssp.; sub- and parasubterminala lacking. Branched setae moderately plumose, with stiff branches. Apical setae with fewer branches. Tarsal claws with a pair of onychotriches, empodia apparently nude. Branched setae per segment for legs I, II, and III: Coxa 2,1,1; trochanter 1,1,1; femur 6,7,5; genu 4,4,4; tibia 8,6,6; tarsus 28,17,15. Leg index 846.

Distribution: Oaxaca, México.

Material Examined: Holotype only.

Other Records: One paratype, ex Baiomys musculus musculus, Oaxaco, México. Panama records (Brennan and Yunker, 1966) are S. furmanı panamensis n. ssp.

Sasacarus furmani panamensis n. ssp. (Fig. 16)

Type data: Holotype, RML#44965, ex Proechimys semispinosus, France Field, Panama Canal Zone, 8 Sep 1961; Paratypes: 2, RML#40125, ex P. semispinosus, Pina, Panama Canal Zone, 13 Dec 1960; 2 RML#44105, ex P. semispinosus, France Field, Panama Canal Zone, 16 Nov 1961; 1, RML#35276, ex P. semispinosus panamensis, Panamá 7 Jan 1954; 1, RML#44401, ex P. Tylo-

Fig. 16. Sasacarus furmani panamensis. A, scutum; B, palpus and cheliceral blade, dorsal aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, coxae and leg segments showing specialized setae.


**Wagenaaria similis** Brennan

(Fig. 17)


**Genus Wagenaaria** Brennan


**Diagnosis:** Larvae lacking spiracles, tracheae, eyes, and nasus. Scutum with submarginal anterolateral setae; venter with 2 sternal setae. Parasitic on bats.

**Redescription:** Parasitic on bats. Palpal tarsus 7B plus tarsala. Palpotibial claws with several slender prongs. Cheliceral blades with small tricuspid cap. Scutum with a pair each of anterolateral, anterolateral, and posterolateral setae. Sensillae flagelliform, bases far posterad of posterolateral scutal setae. Coxa I bisetose, coxae II and III unisetose. Tarsal claws with long onychotriches, empodia nude.

**Wagenaaria similis** Brennan

(Fig. 17)


**Material Examined:** Type material.

**Other Records:** Piña, Gamboa Road, Fort Gulick, and France Field, Bocas del Toro province, Panamá. Hosts: *Didelphis marsupialis*, *Heteromyis desmarestianus*, and *Proechimys semispinosus*, Nov to Apr 1954-1962 (Brennan and Yunker, 1966:224).
**Diagnosis:** Larvae lacking spiracles, tracheae, eyes, and nasus. Scutum with submarginal anterolateral setae; venter with 2 sternal setae. Parasitic on bats.

**Redescription:** *Idiosoma*: Long ovoid. Length and width of holotype 450 and 305. Eyes lacking. About 200 dorsal setae in uneven rows, 30-52 \( \mu \)m long, longest anterolaterally. Two sternals plus about 140 ventrals, 24-32 \( \mu \)m long; pre-anals similar to postanals. Anus located at anterior third of ventral setae. All setae slender, moderately barbed. Spiracles and tracheae lacking. *Gnathosoma*: Chericeral bases moderately punctate, blades 37 \( \mu \)m long, with small bicuspid cap. Palpal formula B/B/BBB, all setae stout, with long setules (ca. 10 \( \mu \)m). Tarsae 5-8 \( \mu \)m. Tarsus 7B, branched setae sparsely branched. Tibial claws with ventral row of prongs and a few large apical prongs forming a cupped shape. Galealae sparsely barbed. *Scutum*: Shaped as originally figured: Moderately punctate; anterolateral angles acute; posterior margin broadly rounded, with mild indentation medially. Nasus lacking. Scutal setae similar to dorsals. Sensillae nude; bases posterior to PLs. Measurements of holotype: AW-57, PW-69, SB-31, ASB-38, PSB-11, AMB-9, AM-53, AL-39, PL-40, S-85. Legs: Coxae moderately to densely punctate, other leg segments sparsely punctate. Specialized leg setae as originally figured, but with microtarsala II lateral of Tarsala II. Tibiala formula 2+2,1. Microgenualae and microtibialae 6-7 \( \mu \)m long. Branched setae per leg segment for legs I, II, and III. Coxa 2,1,1; trochanter 1,1,1; femur 6,7,5; genu 4,4,4; tibia 8, 6,6; tarsus 29,17,17. Branched setae stout, sparsely to moderately branched. Onychotriches long, empodium nude. Leg index 592.

**Distribution:** México, Curacao, Venezuela.

**Specimens Examined:** Holotype and 4 para- types, ex *Mormoops megalophylla*, Hato, Curacao, Sep, Oct, and Nov 1948; 1, ex *Pterontotus davyi*, Yaracuy, Venezuela, 20 km NW San Felipe (Minas de Aroa), 395 m, 12 Dec 1967, Dec 1947; and 1, ex P. parrilli, Sucre, Vene-

zuela, 12 km NE Gúira (Ensenada Guaranta), 90 m, 17 Jun 1967, Jun and Dec 1967.

**Other Records:** Reported off *Mormops megalo phylla* (paratypes), Hato, Curacao (Brennan, 1967:148), and *Pterontotus davyi*. Yucatan Peninsula, México (Loomin, 1969:5).

**Remarks:** The Venezuela specimens agree closely with the holotype as did the Mexico specimens (according to Loomis, 1969). The palpal claw is reillustrated to indicate differences from the original illustration. In addition, the microtarsala I is correctly placed lateral of tarsala I.

**Veremmen-Grandjean, et al. (1973)** place Wagenaaria as a subgenus of Chatia Brennan, 1946, on the basis of the number of branched setae on the femora of the legs (6, 7, 5 for legs I, II, and III).

**Genus Whartonia Ewing**


**Diagnosis:** Larvae with spiracles and tracheae. Cheliceral blades with a row each of large dorsal and ventral teeth. Scutum lacking nasus.

**Redescription:** Larvae parasitic on bats and occasionally rodents. Cheliceral blades 50-110 \( \mu \)m long, with dorsal and ventral rows of teeth. Palpotibial claws with three to several prongs. Palpal formula variable, B/B/BBB; palpal tarsi 7B plus tarsala. Galealae branched. Tracheae and spiracles present. Scutum subrectangular, often much broader than deep. Sensillae flagelliform; nude or sparsely barbed. Genualae and tibialae variable. Tarsala III present or absent; coxa I bisetose; coxa II unisetose. Masticetae absent. Idiosomal setae with short, barblike setules, sparsely to moderately branched.

**Key to Subgenera and Species**

1. Coxa III bisetose, parasubterminala on leg I absent, tarsala III present (subgenus *Whartonia*) .......................................................... 2
   Coxa III unisetose, parasubterminala on leg I present, tarsala III lacking, (subgenus *Asolentria*) .......................................................... 4

2(1). Three genualae I, anterolateral angles of scutum acute *W. (W.) angulascuta* n. sp.
   Two genualae I, anterolateral angles of scutum not acute .......................... 3

3(2). Dorsal setae number about 30, with very appressed, short barbs, nearly nude .......................... *W. (W.) nudosetosa*
Dorsal setae number about 60, densely barbed; setules thornlike .... W. (W.) pachywhartoni

4(1). Palpotibial claw trifurcate, Palpal formula B/B/BNN, setules of scutal setae short and thornlike ................................................................. W. (A.) guerrerensis

Palpotibial claw pectinate, palpal formula B/B/BNB, setules of scutal setae about
8 \( \mu \)m long, slender ......................................................... W. (A.) womersleyi

Remarks: Although tracheae and spiracles are reportedly absent in the subgenera Whartonia and Asolentria (Vercammen-Grandjean, 1968:119), neotropical representatives of these taxa were found to possess both. The spiracles are small and located adjacent to the anterior margin of coxa I. Lack of scutal nasus is therefore not coincident with the absence of spiracles and tracheae in these subgenera.

Subgenus Whartonia Vercammen-Grandjean


Diagnosis: Larvae with bisetose coxa II, tarsal III, and lacking parasubterminala on leg I.

Description: Larvae large, broad ovoid to circular when engorged. Cheliceral blades about 100 \( \mu \)m long, with large dorsal and ventral teeth. Palpal formula B/B/BBB; galealae branched; palpotibial claws pentaforcurate to pectinate. Scutum much wider than deep; sensillae barbed or nude. Coxa III bisetose; tarsal III present; parasubterminala I lacking.

Whartonia (Whartonia) nudosetosa (Wharton)

Hennemaniana nudosetosa Wharton 1938:142
[Holotype, larva; ex Peropteryx canina canina (= P. macrotis) and Arthieus jamaicensis, Yucatán, México: Rocky Mountain Laboratory, Hamilton, Montana]; Hoffman 1944: 56; Vercammen-Grandjean 1968:126.


Diagnosis: W. nudosetosa separates from W. angulascuta n. sp. by the form and pattern of dorsal setae palpal formula B/B/BNN, and non-acute anterolateral angles of scutum.

Redescription: Idiosoma: Nearly circular; length and width of holotype 710 and 620. Eyes 2/2, plate lacking; anterior II, posterior 10 \( \mu \)m in diameter. Dorsal setae appearing almost nude, with minute nubbins. Dorsal setae 40-50 \( \mu \)m, longer anteriorly; 2 numerals (62 \( \mu \)m)-8-2 (lateral)-6-2 (lateral)-8-6-2. Ventral setae: 2 sternals with long setules (broken in most specimens); 30-34 slender pre- and para-anals 30-40 \( \mu \)m, with long slender setules or stubs of broken setules; and about 16 postanals similar to dorsals. Anus just posteral of third row of setae. Spiracles small, adjacent to anterior margin of coxa I (not visible in holotype). Tracheae visible in some specimens to posterior third of idiosoma. Gnathosoma: Cheliceral bases moderately punctate, punctae fine. Palpal formula B/B/BBB, femoral and genu setae slender, with a few branches; dorsoptibial much heavier with numerous, very small branches. Galealae sparingly branched. Palpotibial claw pentafurcate. Cheliceral blades about 87 \( \mu \)m (absent on holotype); teeth large and curved, numbering about 21 dorsally and 20 ventrally. Scutum: Shaped as figured by Brennan and Dalmat (1960:185, Fig. 3); much broader than deep, subquadrate, with sinuate posterior margins. Sensillae nude; posterior to PL's. Scutal setae similar to dorsals. Measurements of Holotype (measurements of Venezuela specimens in parentheses): AW-138 (130), PW-148 (140), SB-54 (50), ASB-41 (48), PSB-10 (8), AP-22 (22), AMB-13 (11), AM-59 (79), AL-58 (56), PL-67 (67), S- (−). Legs: Coxae lightly punctate. Distance between coxa I setae 40. Legs relatively long, not heavily sclerotized. Specialized setae as figured by Brennan and Dalmat (1969:185, Fig. 3). Gennula formula 2+1,1. Tibiala formula 2+2.1. Microsetae 3-11 \( \mu \)m long. Branched setae per leg segment, sequentially for legs 1, II, and III: Coxa 2,1,2; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 8,6,6; tarsus approximately 24,21,24 (33,29,27 on Venezuela specimen). Tarsal claws nude. Leg index 1075.

Distribution: México, West Indies, Trinidad, Colombia, Venezuela, and Guatemala.

Specimens Examined: Holotype and 2 paratypes, ex Arthieus jamaicensis and Peropteryx canina canina, [= Peropteryx macrotis], Yucatán, México, Aug 1936:1, Glossophaga soricina, Sinaloa, México, Jul 1964:1, Mimom cosumelae, Yucatán, México, Jul 1962; larvae off 89 Venezuela bats, as follows: 25, ex 6 Peropteryx kapperi; 3 ex 1 Noctilio lehali; 5, ex 1 Chrototephus auritus; 1 ex Glossophaga longirostris; 100,
ex 20 G. soricina; 28, ex 9 Lionycteris spurrelli; 9, ex 4 Anoura caudifer a; 2, ex 2 A. geoffroyi; 6, ex Anoura sp. A, 38, ex 11 Carollia brevicauda; 68, ex 23 C. perspicillata; 2, ex 2 Sturnira lilium; 2, ex 1 Vampyrops aurarius; 1 ex Chiroderma villosum; 1 ex Artibeus jamaicensis; 1, ex Amertrixa centuria; 7, ex 3 Desmodus rotundus. Collected throughout the year except Dec and Jan 1966-68, from TF Amazonas, Apure, Barinas, Bolivar, Carabobo, Distrito Federal, Falcón, Mérida, Miranda and Zulia.

Other Records: Recorded off: Carollia perspicillata azteca, Alta Vera Paz, Guatemala (Brennan and Damat, 1960:185); Leaf-nosed bat, Jamaica (Brennan, 1953:294); Carollia perspicillata, Quintana Roo, and Artibeus jamaicensis, Desmodus rotundus, Mimom cozzumae, and Glossophaga soricina; Yucatán, México (Loomis, 1969:6); Nycteris borealis and unidentified bats, Puebla, México, (Hoffman, 1948: 189); Desmodus rotundus, La Fontaine Cave, Trinidad. (Brennan and Jones, 1960:496); and C. perspicillata, Tamana Bat Cave, Trinidad (Brennan, 1967:153).

In addition, specimens from Dept. Meta, Colombia, off Molossus major, are on deposit in the Rocky Mountain Laboratory, Hamilton, Montana.

Remarks: The presence of 2 coxa III setae, which has not previously been reported, was observed on the holotype as well as on all other specimens studied. Specimens examined indicated a climatic increase in size of the South America specimens over the original specimens from Yucatán, México, to South America, and also showed an increase in the number of setae on the tarsi of the legs. Comparison of the leg index and number of branched setae on the tarsi of legs I, II, and III for specimens from Yucatán, Costa Rica, and Venezuela follows: Yucatán (holotype), leg index 1075, branched setae 24, 21, 24; Costa Rica, leg index 1250, branched setae 33, 27, 23-24; Venezuela, leg index 1390, branched setae 33, 29, 27. A specimen from Sinaloa, México, collected in 1960, had a leg index of 1080 and approximately 30, 22, 20 branched setae on legs I, II, and III, respectively. Although the type material seen is too poor to accurately count the branched setae of the legs, it is evident that the México material examined has fewer branched tarsal setae than the specimens from Costa Rica and Venezuela. This variation may be contributed to the increase in size as referred to by Vercammen-Grandjean, et al. (1973:54), “Gigantism often favors an increase in the number of barbed setae, predominantly on tarsus and tibia.”

Whartonia (Whartonia) pachywhartoni Vercammen-Grandjean


Diagnosis (based on original description): W. pachywhartoni differs from other neotropical Whartonia species by the densely barbed dorsal setae and the six-pronged palpitozial claws.

Distribution: Brazil: Lagoa Ltd.

Specimens Examined: None.

Records: Holotype and 5 specimens only; ex Micronycteris megalotis, Lagoa Ltd., Brazil, 10 Apr 1962, M. G. Sceva, collector.

Remarks: Specimens of this species could not be located. Apparently the author’s shipment of type material to the United States National Museum coincided with the transfer of the U. S. N. M. chigger collection to the Rocky Mountain Laboratory and was misplaced.

Whartonia (Whartonia) angulascula n. sp.

(Fig. 18)


Diagnosis: W. (W.) angulascula n. sp. differs from other Neotropical species by acute anterolateral scutal angles and by numerous genualae on leg III.

Description: Idiosoma: Broadly ovoid, length and width of holotype 736 and 435. Eves 2/2: anterior 20, posterior 17 μm in diameter; plates lacking. Dorsal setae moderately barbed, se-
Fig. 18. *Whartonia angulascuta*, new species. A, scutum; B, palpus, dorsal aspect, and cheliceral blade—left, dorsal aspect, right, ventral aspect; C, palpal tibia and tarsus, ventral aspect; D, anterosubmedian dorsal seta; E, anterosubmedian ventral seta; F, leg segments showing specialized setae.
tules very short and appressed, appearing as rubbins; humerals 66 μm, others 58-78; arranged approximately 2-11-2-9-2-9-9-6-2 (variable).

Ventral setae: 2 sternals; about 40 slender preanal and para-anal setae with longer setules 37-60 μm, para-anals longest; plus about 32 postanalals similar to dorsal. Arms located at fourth row of ventral setae. Spiracles small; tracheae apparent in less engorged specimens. **Gnathosoma:** Cheliceral bases moderately punctate; palpal formula B/B/BBB, setae long, with few long setules; palpotarsus 7B plus tarsala; galealeae sparsely branched; palpotibal claws apparently pentafurcate; cheliceral blades 111 μm long, with about 8 dorsal and 15 ventral teeth. **Scutum:** Shaped as figured; anterolateral angles acute; sensillae nude; bases posterior to PL's. Other scutal setae similar to dorsals, with longer setules. Measurements of holotype: AW-170, PW-146, SB-58, ASB-59, PSB-11, AP-29, AMB-12, AM-67, AL-55+, PL-95, S-131. Legs: Long and slender, with little intermedillary space. Specialized setae as figured; parasubterminala absent. Branched setae per leg segment, sequentially for legs I, II, and III: Coxa 2, 1, 2; trochanter 1,1,1; femur 6,6,4; genu 4,4,4; tibia 8,6,6; tarsus about 50-60,56,45. Number of tibialae and genualae variable among specimens.

**Distribution:** Venezuela: Monagas and Falcon states.

**Specimens Examined:** Type specimens.

**Remarks:** The genualae varied from 3 to 4 on leg II and from 7 to 11 on leg III. The distal tibiala III and was absent from both legs of 1 specimen, and from 1 leg of 2 specimens. No differences in the number of branched setae were noted on segments where variations in specialized were found. The heavy sclerotization of the legs is similar to that described for **W. pachycharitoni**. The name refers to the acute anterolateral scutal angles.

**Subgenus Asolentria** Vercammen-Grandjean


**Diagnosis:** Larvae separate from the nominate subgenus by unisette coxa III, parasubterminala on leg I, and absence of tarsala III.

**Redescription:** Larvae large, parasitic on bats. Idiosoma semicircular when engorged. Cheliceral blades about 50 μm long, with dorsal and ventral teeth, and dorsal, subapical hook. Palpal claws trifurcate to pentafurcate. Palpal formula variable. Galealeae branched. Scutum deep, subrectangular; sensillae flagelliform. Tracheae and spiracles present, minute. Coxa III unisetose; subterminala and parasubterminala present on leg I. Tarsala III lacking.

**Whartonia (Asolentria) guerrerensis** Hoffman


**Whartonia trinidadensis** Brennan and Jones, 1960:496 [Type species: **Whartonia trinidadensis**, ex **Mormoops megalophylla**, Tamana Cave, Trinidad; Rocky Mountain Laboratory, Hamilton, Montana].

**Whartonia (Asolentria) trinidadensis** Vercammen-Grandjean 1968:126.

**Diagnosis:** W. guerrerensis differs from **W. (A.). womersleyi** by the trifurcate palpotalial claw and short thornlike barbs on scutal setae.

**Redescription** (Based on Venezuela specimens. See remarks below): **Idiosoma:** Nearly circular when engorged, length and width of one engorged specimen: 550 and 475. Eyes 2/2 in indistinct plates; anterior 10, posterior 6 μm in diameter. Humerals 54 μm; dorsal setae 44-55 μm longer laterally and posteriorly, sparsely branched, with short thornlike setules. Dorsal formula approximately 2 (humerals) -8-10-4 (lateral) -11-4 (lateral) -13-2-10-6-2-2. Ventral setae: 2 sternals; 30 pre-anals in uneven rows (37-43 μm), the first 3 rows with longer setules; and 28 postanals, similar to dorsals. Spiracles minute, visible in most specimens only as small portion of trachea adjacent to or under anteromedian margin of coxa I. Tracheae traceable for only few micrometers. **Gnathosoma:** Cheliceral bases prominent, about 58 μm long with about 13 large ventral teeth, 8 small dorsal teeth and 1 large dorsolateral subapical tooth. Palpal formula B/B/BBN; femoral and genu setae with 1 or 2 barbs; genu very long and slender; dorso-tibial thicker and densely branched with short fine branches. Palpotarsus 7B plus tarsala; setae sparsely barbed, ventral setae usually appearing nude. Galealeae with a few inconspicuous barbs. **Scutum:** Shape conforms to original illustration. Subrectangular, anterior and posterior margins slightly sinuate; punctae light and sparse. Scutal setae similar to but stouter than dorsals; sensillae with 1 or 2 barbs. Measurements of Venezuela specimen (measure-
ments of holotype in parentheses, according to Hoffman, 1960): AS-81 (78), PW-84 (81), SB-26 (28), ASB-25 (26), PSB-17 (15), AP-30 (28), AM-19 (40), AMB-8 (—), AL-38 (36), PL-53 (46), S-76+ (más de 60). Legs: Coxae moderately punctate; all other segments lightly punctate. Specialized setae as originally figured. Genua formula 2+1+1; tibia formula 2+,2,1. Branched setae sparsely branched; number per segment listed sequentially for Legs I, II, and III: Cox 2,1,1; trochanter 1,1,1; femur 6,5,4; genu 4,4,4; tibia 5,6,6; tarsus 20,17,15. Leg index 874. Tarsal claws with a pair of onycho-
chronites, apparently easily broken. Empodium nude.

Distribution: Bahamas, Curaçao, Colombia, México, and Venezuela.

Specimens Examined: Eleven larvae from Venezuela; 2 ex Mormoops megalaphylla, Sucre, 9 km NE Guíria (Ensenada Cuaranta), 1 m, 5 Jun 1967; 9 ex 3 M. megalaphylla, 10 km NE Guíria (Río Salado), 90 m, 7 Jun 1967.

Other Records: Holotype and a paratype, ex Mormoops megalaphylla, Guerrero, México (Hoffman, 1960:7). Also reported off: Mormoops megalaphylla, Tamana Cave, Trinidad (Brennan and Jones 1960:496); M. megalaphylla, Hato, Curaçao and Cueva de Quadirikiri, Aruba; Erophylla sezekorni, New Province Bahamans; and Peroptycrx macrots, Isla Margarita, Venezuela (Brennan, 1967:153). In addition, the Rocky Mountain Laboratory collection includes specimens off Mormoops megalaphylla, Apr 1967, Macarequa, Colombia.

Remarks: Type material for W. guerrerensis was not obtainable at the time of writing. The description of a Venezuela specimen, therefore, was used primarily to enlarge upon the original description. Measurements of the Venezuela specimen are overall larger than those of the holotype. Brennan's description of the synonym, W. trinidadensis, also shows some increase in size over the scutal measurements listed by Hoffmann in the original description. A similar increase in size of Venezuela specimens in comparison with Mexico representatives was also noticed in W. nudoscutosa.

Whartonía (Asolentria) womersleyi
Brennan and Dalmat

Whartonía womersleyi Brennan and Dalmat, 1960:185 [Holotype, larva, ex Balantiopteryx io, Guatemala: Field Museum of Natural History].

Diagnosis: W. womersleyi differs from other neotropical Whartonía species by the pectinate palpal claws and single dorsal teeth on the cheliceral blades.

Redescription: (based on paratypes and original description): Idiosoma: Nearly circular. Length and width of one paratype, 924 and 721. Eyes 2/2. Body setae moderately branched, setules barblike. DF approximately: 2 humerals (70 μm) 6-10-2 (lateral) 8-12+24, (62-69 μm). Two sternals, plus about 48 ventral setae; preanal and postanal similar to dorsals (49-66 μm). Spiracles visible only as opening to tracheae, adjacent to anterior margin of coxa I. Tracheae visible only near coxa I. Giiiria: Cheliceral blades 50 μm, as shown in original description with large dorsal tooth, several small anteroventral teeth, and large ventral teeth posteriorly. Galealae apparently branched. Palpal formula B/B/??? (B/B/BNB, Brennan and Dalmat, 1960); palpatarsis 7B plus tarsala. Scutum: Not completely visible on 2 paratypes observed. Shape conforms to original illustrations, nearly quadrate, deep, sparsely punctate, posterior margin broadly rounded. Sensillae branched with very long slender branches. Scutal setae similar to dorsals, with longer setules. Measurements of one paratype with measurements of holotype in parentheses (from Brennan and Dalmat, 1960). AW-81 (83), PW-87 (88), SB-28 (30), ASB-40 (40), PSB-16 (22), A)-32 (33), AMB-10 (—), AM-77 (72), AL-56 (61), PL-57 (61), S-about 81. Legs: Specialized setae as originally figured; sclerotization not obvious. Genua formula 2,1,1; tibia formula 2+,2,1. Parasubterminala I present and may have a few bars; branched setae not plumose, moderately branched, with long, stiff setules; branched setae per segment, listed sequentially for legs I, II, and III: Cox 2,1,1; trochanter 1,1,1; femur 6,5,4; tibia 2,6,6; tarsus 20,15,14. Tarsal claws paired with onychochronites apparent on some claws; empodium nude. Leg index 1113 (paratype).

Distribution: Guatemala and British Honduras.


Remarks: The 2 paratypes studied were in poor condition, making accurate scutal measurements and setal counts difficult. Differences from the original description noted in the para-
types were the presence of onychotriches, slightly different counts of the branched setae on tarsi of the legs, and branched sensillae. The only specimen from British Honduras possessing cheliceral blades showed 8 small dorsal teeth on one blade and 5 on the other in addition to the large subapical tooth.

HOST-PARASITE LIST

Class Reptilia

Order Squamata
Tropidurus peruvianus
Odontacarus australis
Unidentified lizard
Odontacarus australis

Class Aves

Order Galliformes
Odontaphoitus erythropus
Odontacarus tubercularis

Order Cuculiformes
Neomorphis geoffroyi salvini
Odontacarus tubercularis
Unidentified bird
Odontacarus comosus comosus
Odontacarus mastigophorus

Class Mammalia

Order Marsupiala
Monodelphis brevicaudata
Odontacarus tubercularis
Marmosa fuscata
Odontacarus comosus novemsetus
O. sunnianae
O. tubercularis
Marmosa dryas
Odontacarus comosus comosus
O. canderhameni
Marmosa robisoni
Odontacarus tubercularis
Marmosa sp. A
Odontacarus tubercularis
Philander opossum
Odontacarus tubercularis
Didelphis marsupialis
Odontacarus sunnianae
O. tubercularis
Sasacarus furmani panamensis
Didelphis opossum [=Philander opossum]
Leeuwenhoekia verdunii

Order Insectivora
Cryptotis thomasi
Odontacarus dienteslargus

Order Chiroptera
Saccopteryx bilineata
Odontacarus tubercularis
Peropteryx macrotis
Whartonia guerrerensis
Whartonia nudosetosa
Peropteryx kappleri
Whartonia nudosetosa
Balantiopteryx io
Whartonia womersleyi
Nectilingu flavida
Whartonia nudosetosa
Pteronotus dafini
Wagenaaria similis
Pteronotus parnellii

Wagenaaria similis
Mormoops megalophylla
Wagenaaria similis
Whartonia guerrerensis
Micronycteris megalotis
Whartonia pachywhartoni
Micronycteris microtus
Odontacarus tubercularis
Lonchorhina aurita
Odontacarus schoenesetosus
O. vergrandi
Mimon cozumelae
Whartonia nudosetosa
Phyllostomus hastatus
Odontacarus tubercularis
Ghrotopterus auritus
Whartonia angulascuta
Whartonia nudosetosa
Glossophaga longirostris
Whartonia nudosetosa
Glossophaga soricina
Whartonia nudosetosa
Linycteris spurrelli
Whartonia nudosetosa
Anoura caudifera
Whartonia nudosetosa
Anoura geoffroyi
Whartonia nudosetosa
Anoura sp. A
Whartonia nudosetosa
Carollia brevicauda
Odontacarus tubercularis
Whartonia angulascuta
W. nudosetosa
Carollia perspicillata
Whartonia angulascuta
W. nudosetosa
Carollia perspicillata azteca
Whartonia nudosetosa
Sturnia lilium
Whartonia nudosetosa
Vampprops aurarius
Whartonia nudosetosa
Vampprops helleri
Odontacarus tubercularis
Vamppressa pusilla
Odontacarus tubercularis
Chiroderma villosum
Whartonia nudosetosa
Artibeus jamaicensis
Odontacarus schoenesetosus
Whartonia nudosetosa
Ametriza centurio
Whartonia nudosetosa
Erophylla sezekorni
Whartonia guerrerensis
Desmodus rotundus
Whartonia nudosetosa
Dinizulla ecuandata
Whartonia angulascuta
Epitesicus montosus
Albeckia albecki  
Odontacarus tubercularis  
Lasiurus borealis  
Whartonia nudisetosa  
Histiotus sp. A  
Albeckia albecki  
Antrozous pallidus pacificus  
Albeckia albecki  
Molossus major  
Whartonia nudisetosa  
Order Lagomorpha  
Sylvilagus floridanus  
Odontacarus tubercularis  
Sylvilagus floridanus chiapensis  
Odontacarus mastigophorus  
Order Rodentia  
Sciurus granatensis  
Odontacarus sunnianae  
O. pugnator  
O. Schoenesetosus  
O. tuberculohirsutus  
O. vanderhammeni  
O. vergrani  
Thomosomys lugens  
Odontacarus schoenesetosus  
O. pugnator  
O. tiptoni  
O. tuberculatis  
Thomosomys vestitus  
Odontacarus schoenesetosus  
O. tiptoni  
Chilomys instans  
Odontacarus denteslaurus  
Tylomys watsoni  
Sasacarus furmani panamensis  
Ototoyomys phylloides  
Odontacarus chiapanensis  
O. tuberculatis  
Peromyscus truji gratus  
Odontacarus bakeri  
Peromyscus guatemalensis  
Odontacarus bakeri  
Peromyscus leucopus  
Odontacarus tuberculatis  
Peromyscus yucatanicus  
Odontacarus chiapanensis  
O. tuberculatis  
Reithrodonontomys sp.  
Odontacarus bakeri  
Baiomys musculus musculus  
Sasacarus furmani furmani  
Baiomys taylori  
Odontacarus bakeri  
Akodon bogotensis  
Odontacarus denteslaurus  
O. tuberculohirsutus  
Akodon urichi  
Odontacarus tuberculatis  
Zygodontomys brevicauda  
Odontacarus tuberculatis  
Chinchillula saliamae  
Odontacarus kofoardi  
Punomys lemminur  
Odontacarus kofoardi  
Neotomys ebrirosus  
Odontacarus kofoardi  
Sigmomys hispidus  
Odontacarus sunnianae  
O. tuberculatis  
Sigmomys astoni  
Odontacarus tuberculatis  
Unidentified Rodent  
Rattus norvegicus  
Odontacarus tuberculatis  
Rattus rattus  
Odontacarus tuberculatis  
Rattus sp.  
Odontacarus tuberculatis  
Unidentified Rodent, “Tepeizinte” (=Agouti paca?)  
Odontacarus chiapanensis  
Agouti paca  
Odontacarus tuberculatis  
Dasyprocta agouti  
Odontacarus tuberculatis  
Dasyprocta sp.  
Odontacarus tuberculatis
LITERATURE CITED


—. 1911. Acarologische Aanteekeningen XXXIII. Entomologische Berichten. 3:137-139.


