

Revision of the Genus *Pseudognaptodon* Fischer (Hymenoptera: Braconidae: Gnamptodontinae)

DARYL J. WILLIAMS

Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, 5320-122nd street, Edmonton, Alberta, Canada T6H 3S7; email: dawillia@nrca.gc.ca

Abstract.—The New World genus *Pseudognaptodon* has three previously described species, *P. curticauda* Fischer, *P. minutus* Ashmead, and *P. omissus* Fischer. *Pseudognaptodon attenuatus*, *P. brevis*, *P. conjunctus*, *P. carinatus*, *P. gibsoni*, *P. gouleti*, *P. hemicolor*, *P. labrus*, *P. langori*, *P. minimus*, *P. nitidus*, *P. ocellatus*, *P. shawi*, *P. striatus*, *P. whartoni*, *P. whitfieldi*, and *P. xanthus*, are described here as new. A key is given to the species of *Pseudognaptodon*. Problems in the phylogenetic relationship between *Gnamptodon* and *Pseudognaptodon* are discussed.

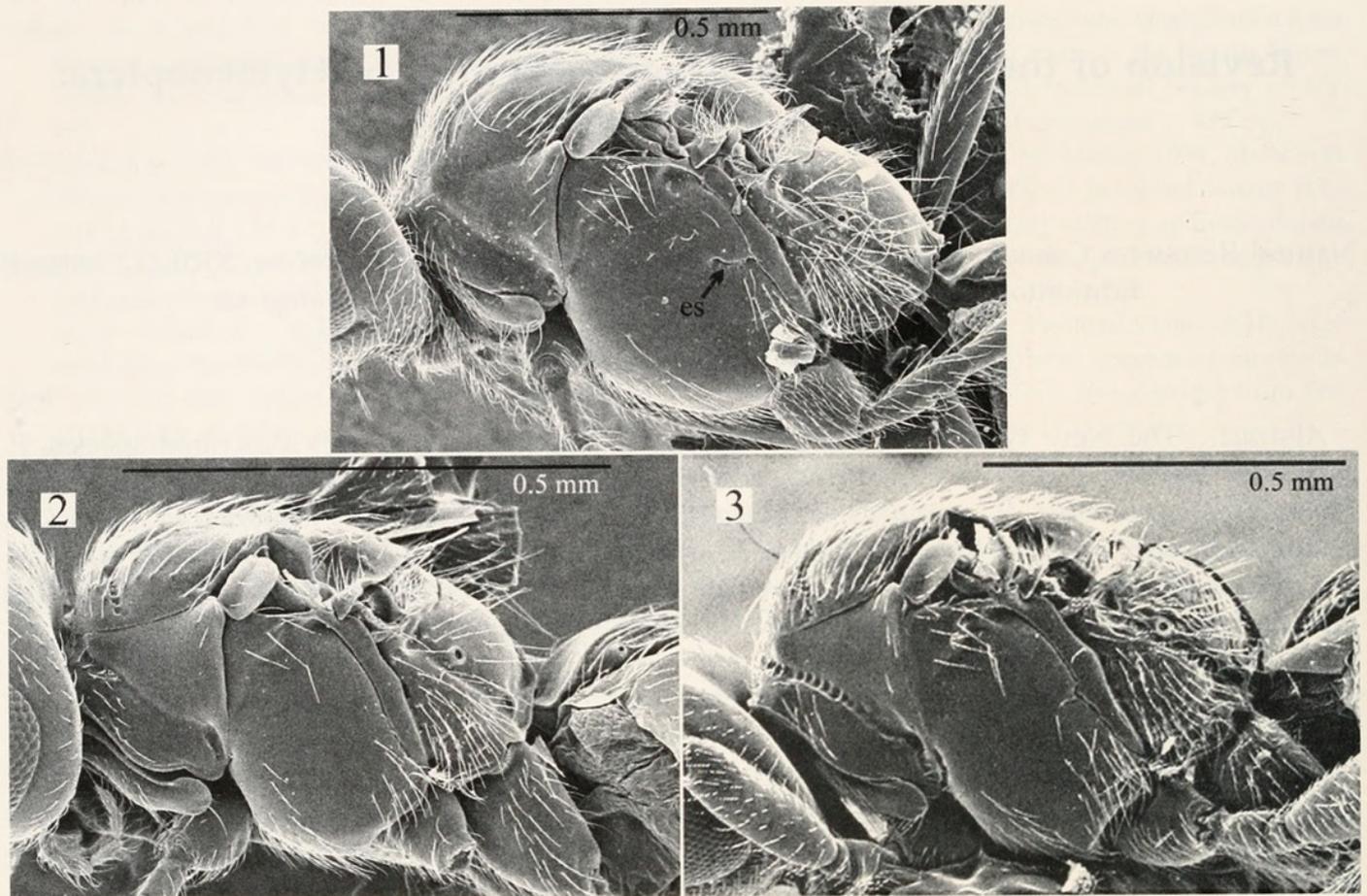
Fischer (1965) described the genus *Pseudognaptodon* (Braconidae: Gnamptodontinae) and included two new species, *P. omissus* and *P. curticauda*, each of which was described from only two specimens from the Nearctic. He subsequently (Fischer 1967) included *P. minutus* Ashmead, based on the study of 13 specimens. These three species are very similar to species of *Gnamptodon*, but differ by the absence of the forewing r-m vein. Fischer (1977) treated both *Gnamptodon* (as *Gnaptodon*) and *Pseudognaptodon* as genera of the Opiinae. They were subsequently transferred to the new subfamily Gnaptodontinae by van Achterberg (1983). Wharton (1997), and Whitfield and Wagner (1991), have published taxonomic works and keys to the gnamptodontine genera, including *Pseudognaptodon*, but no further species-level work has been done on the genus since the original descriptions from limited material. Since that time more material has accumulated through biodiversity studies in Central America (S.R. Shaw, R. Wharton, pers. comm.) and studies of the parasitoids of Nearctic leaf-mining Lepidoptera (Whitfield and Wagner 1991), representing new species and a much wider range of morphological variation than previously

documented. The purpose of this study is to describe these species and discuss characters that may be useful in phylogenetic analysis.

The species of *Pseudognaptodon* are here divided into two species groups, the *curticauda*-group and the *omissus*-group, which are united by wing venation but otherwise no more similar to one another than either is to *Gnamptodon* (Williams, unpublished data). A conservative approach is taken in light of the uncertainty of phylogenetic relationships within the Gnaptodontinae, so no new genus-group names are proposed here.

METHODS

Terms follow Wharton *et al* (1997), with some details clarified as follows: The basal raised area is the anterior portion of the second metasomal tergite (T2), which is separated from the posterior portion by a groove (the defining synapomorphy of the Gnaptodontinae) (Figs. 22, 32, 42). This portion is higher posteriorly than anteriorly in lateral view, and higher than the posterior portion of the tergite, even in species where the groove is somewhat effaced. The anterolateral grooves of the third metasomal tergite (T3) are those on



Figs. 1–3. *Pseudognaptodon* species, metasoma in lateral view. 1, *P. attenuatus*: es = epicnemial scrobe. 2, *P. minutus* (Ashmead). 3, *P. carinatus*.

either side of the anterior margin that join the suture between the second and third metasomal terga, and separate the anterolateral corners from the remainder (Figs. 22, 32, 42). The knob of the hind wing R vein refers to the remnant of the base of the RS vein, which may be absent, or visible as a variously developed convexity or bump (Figs. 7, 18).

Most measurements are taken as the greatest length of the body part measurable (e.g. femur length, clypeus height, etc.). Other measurements used in descriptions are:

Eye length: the greatest width of the eye in lateral view, along the line of greatest head width (Fig. 6).

Eye height: the greatest height of the eye in lateral view, measured perpendicular to the eye length (Fig. 6).

Gena width: the width of the gena measured on the same line as for eye length (Fig. 6).

Head height: the greatest distance between the vertex and ventral margin of the gena in lateral view (Fig. 6).

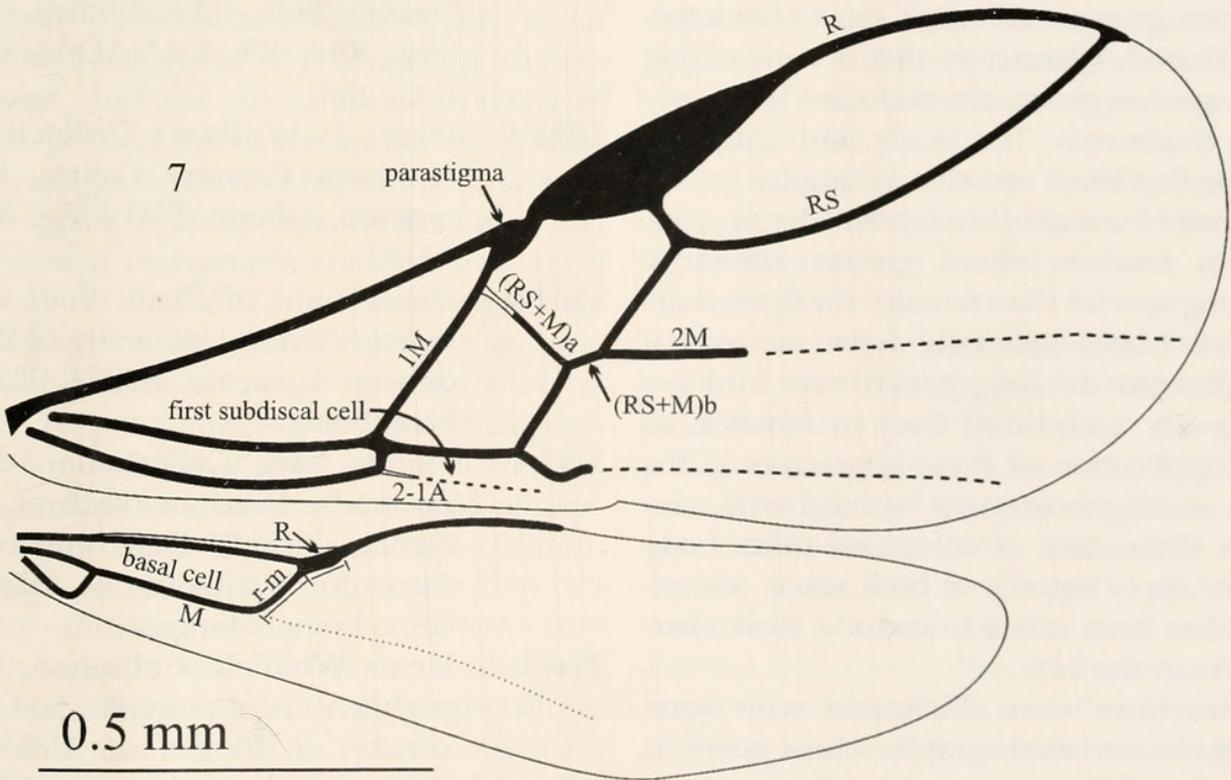
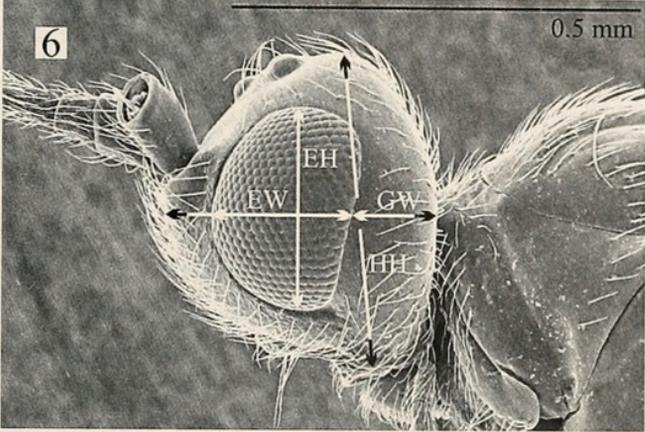
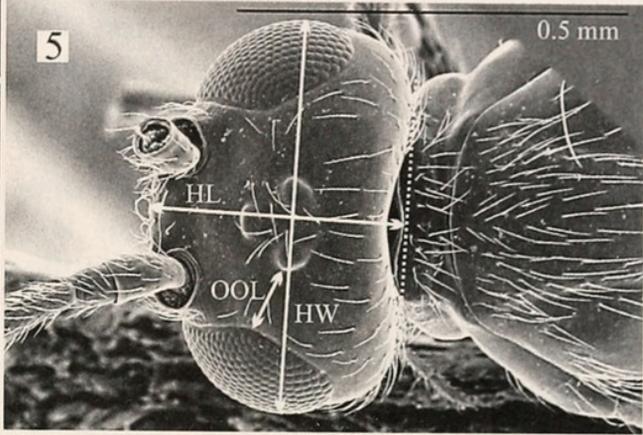
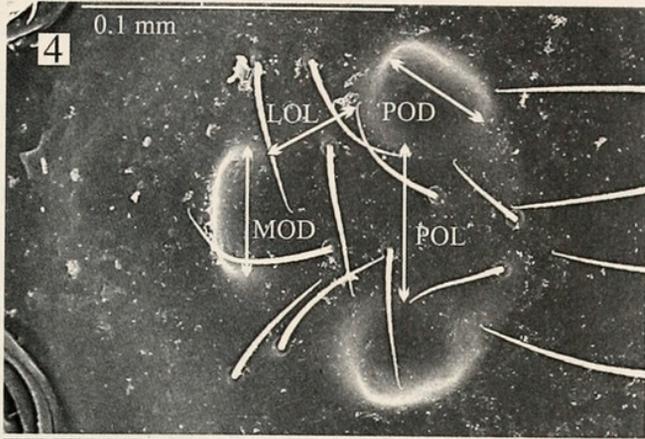
Head length: measured from the anterior-most projection of the middle of the face to a line intersecting the posteriormost curve of the occiput (Fig. 5). This method avoids error introduced by variation in occiput indentation.

Head width: the greatest distance across the head in dorsal view, including the eyes (Fig. 5).

Diameter of median ocellus (MOD): the greatest diameter of the median ocellus (Fig. 4).

Diameter of lateral (or posterior) ocellus (POD): the greatest diameter of the left ocellus, usually measured about 45 degrees from the long axis of the body (Fig. 4).

Lateral ocellar length (LOL): The least distance between the median ocellus and the left lateral ocellus (Fig. 4).



Figs. 4-7. *Pseudognaptodon attenuatus*. 4, Ocelli in dorsal view. LOL = lateral ocellar length, MOD = diameter of median ocellus, POD = diameter of lateral ocellus, POL = posterior ocellar length. 5, Head in dorsal view. HL = head length, HW = head width, OOL = ocello-ocular length. 6, Head in lateral view. EH = eye height, EW = eye width, GW = gena width, HH = head height. 7, Wings.

Ocello-ocular length (OOL): the shortest distance between the left lateral ocellus and the closest point on the dorsal eye margin (Fig. 5).

Posterior ocellar length (POL): the least distance between the lateral ocelli (Fig. 4).

Metasomal T1 length: the distance from the posteriormost point of the tergite to a line drawn through the narrowest point immediately posterior to its' attachment point to the propodeum (Fig. 10).

Metasomal T1 width: the greatest distance of it's posterior margin (Fig. 10).

Metasomal T2 and T3 length: measured on the midline (Fig. 22).

Wing vein lengths: vein junctions are gradual thickenings with curved margins. Lengths are measured at the midpoint of the curve between the veins (Fig. 7, R and r-m).

Descriptions are based on females, and are not identical in format between the species groups, although most characters are shared. Characters that are invariable in a species group are excluded from species treatments. The shape and sculpture of the first three metasomal tergites are diagnostic for most *Pseudognaptodon* species. Males tend to show greater similarity among species than females for these characters. Males generally have metasomal tergites that are longer, narrower, and less distinctly sculptured than in females, so the application of these characters in the key or diagnoses must be used with caution. Characters of color and other body parts apply equally to both sexes, and effort has been made to include these characters in the key.

Structures were illustrated with scanning electron micrographs where possible. Because of their minute size specimens are easily damaged by any attempt to manipulate them. So, specimens for S.E.M. were left on their points and unaltered, except for the removal of wings, which were mounted on a separate card and later repinned with the specimen. Points were

mounted directly to S.E.M. stubs, and gold-coated along with the specimens. Micrographs are somewhat variable in quality and position of illustrated structures because of this. For species described from few specimens it was not desirable to alter specimens by removal of appendages or gold coating. Photographs of holotypes of these species were taken with a stereomicroscope and digital camera. These photographs were of insufficient quality for publication, and so were rendered into line drawings by tracing.

Specimens were obtained from the following collections, with the name of the originator of the loan:

- BMNH The Natural History Museum, Cromwell Road, London, SW7 5BD, ENGLAND, Suzanne Lewis.
- CNCI The Canadian National Collection of Insects, ECORC, K.W. Neatbly Bldg.-CEF, Ottawa, Ontario, K1A 0C6, CANADA, Henri Goulet.
- DJMW Daryl J. Williams Collection, Northern Forestry Centre, Edmonton, Alberta, T6H 3S7, CANADA.
- ESUW Department of Plant, Soil, and Insect Science, University of Wyoming, Laramie, 82071, USA, Scott Shaw.
- FSCA Florida State Collection of Arthropods, Division of Plant Industry, Florida Department of Agriculture, Gainesville, 32602, USA, Lionel Stange.
- JWCI James Whitfield Collection, Department of Entomology, University of Illinois at Urbana-Champaign, Urbana, 61801, USA.
- RNHL Rijksmuseum von Natuurlijke Historie, Raamsteeg 2, Postbus 9517, 2300 RA Leiden, NETHERLANDS, Kees van Achterberg.

TAMU Department of Entomology, Texas A&M University, College Station, 77843-2475, USA, Robert Wharton.

USNM United States National Museum of Natural History, Smithsonian Institution, Washington, DC, 20560-0168, USA, David Smith.

Pseudognaptodon Fischer

Pseudognaptodon Fischer 1965:182. Fischer 1967: 973; Fischer 1977:983; Shenefelt 1975:133; Marsh 1979:175; van Achterberg 1983:26; Wharton 1997:258; Type species *Pseudognaptodon curticauda* Fischer by original designation.

Relationships.—Some questions exist about the validity of *Pseudognaptodon*, which is separated from *Gnamptodon* only by the loss of the forewing r-m vein. While this character has practical utility in identification its phylogenetic reliability has yet to be assessed. Both genera are speciose with substantial morphological variation that has yet to be phylogenetically analyzed, and the distribution of states of some of these characters in the two genera may suggest relationships among species and groups of species. Wharton (1997) suggested that generic concepts based primarily on the old world species do not account for undescribed variation in new world species, and may have to be revisited. He also suggested that *Pseudognaptodon* might prove to be one or more species groups of *Gnamptodon*. I tend to support that view. The *omissus*- and *curticauda*-groups each have characters that are more similar to species of *Gnamptodon* than to each other. An example of this is the state of the anterolateral grooves of the third metasomal tergite. These grooves are well defined and slightly to moderately crenulate in the *omissus*-group. A similar state is found in *Gnamptodon vlugi* van Achterberg from Europe (van Achterberg 1983, Fig. 72), and other undetermined North American *Gnamptodon* species I have examined (Wharton 1997, Fig. 3).

The grooves are absent or partially, faintly impressed and smooth in the *curticauda*-group. This state is found in most other *Gnamptodon* species (van Achterberg 1983, Fig. 63). Another example is the state of the epicnemial scrobe. It is present, and joined to the posterior margin of the mesopleuron by a cuticular fold in species of the *omissus*-group, and poorly developed or absent in species of the *curticauda*-group. I have examined specimens of *Gnamptodon* with either of these two states, and others with the epicnemial scrobe present as a depression of varying shape and depth (van Achterberg 1983). A comprehensive phylogenetic analysis of the subfamily is needed in order to discover monophyletic assemblages, identify synapomorphies, and elucidate phylogenetic relationships among species. For this reason I have made a conservative choice and retained *Pseudognaptodon* as a separate taxon. A phylogenetic analysis of *Pseudognaptodon* is not presented here since the genus may not be a monophyletic unit, and outgroup selection would be problematic at this level.

Diagnosis.—Species of *Pseudognaptodon* may be separated from other genera of Gnamptodontinae by the absence of the forewing vein r-m.

Description.—*Head*: Oval in anterior view; eyes slightly protuberant, with rounded but parallel inner margins, straight to slightly concave adjacent to antennal sockets but margins otherwise convex; face convex, wider than high, with curved setae, directed dorsally and dorsomedially; clypeus arcuate, with straight ventral and convex dorsal margin, surface convex dorsally, concave ventrally, with a ventral setose rim. *Mesosoma*: Length about 1.5× height, smooth; notauli deeply impressed anteriorly, increasingly obsolete posteriorly; mesonotum and metapleuron setose, mesosternum and propodeum with sparse, scattered setae. *Wings*: Forewing with 2 submarginal cells, r-m of forewing absent (Fig. 7); first abscissa of

M present as a short spur, shorter than 2RS; RS+Ma and RS+Mb less pigmented and thinner than other veins, base of RS+Ma obsolete in some species. Hind wing with RS and second of M present as folds, 2r-m present as fold or absent. Sub-basal cell less than 1/2× as long as basal cell, first of abscissa M nearly twice as long as M+Cu. *Metasoma*: T1 about as long as or slightly longer than apical width, constricted immediately posterior to junction with propodeum, convex medially in both lateral and posterior view, with sinuate carinae originating posterior to constriction, the carinae laterally produced on basal 1/3 of tergite and convergent on remainder. T2 with basal 0.2–0.4

raised, higher posteriorly than anteriorly, smooth, defined posteriorly by a crenulate, striate, or granulate groove; disc of T2 posterior to basal raised area granulate, granulostriate, or striate, rarely smooth. T3 separated from T2 by a well developed, smooth to crenulate, evenly curved or laterally decurved groove; T3 smooth to sculptured on basal 1/3 with similar sculpture to T2. Ovipositor barely exerted to nearly as long as hind basitarsus. *Legs*: Legs stout, hind femur length 3.0–5.0 greatest width. Femur, tibia, and tarsus about equally long.

Hosts.—One species reared from leaf-mining larvae of the family Nepticulidae (Lepidoptera).

KEY TO FEMALES OF SPECIES OF *PSEUDOGNAPTODON* FISCHER

1. Episternal scrobe present as a curved, distinct crease (Fig. 1). T3 of metasoma with anterolateral grooves complete, distinctly impressed, and partially to completely crenulate (complete but smooth in *P. attenuatus* new species) (Figs. 22, 42). Ovipositor distinctly exerted, setose portion of sheath 0.5–0.9× as long as hind basitarsus (Fig. 13). *omissus*-group 2
- Episternal scrobe absent (Fig. 2), or present as a shallow impression in *P. carinatus* new species (Fig. 3). T3 of metasoma usually without anterolateral grooves, rarely with faint grooves near lateral tergal margins or with anterolateral areas partially defined by microsculpture (Figs. 104, 207). Ovipositor barely exerted, setose portion of sheath less than 0.5× as long as hind basitarsus (Fig. 115). ***curticauda* group** 9
2. Head and mesosoma yellow to light orange with brown patches 3
- Head and mesosoma brown to black, rarely with lighter patches on head and/or lighter pronotal collar 4
3. Propodeum smooth medially (Fig. 81). Basal cell of hind wing narrow, r-m 0.5–1.0× as long as R (Fig. 79). Mesothorax and metasoma unicolorous or with slightly darker areas dorsally ***P. xanthus* new species**
- Propodeum striate medially (Fig. 39). Basal cell of Hind wing wide, r-m 2.5× as long as R (Fig. 38). Mesothorax with sharply contrasting brown areas dorsally and ventrally, and metasoma with brown spot mid-dorsally ***P. langori* new species**
4. Appendages elongate, basal flagellomere 4.8–5.0× as long as wide and hind femur 4.5–5.5× as long as wide (Fig. 13). T1–T3 of metasoma smooth (Fig. 12) ***P. attenuatus* new species**
- Appendages relatively shorter, basal flagellomere 3.0–4.5× as long as wide and hind femur 3.0–4.0× as long as wide. T1 of metasoma usually striate medioapically, and usually T2 and T3 partially striate or granulate (Figs. 22, 52) 5
5. T3 of metasoma with anterolateral corners joined by a thin carina, the groove between T2 and T3 appearing double (Fig. 22) ***P. conjunctus* new species**
- T3 of metasoma with anterolateral corners separate, the groove between T2 and T3 single (Figs. 42, 52) 6
6. T2 of metasoma posterior to basal raised area and base of T3 between anterolateral corners

- coarsely striate (Fig. 73). Hind wing with angle of M and r-m with a faintly pigmented, posteriorly directed spur (Fig. 69) *P. striatus* new species
- T2 of metasoma granulate or finely striate and T3 smooth or with faint microsculpture (Figs. 42, 52). Hind wing with angle of M and r-m without spur or with faint, unpigmented crease (Fig. 47) 7
- 7. Head bicolored, face orange and remainder of head brown. T1 of metasoma with length greater than apical width (Fig. 30) *Pseudognaptodon gouletti* new species
- Head brown, some specimens with lighter markings around dorsal margin of eye. T1 of metasoma with length and apical width about equal (Fig. 50) 8
- 8. Anterior tergites of metasoma uniform brown, concolorous with rest of body. POD shorter than to as long as LOL and shorter than POL (Fig. 44). T3 of metasoma with grooves defining anterolateral corners mostly crenulate (Fig. 52.) *P. ocellatus* new species
- Anterior 2 or 3 tergites of metasoma lighter than remainder of body. POD about as long as LOL and POL (Fig. 55). T3 of metasoma with grooves defining anterolateral corners mostly smooth (Fig. 63) *P. omissus* Fischer
- 9. Propodeum with apical cell triangular, median carina complete (Fig. 101) *P. carinatus* new species
- Propodeum with apical cell arcuate or incomplete, median carina absent (Fig. 111) 10
- 10. Body length about 1 mm. T1 of metasoma triangular, posterior margin wider than length, nearly flat, with basal carinae and striae obsolete (Figs. 152, 153) *P. minimus* new species
- Body length usually greater than 1.5 mm. T1 of metasoma with shape various, convex medially with distinct basal carinae, and usually striate or granulate on apical half or more (Figs. 112, 113, 163, 164) 11
- 11. Labrum as large as clypeus, apically truncate, brown (Fig. 138). Forewing vein 2M markedly longer than RS+Ma (Fig. 140) *Pseudognaptodon labrus* new species
- Labrum smaller than clypeus, semicircular or triangular, concolorous with other mouthparts. Forewing vein 2M shorter than RS+Ma (Fig. 120) 12
- 12. Forewing vein R shorter than stigma along anterior wing margin, RS evenly sharply curved (Fig. 90) *Pseudognaptodon brevis* new species
- Forewing vein R as long as or longer than stigma along anterior wing margin, RS variable, in most specimens straighter apically than basally or decurved (Fig. 120) 13
- 13. Lateral margins of T1 to entire metasoma yellow to light honey-brown, contrasting with head and mesosoma 14
- Metasomal tergites unicolorous, medium red-brown to black, concolorous with head and mesosoma or slightly lighter 16
- 14. Tergites of metasoma uniformly yellow, or with slightly darker shade posterior *P. gibsoni* new species
- Tergites of metasoma with lighter color on at most T1-T3, remainder brown or red-brown 12
- 15. Junction of 1M and RS+Ma at or basal to midlength of discal cell, RS+Ma about as long as 1M (Fig. 130). Body dark brown to black with yellow anterior metasomal tergites *P. hemicolor* new species
- Junction of 1M and RS+Ma apical to midlength of discal cell, RS+Ma clearly shorter than 1M (Fig. 192). Body reddish-brown with yellow to light honey-brown anterior metasomal tergites *P. whartoni* new species
- 16. Metasoma with disc of T2 with granulate microsculpture posterior to basal raised area, from a small area immediately posterior to basal raised area to covering most of tergum (Fig. 114) *P. curticauda* Fischer
- Metasoma with disc of T2 striate or granulostriate, or smooth with posterior margin of basal raised area crenulate (Figs. 175, 186) 17
- 17. Metasoma with most of T2 and base of T3 coarsely striate, the anterolateral corners of T3 defined by sculpture (Figs. 175, 207) 18

- Metasoma with T2 partly to mostly striate, T3 smooth or with some striae mid-basally, the anterolateral corners not defined (Figs. 165, 186) 19
- 18. Vertex with granulate microsculpture obsolete, appearing smooth (Figs. 167, 168). Ocellar triangle large, both LOL and POL3 as long as POD (Fig. 167). Metasomal T1 basal raised area with median projection (Figs. 173, 175) *P. nitidus* new species
- Vertex with well developed granular microsculpture (Figs. 199, 200). Ocellar triangle small, LOL shorter than to as long as POD (Fig. 199). Metasomal T1 basal raised area evenly curved or irregular at midline (Fig. 207) *P. whitfieldi* new species
- 19. T2 of metasoma finely striate or granulostriate, rarely smooth (Fig. 165); groove between T2 and T3 evenly crenulate throughout, rarely slightly widened medially, T3 smooth (Fig. 635). POD about as long as LOL (Fig. 156) *P. minutus* (Ashmead)
- T2 of metasoma coarsely striate (Fig. 186); groove between T2 and T3 wider and more strongly crenulate medially than laterally, with striae extending onto disc of T3 (Fig. 186). POD3 as long as LOL (Fig. 177) *P. shawi* new species

OMISSUS GROUP

Included species.—This species group includes *Pseudognaptodon omissus* Fischer and the following new species: *P. attenuatus*, *P. conjunctus*, *P. gouletti*, *P. langori*, *P. ocellatus*, *P. striatus*, and *P. xanthus*.

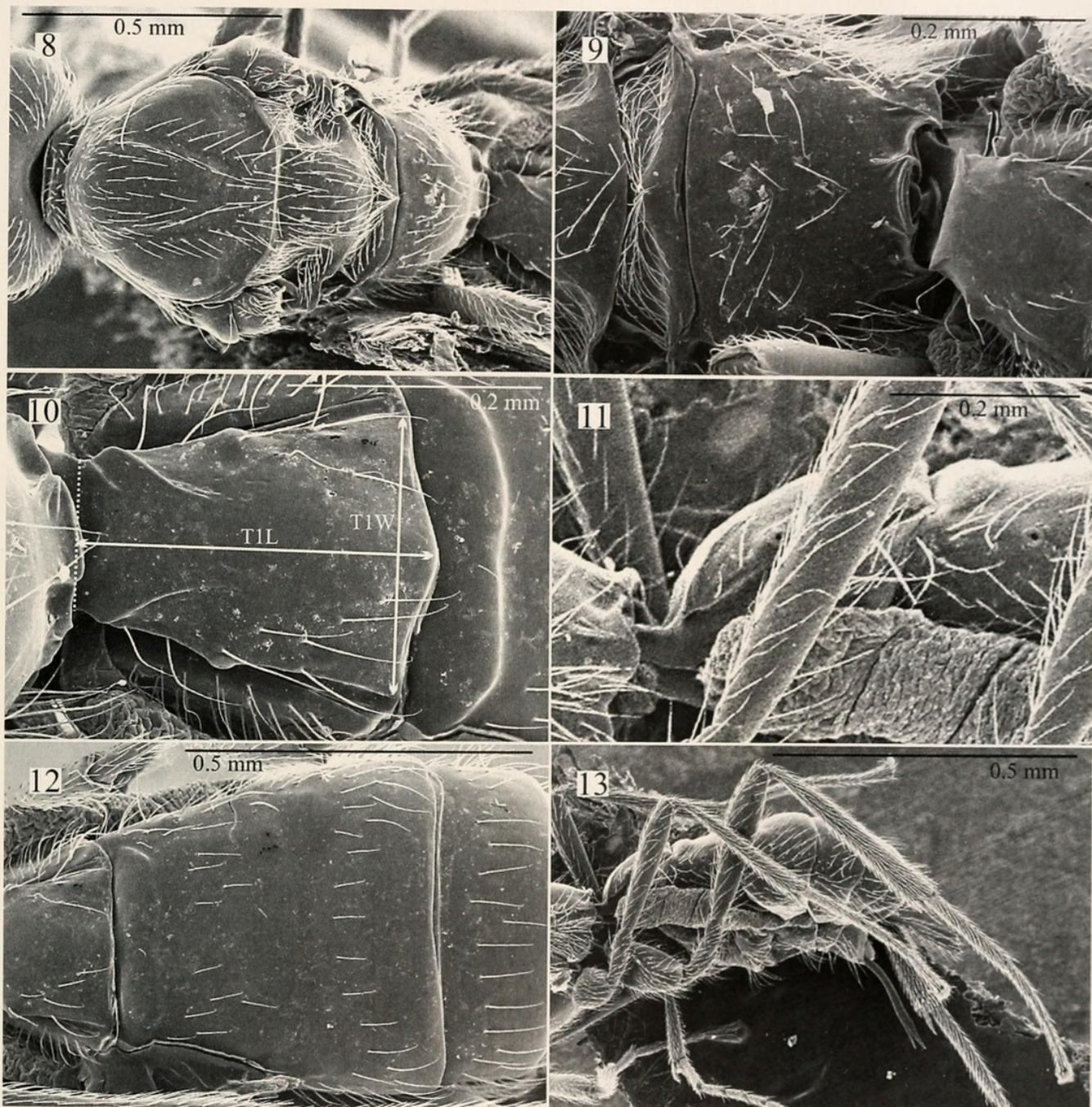
Remarks.—Species of this group are separated from the *curticauda* group by the following combination of characters: Frons smooth or with areas of faint granulate sculpture between ocelli and antennal sockets (Fig. 5). Episternal scrobe present as a sharp, curved groove linked to posterior margin of mesopleuron (Fig. 1). Propodeum with a small depression and/or area of fine wrinkles mediobasally (Fig. 19). T3 of metasoma with anterolateral grooves complete and partially to completely crenulate (complete but smooth in *P. attenuatus*) (Fig. 42). Ovipositor conspicuously exerted, with setose portion of sheath at least half as long as hind basitarsus (Fig. 13).

Pseudognaptodon attenuatus Williams,
new species
(Figs. 4–13)

Diagnosis.—This species is separated from other *omissus*-group species by the following combination of characters: antenna elongate, with basal flagellomere 4.8–5.03 as long as wide; T1 of metasoma smooth, with protuberant spiracles (Fig.

10); T2+T3 of metasoma, including grooves, smooth and shining (Fig. 12); legs elongate, femur 4.5–5.53 as long as greatest width (Fig. 13).

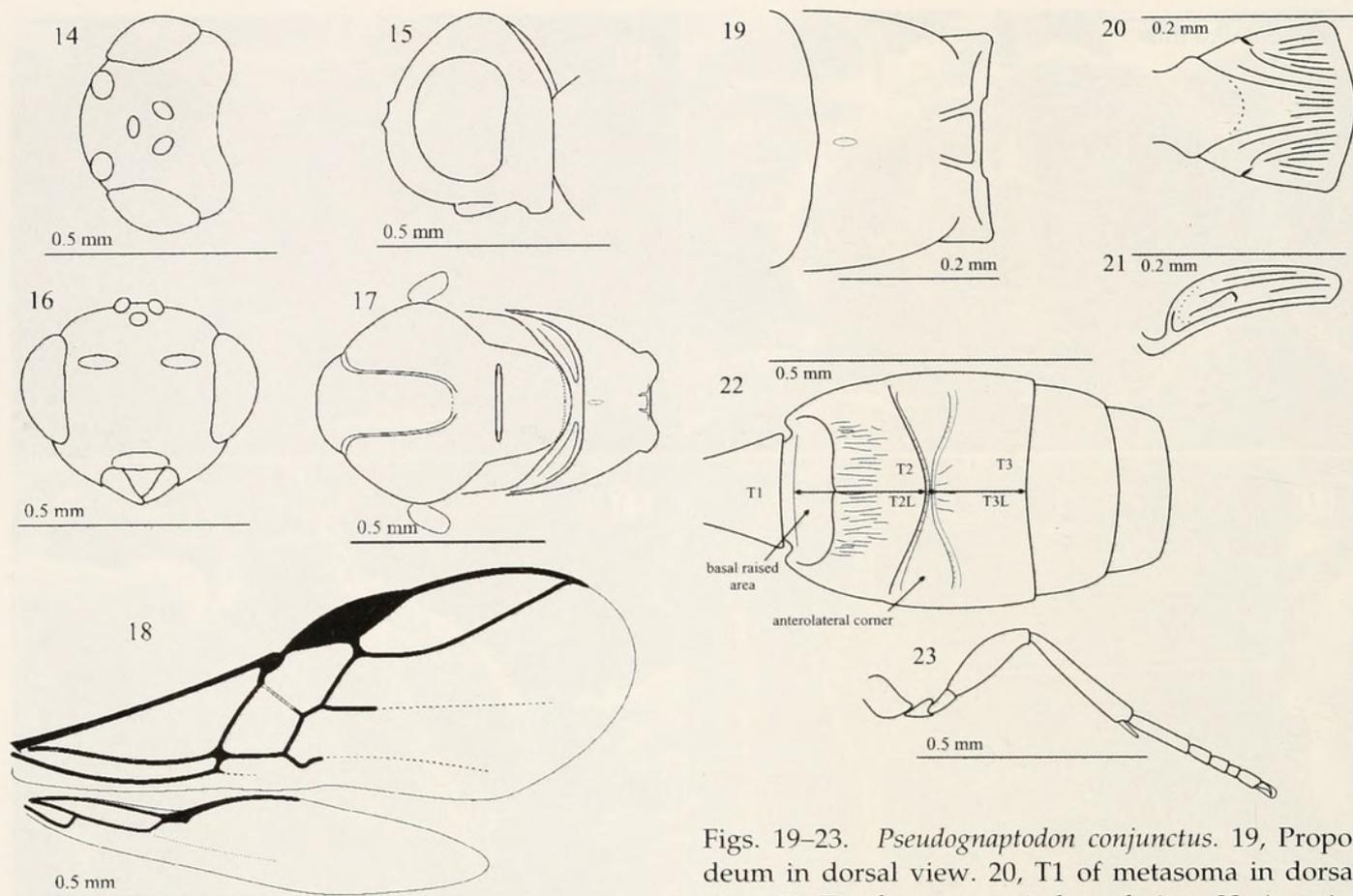
Female.—*Color:* Body uniformly medium to dark brown except as follows: Ventral or ventral and interior surfaces of scape light brown; pronotal collar light to medium brown; mesopleuron with a narrow light brown band near ventral surface in some specimens; legs with forecoxa, trochanter, ventral surface of femur, and basal $\frac{1}{3}$ to $\frac{2}{3}$ of tibia yellow to light brown. *Head:* Length of antennal scape 1.67–2.00× width; flagellum with 18–20 flagellomeres: L/W of first three flagellomeres 4.8–5.0, 3.67–4.00, 3.00–3.67; L/W of apical flagellomere 3.67–3.75; MOD 0.86–1.07× as long as POD; POD 0.75–1.03× as long as LOL, and 0.60–0.80× as long as POL (Fig. 4); OOL 2.00–2.25× as long as POL (Fig. 5); head length 0.64–0.67× width in dorsal view; occiput moderately indented (Fig. 51); head L/H 0.90–0.94 in lateral view; eye L/H 0.65–0.71, eyeH/headH 0.67–0.69, eye width/gena width 1.44–1.88; gena wider ventrally than dorsally (Fig. 6); face granulate on lateral $\frac{1}{3}$ and smooth on median $\frac{1}{3}$, most setae as long as clypeus height, clypeus W/H 2.00–2.44, clypeus width 1.11–1.38× as long as malar space. *Wings:* Forewing with RS vein evenly curved, less at apex than at base; RS+Ma



Figs. 8–13. *Pseudognaptodon attenuatus*. 8, Mesosoma in dorsal view. 9, Propodeum in dorsal view. 10, T1 of metasoma in dorsal view. T1L = T1 length, T1W = T1 width. 11, T1 of metasoma in lateral view. 12, Anterior end of metasoma in dorsal view. 13, Hind leg.

unpigmented on basal $\frac{1}{3}$, tubular throughout length, distance between point of attachment of RS+Ma to M and parastigma $0.63\text{--}0.80\times$ as long as RS+Mb; 2M spur $3.0\text{--}5.03$ as long as RS+Mb; 2-A1 tubular on basal quarter, remainder obsolete and faintly pigmented, first subdiscal cell closed by obsolete veins (Fig. 7). Hind wing with r-m $1.4\text{--}2.0\times$ as long as R; angle of M and r-m without a spur or thickened area; apex of R evenly narrowed apically,

knob faint or absent (Fig. 7). *Mesosoma*: Notauli wide but shallow, merged with posterior median depression (Fig. 8); propodeum smooth, medioapical carinae short, straight, slightly convergent, medioapical cell open (Fig. 9). *Metasoma*: T1 length $1.04\text{--}1.15\times$ as long as apical width, lateral margins concave posterior to spiracle, the spiracle moderately protuberant, lateral carinae about 0.3 tergum length, smooth and shining throughout, (Figs. 10,



Figs. 14–18. *Pseudognaptodon conjunctus*. 14, Head in dorsal view. 15, Head in lateral view. 16, Head in anterior view. 17, Mesosoma in dorsal view. 18, Wings.

11); basal raised area of T2 0.23–0.24 of total T2 length, the posterior margin of basal raised area evenly curved, rarely somewhat obsolete; T2 smooth and shining; T3 0.66–0.86× as long as T2, smooth, with anterior and lateral grooves smooth and somewhat effaced laterally (Fig. 12). *Legs*: Hind femur length 4.5–5.53 maximum width, it's ventral hairs as long as or longer than width of femur at point of attachment (Fig. 13).

Material examined.—5 ♀, 1 ♂. HOLOTYPE ♀ (UWYO), labelled as follows: “Costa Rica: San Jose, Cerro Muerte 20 km S Empalme 2800m iii-vi 1990 P. Hanson”. Also red label “HOLOTYPE” and bordered label “*Pseudognaptodon attenuatus* Williams Holotype det. D. Williams 2003”. PARATYPES: **Costa Rica: San Jose:** 16 km S. Empalme, 2500m, III-IV-1989, P. Hanson & I Gauld, 1 ♀, 1 ♂, (UYWO). Cerro

Figs. 19–23. *Pseudognaptodon conjunctus*. 19, Propodeum in dorsal view. 20, T1 of metasoma in dorsal view. 21, T1 of metasoma in lateral view. 22, Anterior end of metasoma in dorsal view. T2L = T2 length. T3W = T3 length. 23, Hind leg.

Muerte, 20 km S. Empalme, 2800m, III-IV-1989, (1 ♀), VII-VIII-1989, (2 ♀), P. Hanson, (UWYO).

Etymology.—The name *attenuatus* refers to the elongate appendages, particularly the legs, of this species.

Pseudognaptodon conjunctus Williams,
new species
(Figs. 14–23)

Diagnosis.—This species is separated from other *omissus*-group species by the following combination of characters: Head bicolored orange and brown, remainder of body uniform light brown; metasomal T1 length 1.21–1.363 apical width (Fig. 20); groove between metasomal T2 and T3 appearing double, separated by a partial to complete fine carina (Fig. 22).

Female.—*Color*: Body and appendages medium brown except as follows: Scape yellow to light honey-brown, face and lower part of gena light orange-brown;

pronotal collar usually light brown; legs entirely yellow, with hind tarsi slightly darker. *Head*: Length of antennal scape 1.4–1.6 \times width; flagellum with 16–17 flagellomeres, first flagellomere slightly curved and narrower than others, L/W of first three flagellomeres 3.0–3.5, 2.6–3.2, 2.5–2.7; L/W of apical flagellomere 3.2–3.5; MOD 0.91–1.00 \times as long as POD, POD 1.00–1.33 \times as long as LOL, and 1.00–1.33 \times as long as POL (Fig. 14); OOL 2.00–2.33 \times as long as POL (Fig. 14); head length 0.64–0.68 \times width in dorsal view; occiput narrowly and sharply indented (Fig. 14); head L/H 0.79–0.84 in lateral view; eye L/H 0.69–0.71, eyeH/headH 0.59–0.64, eye width/gena width 1.69–2.00; gena uniformly wide over most of eye height (Fig. 15); face completely covered by granular microsculpture, setae as long as clypeus height, clypeus W/H 2.25–2.66, clypeus width 1.00–1.07 \times as long as malar space (Fig. 16). *Wings*: Forewing with RS vein straighter near apex than base, slightly decurved at point of attachment to R; RS+Ma unpigmented, basal $\frac{1}{3}$ thinner than remainder, point of attachment to M almost obsolete, distance between point of attachment of RS+Ma to M and parastigma 0.50–0.56 \times as long as RS+Mb; 2M spur 2.00–2.50 \times as long as RS+Mb; 2–1A vein present as a crease on basal $\frac{2}{3}$, first subdiscal cell open (Fig. 18). Hind wing with r-m 1.0–1.1 \times as long as R; angle of M and r-m without spur or thickened area; apex of R moderately knobbed (Fig. 18). *Mesosoma*: Notauli impressed, nearly merged posteriorly in a U-shape (Fig. 17); propodeum smooth, medioapical carinae short, anteriorly convergent, medioapical cell open (Fig. 19). *Metasoma*: T1 length 1.21–1.36 \times as long as apical width, lateral margins straight to slightly concave posterior to spiracle, lateral carinae complete on entire tergum length or present on basal half but continued by a raised median area on apical half, sculpture coarsely striate lateral to carinae and smooth between carinae (Figs.

20, 21); basal raised area of T2 0.31–0.40 of total T2 length, the posterior margin of basal raised area irregular, slightly concave, produced medially; T2 striate near basal raised area margin, rarely with a few coarse striae extending posteriorly; T3 0.75–0.86 \times as long as T2, smooth or with a few striae mediobasally, with anterior and lateral grooves smooth, median part of groove doubled, with fine complete or partial ridge joining lateral areas (Fig. 22). *Legs*: Hind femur length 3.22–3.50 \times maximum width, ventral hairs shorter than femur width at point of attachment (Fig. 23).

Material examined.—3♀. HOLOTYPE ♀ (TAMU), labelled as follows: "MEXICO: Jalisco 16 mi. S. Autlan on Hwy. 80, 8-VII-1984, J.B. Woolley". Also red label "HOLOTYPE" and bordered label "*Pseudognaptodon conjunctus* Williams Holotype det. D. Williams 2003". PARATYPES: **Mexico: Jalisco:** 16miS. Autlan on hwy. 80, 8-VII-1984, J.B. Woolley, 1♀ (TAMU). **Mexico: Guerrero:** 32miS.E. Petalan, 10-VII-1985, Woolley and Zolnerowich, 1♀ (TAMU).

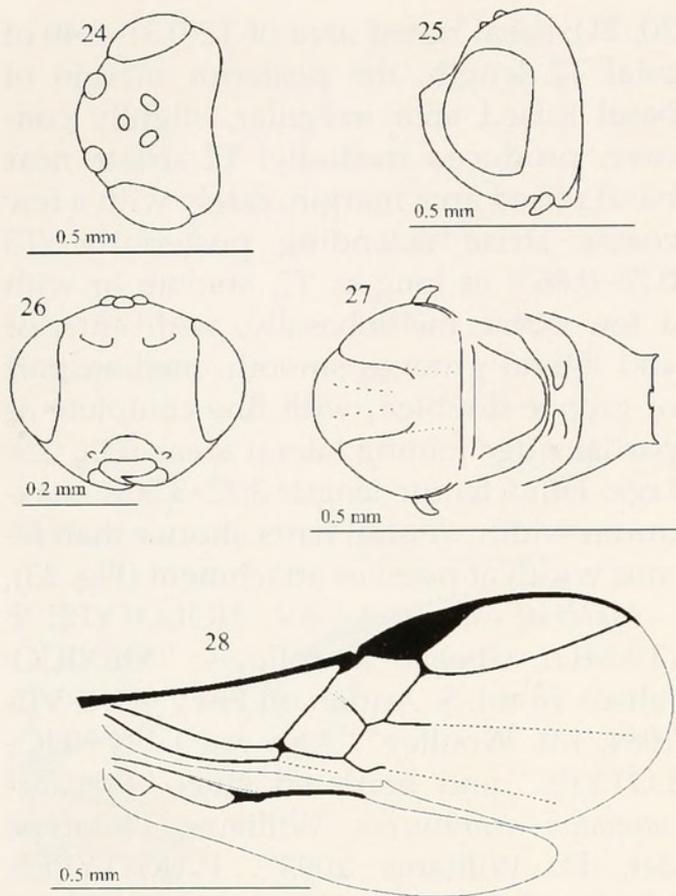
Etymology.—The name *conjunctus* refers to the fine carina that connects the anterolateral areas of T3 of the metasoma.

***Pseudognaptodon gouleti* Williams, new species**

(Figs. 24–33)

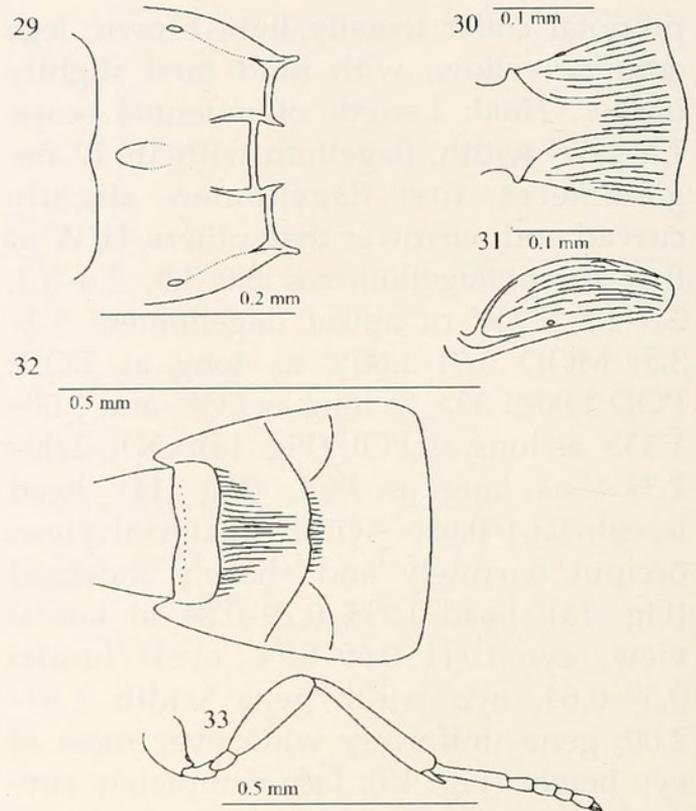
Diagnosis.—This species is separated from other *omissus*-group species by the following combination of characters: Head brown with face orange, mesosoma and metasoma brown; ocellar triangle small, with POD equal to or greater than interocellar distances and OOL 2.0 time as long as POL (Fig. 24); T1 of metasoma longer than apical width (Fig. 30); hind wing with r-m vien as long as R (Fig. 28).

Holotype female.—*Color*: Body brown except as follows: face and margin of eyes light orange; scape light brown; pronotal collar light brown; legs yellow with base of hind coxa, dorsal surface of femur, and hind tarsus darker. *Head*: Length of anten-



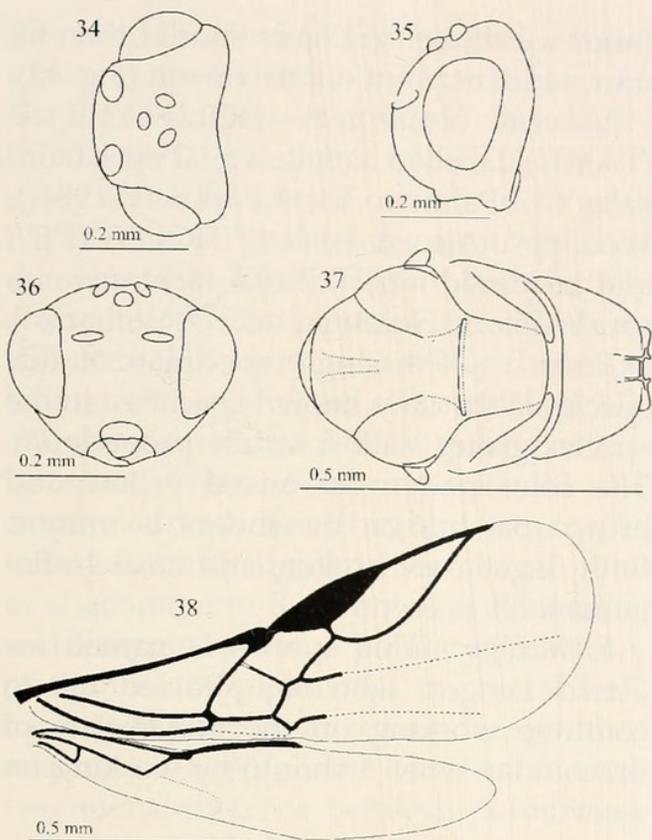
Figs. 24–28. *Pseudognaptodon gouleti*. 24, Head in dorsal view. 25, Head in lateral view. 26, Head in anterior view. 27, Mesosoma in dorsal view. 28, Wings.

nal scape 1.6 width; flagellum with 17 flagellomeres; L/W of first three flagellomeres 3.75, 2.43, and 2.43; L/W of apical flagellomere 3.00; MOD 0.88× as long as POD; POD 1.14× as long as LOL, and as long as POL (Fig. 24); OOL 2.00× as long as POL (Fig. 24); head length 0.63× width in dorsal view; occiput slightly evenly indented (Fig. 24); head L/H 0.90 in lateral view; eye L/H 0.60, eyeH/headH 0.64, eye width/gena width 2.0; gena wider ventrally than dorsally (Fig. 25); face completely covered by granular microsculpture except for narrow median stripe, setae as long as clypeus height, clypeus W/H 2.50, clypeus width 1.1× as long as malar space (Fig. 26). *Wings*: Forewing with RS vein straighter near apex than base; RS+Ma unpigmented on basal half, basal 1/3 thinner than remainder, point of attachment to M obsolete; distance between point of attachment of RS+Ma to M and

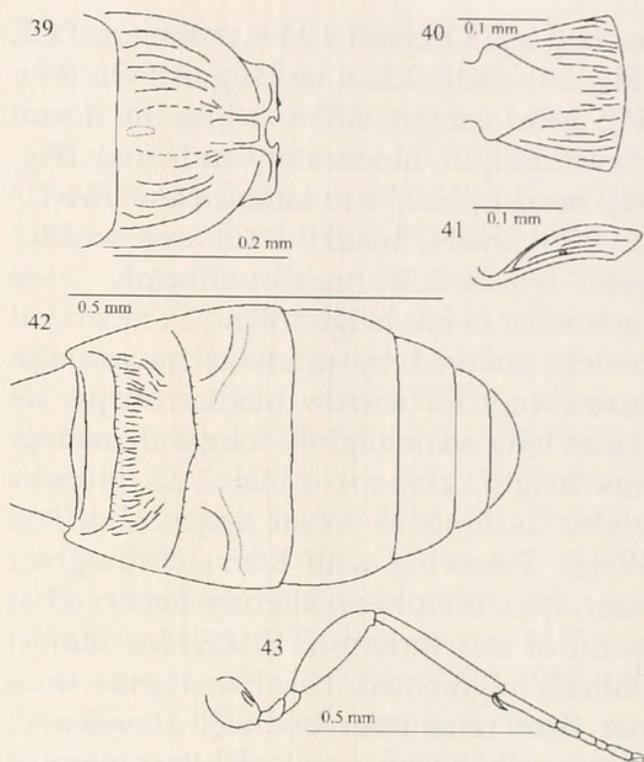


Figs. 29–33. *Pseudognaptodon gouleti*. 29, Propodeum in dorsal view. 30, T1 of metasoma in dorsal view. 31, T1 of metasoma in lateral view. 32, Anterior end of metasoma in dorsal view. 33, Hind leg.

parastigma 0.60× as long as RS+Mb; 2M spur 1.77× as long as RS+Mb; 2–1A vein present as a faintly pigmented crease on basal 2/3, first subdiscal cell open (Fig. 28). Hind wing with r-m as long as R; angle of M and r-m without spur or thickened area; apex of R moderately knobbed (Fig. 28). *Mesosoma*: Notauli deep, merged with posterior median depression (Fig. 27); propodeum smooth, medioapical carinae short, straight, medioapical cell open (Fig. 29). *Metasoma*: T1 length 1.2× as long as apical width, lateral margins straight posterior to spiracle, lateral carinae 0.5 of tergum length, finely striate lateral to carinae and at apex between carinae (Figs. 30, 31); basal raised area of T2 0.26 of total T2 length, posterior margin of basal raised area slightly irregular; T2 striate on basal half posterior to basal raised area margin, with scattered fine striae reaching to posterior margin of tergum; T3 0.80× as long as T2, finely striate medially near anterior



Figs. 34–38. *Pseudognaptodon langori*. 34, Head in dorsal view. 35, Head in lateral view. 36, Head in anterior view. 37, Mesosoma in dorsal view. 38, Wings.



Figs. 39–43. *Pseudognaptodon langori*. 39, Propodeum in dorsal view. 40, T1 of metasoma in dorsal view. 41, T1 of metasoma in lateral view. 42, Anterior end of metasoma in dorsal view. 43, hind leg.

Pseudognaptodon langori Williams, new species
(Figs. 34–43)

Diagnosis.—This species is separated from other *omissus*-group species by the following combination of characters: Mesothorax yellow with brown areas dorsally and ventrally; T1 of metasoma with posterior half not raised between lateral carinae (Fig. 40); hind wing with r-m vein $2.5\times$ as long as R (Fig. 38); central disc of propodeum striate (Fig. 39).

Holotype female.—*Color:* Body and appendages yellow to orange-yellow except as follows: pedicel and flagellum light brown; ocellar triangle brown; mesoscutum except for parts of notauli and posteromedial depression brown; ventral surface of mesothorax brown; propodeum brown; metasoma yellow with brown spot on posterior half of T3 and anterior half of T4; Legs entirely yellow. *Head:* Length of antennal scape 1.6 width; L/W of first three flagellomeres 3.71, 2.63, and 2.5; MOD $0.84\times$ as long as POD; POD $1.25\times$

groove, with anterior and lateral grooves smooth to slightly crenulate (Fig. 32). *Legs:* Hind femur length 3.6 maximum width, ventral hairs shorter than femur width at point of attachment (Fig. 33).

Material examined.—HOLOTYPE ♀ (CNCI), labelled as follows: "PANAMA, Panama $8^{\circ}40'N$, $19^{\circ}50'W$ 850m, Cerro Campana J. Helava 7–14.8.73". Also red label "HOLOTYPE", and bordered label "*Pseudognaptodon gouleti* Williams Holotype det. D. Williams". PARATYPE: **Mexico: Jalisco:** Chamela, PT, 4-9-VII-1983, M. Sharkey 1 ♀ (CNCI).

Remarks.—The above description is based on the holotype only. The paratype from Mexico agrees closely with these characters, but is not intact and has been poorly mounted.

Etymology.—This species is named for Henri Goulet, who has contributed numerous specimens to this study.

as long as LOL, and $1.11\times$ as long as POL (Fig. 34); OOL $2.22\times$ as long as POL (Fig. 34); head length $0.65\times$ width in dorsal view; occiput moderately indented (Fig. 34); head L/H 0.78 in lateral view; eye L/H 0.79 , eyeH/headH 0.60 , eye width/gena width 2.38 ; gena uniformly wide over most of eye height (Fig. 35); face completely covered by granular microsculpture except for narrow median stripe, setae as long as or slightly longer than clypeus height, clypeus W/H 2.22 , clypeus width as long as malar space (Fig. 36). *Wings*: Forewing with RS vein straighter near apex than base, slightly decurved at point of attachment to R; RS+Ma almost entirely pigmented, basal $\frac{1}{3}$ slightly thinner than remainder but well developed; distance between point of attachment of RS+Ma to M and parastigma $0.60\times$ as long as RS+Mb; 2M spur $2.6\times$ as long as RS+Mb; 2-1A vein present as a faintly pigmented crease and 2cu-a present as a pigmented spur, first subdiscal cell nearly closed (Fig. 38). Hind wing with r-m $2.5\times$ as long as R; angle of M and r-m without spur or thickened area; apex of R strongly knobbed (Fig. 38). *Mesosoma*: Notauli shallow, narrow, merged with posterior median depression (Fig. 37); propodeum striate laterally with slightly raised median area confluent with medioapical cell, medioapical carinae straight or slightly divergent, ending in fine wrinkles, medioapical cell open (Fig. 39). *Metasoma*: T1 length as long as apical width, lateral margins slightly convex posterior to spiracle, lateral carinae 0.6 of tergum length, not raised between carinae, sculpture striate lateral to carinae, weakly striate at apex between carinae (Figs. 40, 41); basal raised area of T2 0.36 of total T2 length, posterior margin of basal raised area slightly irregular but evenly curved; T2 sculpture granulostrate on basal half posterior to basal raised area margin; T3 $0.84\times$ as long as T2, smooth, with anterior and lateral grooves smooth to slightly crenulate (Fig. 42). *Legs*: Hind femur length 3.15 maxi-

mum width, ventral hairs shorter than femur width at point of attachment (Fig. 43).

Material examined.—HOLOTYPE ♀ (TAMU), labelled as follows: "Texas: Gonzales Co. Palmetto State Park I-IV-1984 J. Woolley". Also red label "HOLOTYPE", and bordered label "*Pseudognaptodon langori* Williams Holotype det. D. Williams".

Remarks.—The single specimen of this species is the only known specimen in the species group with a striate propodeum. The color pattern of mixed yellow and brown patches on the thorax is unique. Both flagella are broken, and have 16 flagellomeres present.

Etymology.—This species is named for David Langor, who has allowed me to continue working on the systematics of Braconidae when I should be working on weevils.

***Pseudognaptodon ocellatus* Williams,
new species
(Figs. 44–53)**

Diagnosis.—This species is separated from other *omissus*-group species by the following combination of characters: Head, thorax and metasoma dark brown to black; ocellar triangle large, LOL and POL larger than MOD and POD, and OOL 1.3 – $1.6\times$ as long as POL (Fig. 44); occiput deeply and evenly indented, head appearing C-shaped in dorsal view (Fig. 45).

Female.—*Color*: Dark brown to black except as follows: Scape light brown, or light brown basally and darker brown apically; pronotal collar light brown or with light brown patches; legs yellow to orange-yellow, rarely with base of hind coxa, dorsal surface of femur, and hind tarsus darker. *Head*.—Length of antennal scape 1.4 – $1.9\times$ width; flagellum with 16–18 flagellomeres, first flagellomere slightly curved in some specimens, L/W of first three flagellomeres 3.3 – 4.5 , 2.7 – 3.9 , 3.0 – 3.9 ; L/W of apical flagellomere 2.8 – 3.3 ; MOD 0.8 – $1.0\times$ as long as POD, POD 0.8 – $1.0\times$ as long as LOL, and 0.6 – $0.8\times$ as long as POL (Fig. 44); OOL 1.3 – $1.8\times$ as long as POL (Fig.

45); head length 0.6–0.7× width in dorsal view; occiput deeply indented, head C-shaped in dorsal view (Fig. 45); head L/H 0.7–0.8 in lateral view; eye L/H 0.6–0.7, eyeH/headH 0.6–0.7, eye width/gena width 1.6–2.2; gena wider ventrally than dorsally (Fig. 46); face granulate laterally with smooth medial stripe to smooth on the medial ½, with a polished, setae as long as clypeus height, clypeus W/H 2.2–3.0, clypeus width 1.2–1.4× as long as malar space. *Wings*: Forewing with RS vein evenly curved, or straighter near apex than base and slightly decurved at point of attachment to R, rarely with RS thinner and irregular at some points; RS+Ma unpigmented to pigmented on apical half, basal ⅓ thinner than remainder, point of attachment to M almost obsolete in some specimens, distance between point of attachment of RS+Ma to M and parastigma 0.5–0.8× as long as RS+Mb; 2M spur 1.5–3.0× as long as RS+Mb; 2–1A vein present as a crease on basal ⅔, first subdiscal cell open (Fig. 47). Hind wing with r-m 1.3–1.8× as long as R; angle of M and r-m without spur, rarely slightly thickened; apex of R moderately knobbed (Fig. 47). *Mesosoma*: Notauli deep, merged with posterior median depression (Fig. 48); propodeum smooth, medioapical carinae short, straight, medioapical cell open (Fig. 49). *Metasoma*: T1 length 0.9–1.1× as long as apical width, lateral margins slightly concave to straight posterior to spiracle, lateral carinae present on basal ⅓ to ½ but continued by a raised median area on apical half or coalesced into a single median ridge, striate lateral to carinae and smooth between carinae, striate across apex in specimens without raised median area (Figs. 50, 51); basal raised area of T2 0.3–0.4 of total T2 length, posterior margin of basal raised area straight but irregular or slightly concave; T2 striate near basal raised area to striate on most of tergum with fine wrinkles extending to apex; T3 0.7–0.8× as long as T2, smooth, with anterior and lateral grooves crenulate (Fig.

52). *Legs*: Hind femur length 3.3–3.9 maximum width, ventral hairs shorter than femur width at point of attachment (Fig. 53).

Material examined.—HOLOTYPE ♀ (TAMU), labelled as follows: "Mexico: Oaxaca 6miles NE Mitla 20-VII-1985 J. Woolley G. Zolnerowich". Also red label "HOLOTYPE", and bordered label "*Pseudognaptodon ocellatus* Williams Holotype det. D. Williams 2003". PARATYPES: **Mexico: Oaxaca**: 6miles N.E. Mitla, 20-VII-1985, J. Woolley G. Zolnerowich 3♂, 2♀ (TAMU). 4mi W. Miltepec, 21-VII-1984, J.B. Woolley 1♀ (TAMU). 8mi N.E. El Punto, 18-VII-1985, Woolley & Zolnerowich, 6♀, 1♂ (TAMU). **Mexico: Guerrero**: 1mi N.E. Laguna, elev. approx. 5000', 17-VII-1984, J.B. Woolley, 1♀ (TAMU). 6mi N.E. Tixtla, 16-VII-1984, J.B. Woolley, 1♀ (TAMU). 6mi E. Xochilapa, 18-VII-1984 1♀ (TAMU). 15mi W. Chichihualco, elev. approx. 1500', 15-VII-1984, J.B. Woolley, 1♀ (TAMU). **Mexico: Veracruz**: Los tuxtles Bio. Station (Malaise), 15-22-VII-1984, G. Steck, 1♂ (TAMU). **Mexico: Puebla**: 5mi S.E. Izucar de Matamoras, 20-VII-1984, J.B. Woolley, 1♀ (TAMU). **Panama: Fortuna**: Chiriqui, 8° 44'N: 82° 15'W, 1050m, 31-VIII-6-IX-1977, H. Wolda, at light, 1♀ (RNHL).

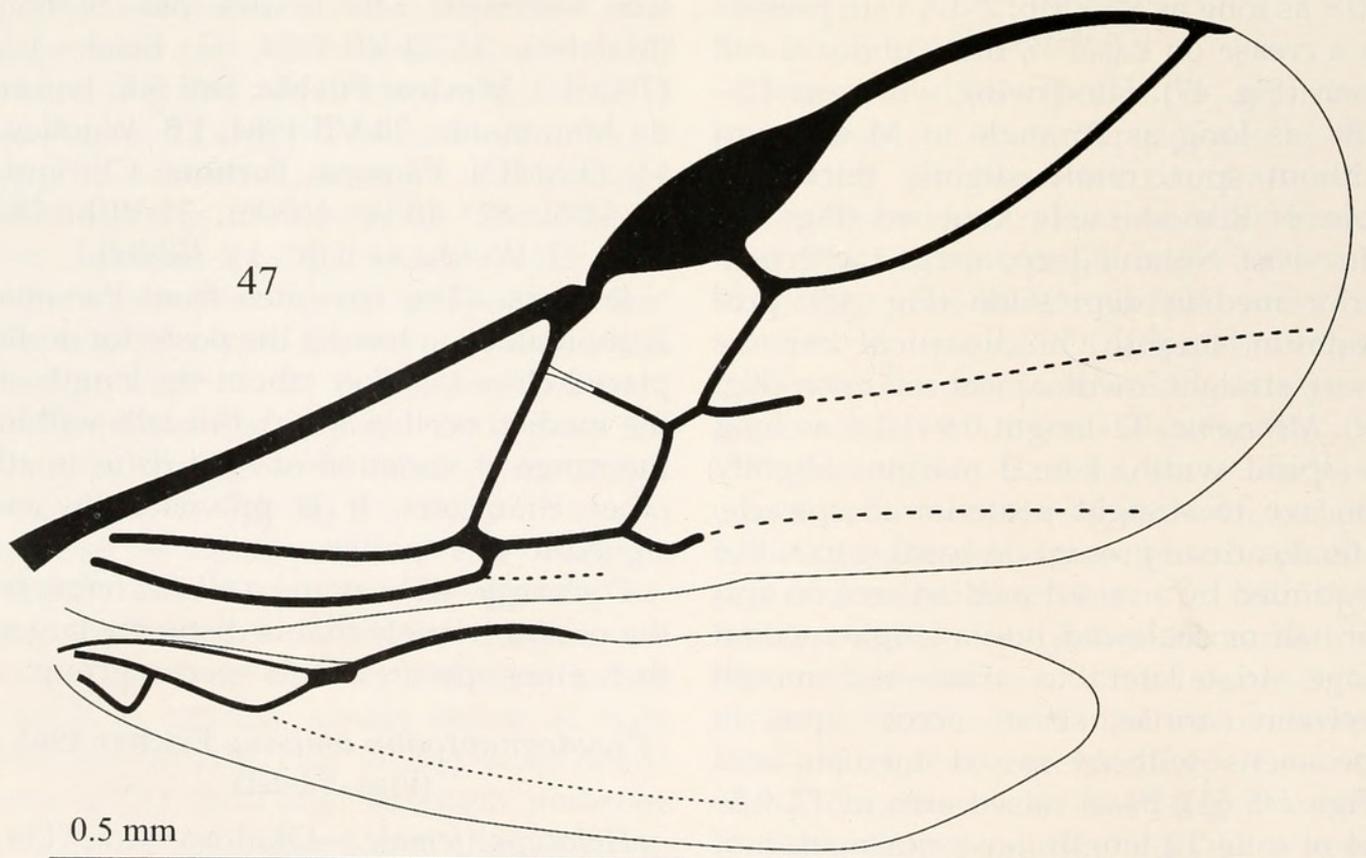
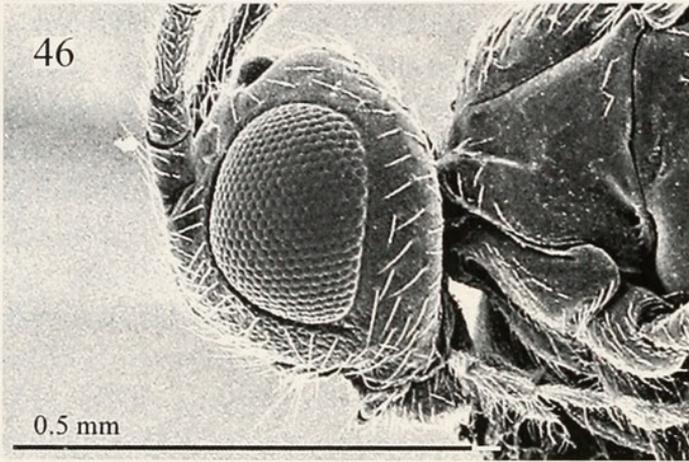
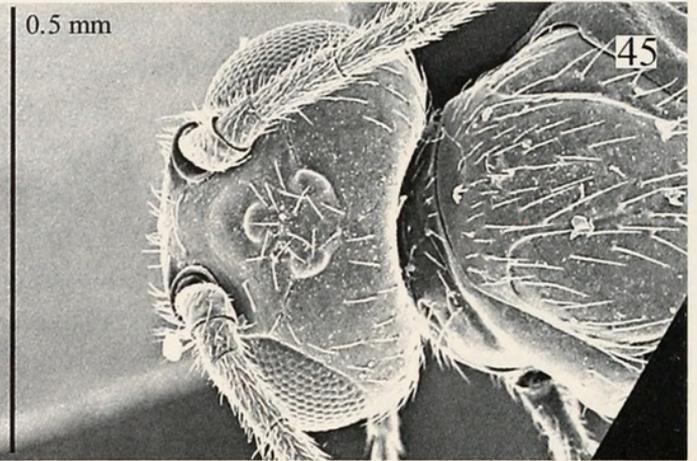
Remarks.—The specimen from Panama is anomalous in having the posterior ocelli placed close together (about the length of the median ocellus apart), but falls within the range of variation of *P. ocellatus* in all other characters. It is provisionally assigned to this species.

Etymology.—The name *ocellatus* refers to the ocellar triangle that is distinctly larger than other species in this species group.

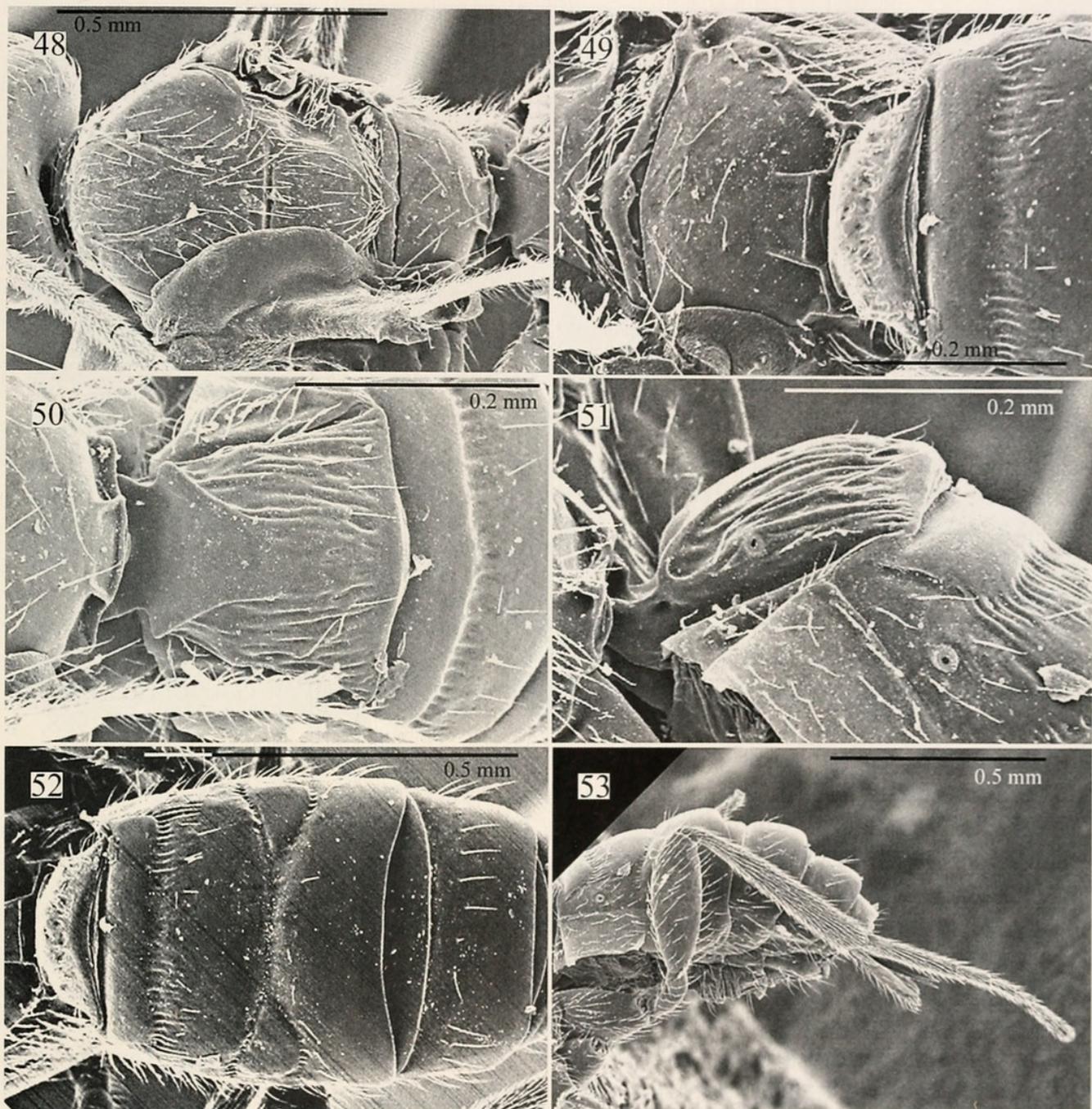
Pseudognaptodon omissus Fischer 1965
(Figs. 54–64)

Holotype female.—Okaloosa Co., Fla. (USNM). Examined.

Diagnosis.—This species is separated from other *omissus*-group species by the following combination of characters: Head, thorax, and posterior part of metasoma brown, face and anterior part of me-



Figs. 44–47. *Pseudognaptodon ocellatus* new species. 44, Ocelli in dorsal view. 45, Head in dorsal view. 46, Head in lateral view. 47, Wings.



Figs. 48–53. *Pseudognaptodon ocellatus* new species. 48, Mesosoma in dorsal view. 49, Propodeum in dorsal view. 50, T1 of metasoma in dorsal view. 51, T1 of metasoma in lateral view. 52, Anterior end of metasoma in dorsal view. 53, Hind leg.

tasoma yellow to light brown; T2 of metasoma smooth or granulostriate near basal raised area margin and smooth on remainder; Hind wing basal cell narrow, r-m $0.7\text{--}0.12\times$ as long as R (Fig. 58).

Female.—*Color*: Body and appendages medium brown except as follows: Scape yellow to light honey-brown; usually with face, narrow band around dorsal eye margin, and lower part of gena light orange-yellow to light orange-brown, rarely with

face concolorous with rest of head except near eye margins, ocellar triangle dark brown; pronotal collar light brown in most specimens; metasoma yellow with brown spot on disc of T1 to medium brown with yellow T2+T3. Legs entirely yellow, rarely with hind tarsi slightly darker. *Head*: Length of antennal scape $1.4\text{--}1.6\times$ width; flagellum with 16–18 flagellomeres, L/W of first three flagellomeres $3.6\text{--}4.7$, $3.0\text{--}3.9$, $2.8\text{--}3.4$; L/W of api-

cal flagellomere 3.0–3.4; MOD 0.61–0.86
 POD, POD 0.88–1.20× as long as LOL,
 and 0.72–1.14× as long as POL (Fig. 54);
 OOL 1.40–2.00× as long as POL (Fig. 55);
 head length 0.64–0.67× width in dorsal
 view; occiput slightly indented (Fig. 55);
 head L/H 0.76–0.86 in lateral view; eye L/
 H 0.65–0.81, eyeH/headH 0.55–0.66, eye
 width/gena width 2.42–3.17; gena uni-
 formly wide over most of eye height to
 slightly widened ventrally (Fig. 56); face
 completely covered by granular micro-
 sculpture except for narrow median stripe
 which is slightly raised on dorsal half of
 face, setae as long as clypeus height, clyp-
 eus W/H 2.57–2.66, clypeus width 1.14–
 1.33× as long as malar space (Fig. 57).
Wings: Forewing with RS vein straighter
 near apex than base, slightly decurved at
 point of attachment to R; RS+Ma with
 basal $\frac{1}{3}$ – $\frac{2}{3}$ unpigmented, basal $\frac{1}{3}$ thinner
 than remainder, point of attachment to M
 almost obsolete in some specimens, dis-
 tance between point of attachment of
 RS+Ma to M and parastigma 0.45–0.86×
 as long as RS+Mb; 2M spur 1.40–2.57×
 as long as RS+Mb; 2–1A vein present as
 a crease to present but obsolete on basal $\frac{1}{3}$,
 first subdiscal cell open (Fig. 58). Hind
 wing with r-m 0.7–1.2× as long as R; angle
 of M and r-m without spur or thickened
 area; apex of R slightly knobbed (Fig. 58).
Mesosoma: Notauli shallow, merged with
 posterior median depression (Fig. 59); pro-
 podeum smooth, medioapical carinae
 short, convergent, medioapical cell open
 (Fig. 60). *Metasoma*: T1 length 0.83–1.1×
 as long as apical width, lateral margins
 straight to slightly concave posterior to
 spiracle, lateral carinae 0.5–0.6 of tergum
 length, convergent basally but parallel
 apically, striate lateral to carinae and
 smooth to weakly striate at apex between
 carinae (Figs. 61, 62); basal raised area of
 T2 0.3–0.5 of total T2 length, posterior
 margin of basal raised area irregular,
 slightly concave medially to evenly
 curved; T2 sculpture smooth to granulo-
 striate near basal raised area margin; T3

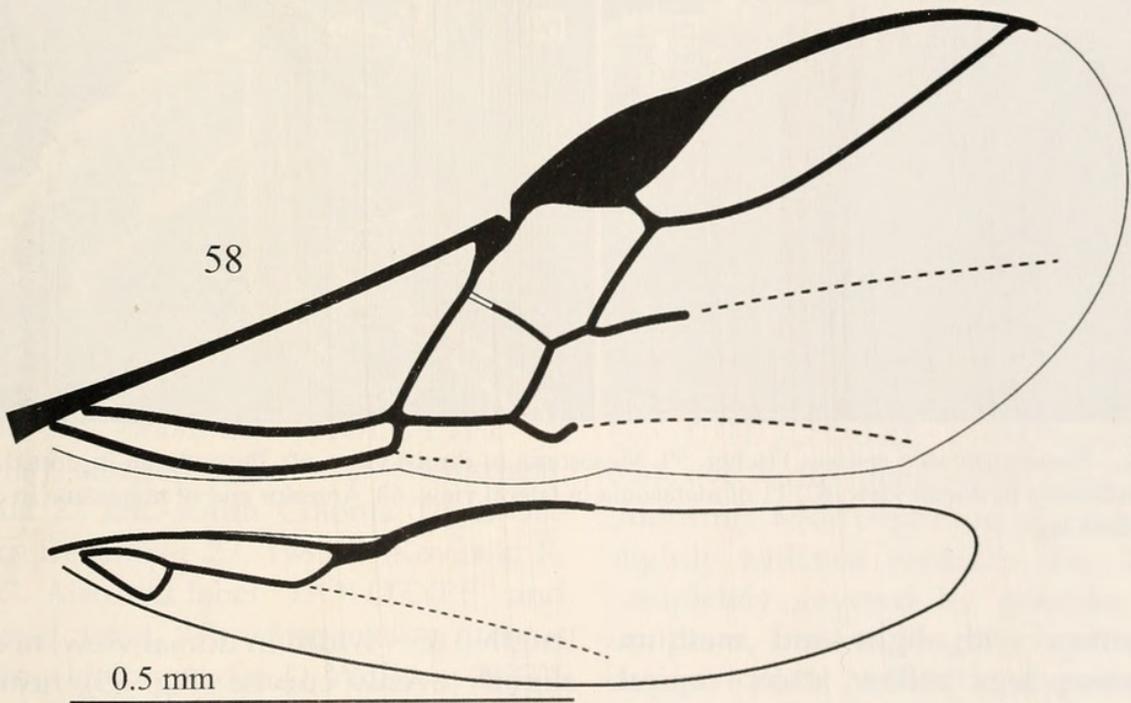
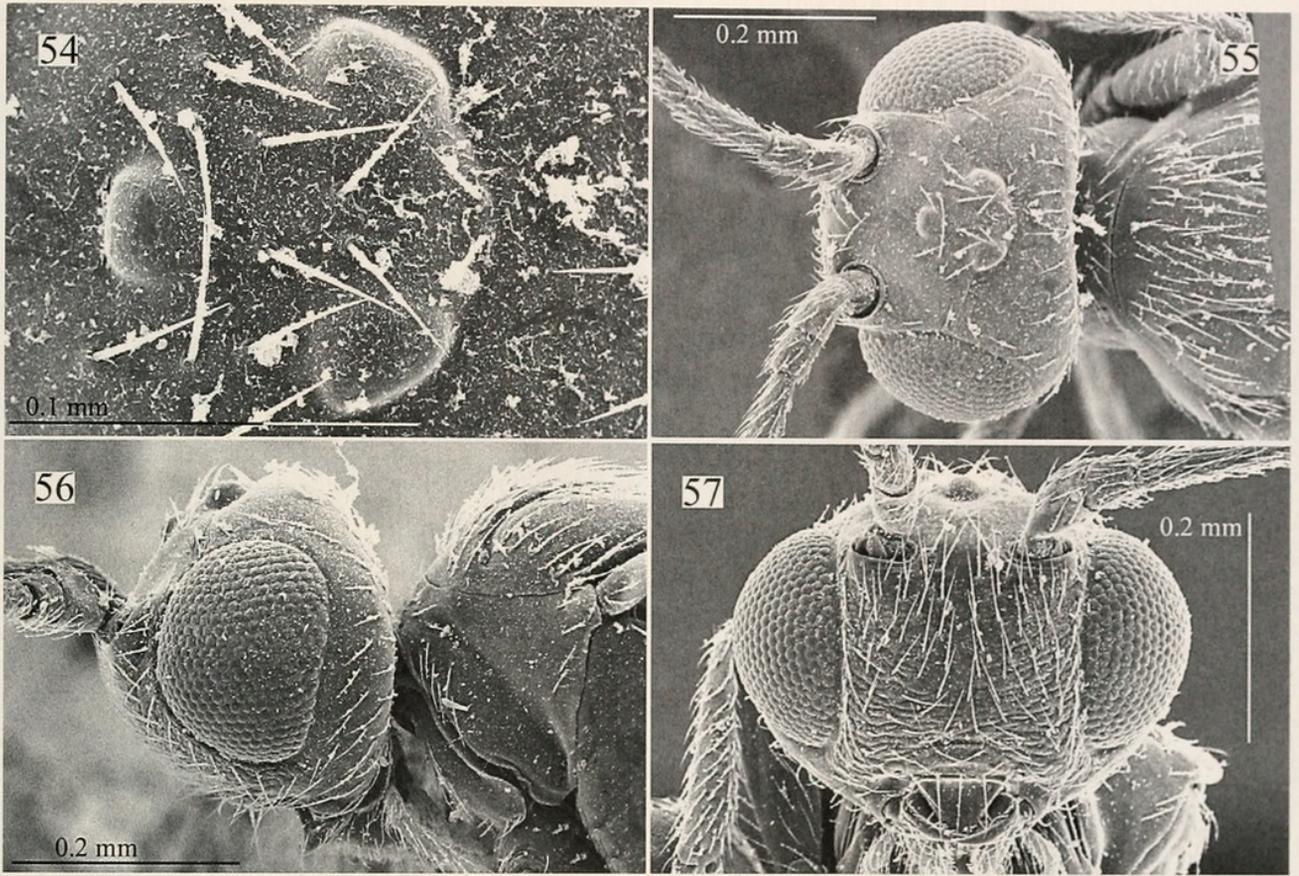
0.65–0.75× as long as T2, smooth, with an-
 terior and lateral grooves smooth to slight-
 ly crenulate (Fig. 63). *Legs*: Hind femur
 length 3.41–3.87 maximum width, ventral
 hairs shorter than femur width at point of
 attachment (Fig. 64).

Material examined.—**Mexico: Guerrero:**
 32miS.E. Petalan, 10-VII-1985, Woolley &
 Zolnerowich, 2♂ (TAMU). **Mexico: Jalisco:**
 16miS. Autlan on Hwy. 80, 8-VII-1984,
 J. Woolley, 1♀ (TAMU). **USA: California:**
Contra Costa Co.: Mt. Diablo, ex. *Copto-*
disca on *Q. lobata*, 4-XI-1984, D. Wagner,
 1♂, 1♀ (JWCI). Mt. Diablo, ex. *Coptodisca*
 on *Q. douglasii*, 4-21-XI-1985, D. Wagner,
 1♀ (JWCI). **Texas: Brazos Co.:** College Sta-
 tion, Lick Creek Park, 22-XI-6XII-1987,
 Wharton, Praetorius, 1♀ (TAMU). **Brew-**
ster Co.: Big Bend National Park, Cotton-
 wood campsite, 2300', 13-14-VII-1982, G.
 Gibson 1♀ (DJMW). **Comal Co.:** Guada-
 lupe River State Park, 18-VIII-1988, J.
 Woolley, 1♀ (TAMU). **Hidalgo Co.:** Ben-
 sten Rio grande State Park, 15-XII-1983, J.
 Woolley, H. Browning, 1♀ (TAMU). **Jim**
Wells Co.: 8miW. Ben Bolt, La Copita Re-
 search Sta., 20-V-1987, J. Woolley, 1♂ 5♀
 (TAMU). **Arizona: Santa Cruz Co.:**
 4.5miN.E. Patagonia, Hwy. 83, sweeping
Bacharis glutinosa and *Chrysothamnus* sp.,
 G. Gibson, 1♀ (DJMW).

Remarks.—The holotype female has
 more developed striae on metasomal T2
 than other specimens examined, but is
 within the range of variation of other
 specimens in the other characters as-
 sessed. Specimens from Big Bend National
 Park and College Station Texas are larger
 and darker than others, with occiput more
 deeply indented and head somewhat C-
 shaped in dorsal view.

Pseudognaptodon striatus Williams,
 new species
 (Figs. 65–74)

Diagnosis.—This species is separated
 from other *omissus*-group species by the
 following combination of characters: Head
 capsule bicolored, with face light brown

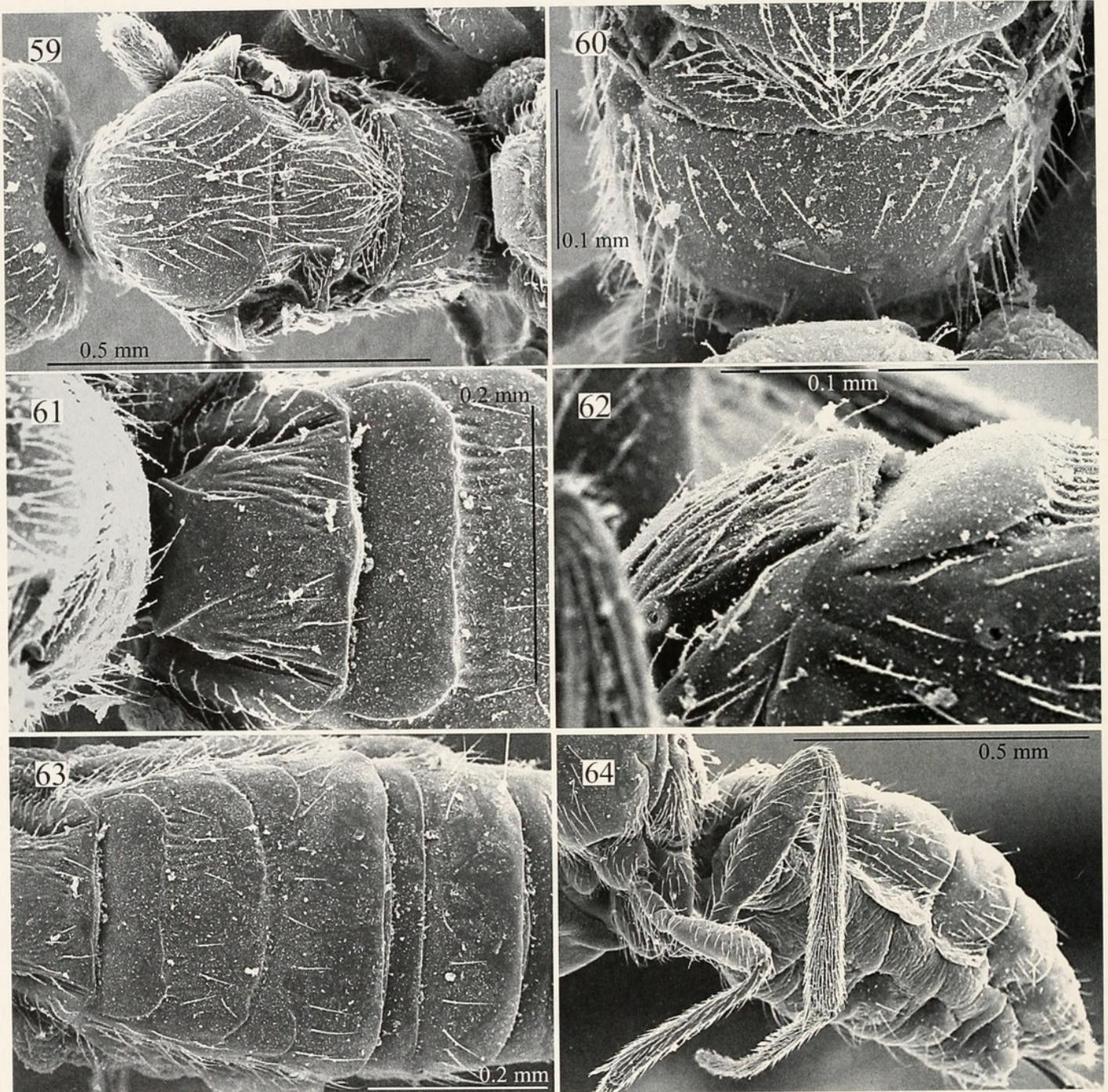


Figs. 54–58. *Pseudognaptodon omissus* Fischer. 54, Ocelli in dorsal view. 55, Head in dorsal view. 56, Head in lateral view. 57, Head in anterior view. 58, Wings.

and remainder dark brown; metasomal T1 covered with fine striae (Fig. 71); most of T2 posterior to basal raised area and base of T3 covered with very coarse, heavy striae, anterolateral corners of T3 defined by

grooves (Fig. 73); Hind wing with spur on angle of M and r-m (Fig. 69).

Holotype female.—*Color*: Body dark brown except as follows: Scape of antenna and face light orange-brown; ventral collar



Figs. 59–64. *Pseudognaptodon omissus* Fischer. 59, Mesosoma in dorsal view. 60, Propodeum in dorsal view. 61, T1 of metasoma in dorsal view. 62, T1 of metasoma in lateral view. 63, Anterior end of metasoma in dorsal view. 64, Hind leg.

of pronotum with light and medium brown areas; legs yellow, except apical tarsomere of fore- and middle leg and entire tarsus of hind leg which are dark brown. *Head*: Length of antennal scape $1.83\times$ width; flagellum with 19 flagellomeres; L/W of first three flagellomeres 3.43, 3.14, 3.14; L/W of apical flagellomere 4.0; MOD $0.80\times$ as long as POD; POD as long as LOL, and $0.80\times$ as long as POL (Fig. 65); OOL $2.00\times$ as long as POL; head

length $0.65\times$ width in dorsal view; occiput slightly evenly curved (Fig. 65); head L/H 0.81 in lateral view; eye L/H 0.63, eyeH/headH 0.67, eye width/gena width 1.88; gena wider ventrally than dorsally (Fig. 66); face completely covered by granular microsculpture, setae as long as clypeus height, clypeus W/H 2.44, clypeus width $1.20\times$ as long as malar space (Fig. 67). *Wings*: Forewing with RS vein straighter near apex than base; RS+Ma

with basal $\frac{1}{3}$ unpigmented, thinner than remainder, point of attachment to M almost obsolete, distance between point of attachment of RS+Ma to M and parastigma $0.60\times$ as long as RS+Mb; 2M spur $3.6\times$ as long as RS+Mb; 2-1A vein present but obsolete and very faintly pigmented on basal $\frac{1}{3}$, first subdiscal cell open (Fig. 69). Hind wing with r-m $1.8\times$ as long as R; angle of M and r-m with posteriorly directed, obsolete, and faintly pigmented spur; apex of R moderately knobbed (Fig. 69). *Mesosoma*: Notauli shallow, not convergent posteriorly, merged with lateral edges of posterior median depression (Fig. 68); propodeum smooth, medioapical carinae straight, medioapical cell open (Fig. 70). *Metasoma*: T1 length $1.04\times$ as long as apical width, lateral margins straight posterior to spiracle, lateral carinae about half of tergum length, finely striate throughout except near base between carinae, (Figs. 71, 72); basal raised area of T2 0.21 of total T2 length, posterior margin of basal raised area irregularly bisinuate; basal $\frac{2}{3}$ of T2 beyond basal raised area coarsely striate; T3 $0.64\times$ as long as T2, coarsely striate between lateral grooves, with anterior and lateral grooves crenulate (Fig. 73). *Legs*: Hind femur length 3.46 maximum width, ventral hairs shorter than femur width at point of attachment (Fig. 74).

Material examined.—HOLOTYPE ♀ (TAMU), labelled as follows: "Venezuela: Aragua 22 km. south Colonia Tovar 900 meters December 23, 1985 P. Kovarik, R. Jones". Also red label "HOLOTYPE" and bordered label "*Pseudognaptodon striatus* Williams Holotype det. D. Williams 2003".

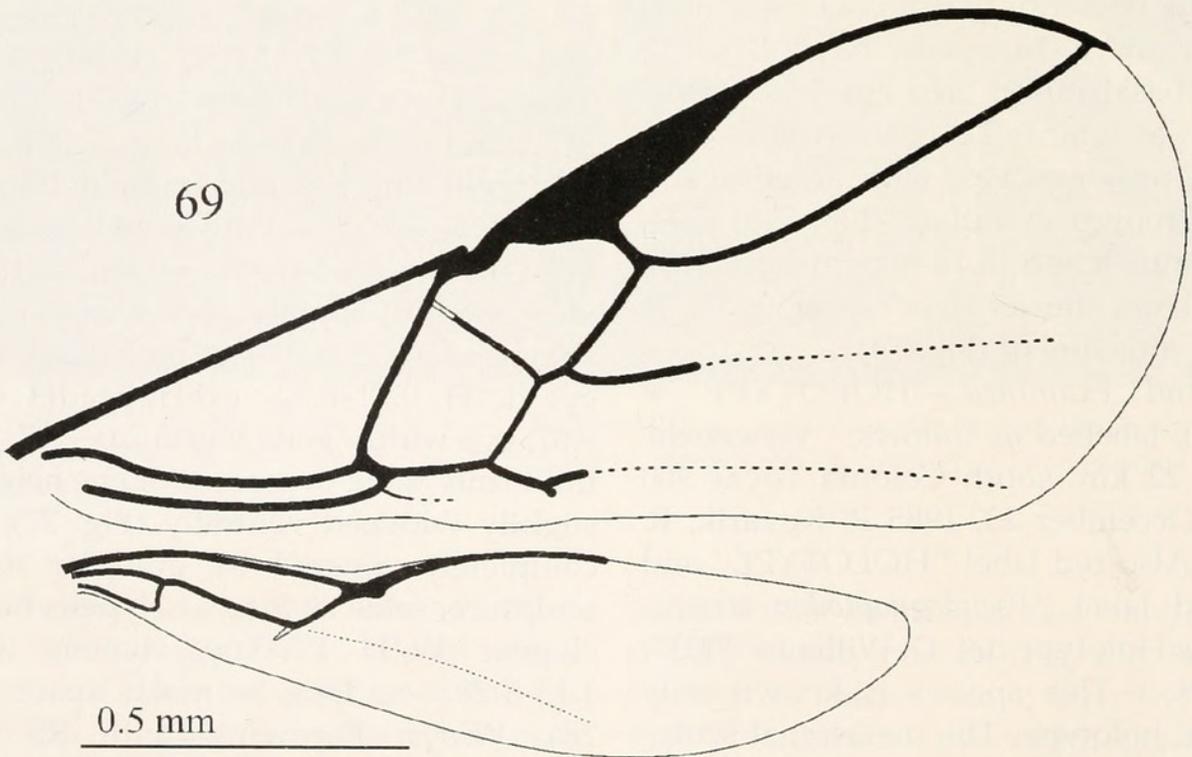
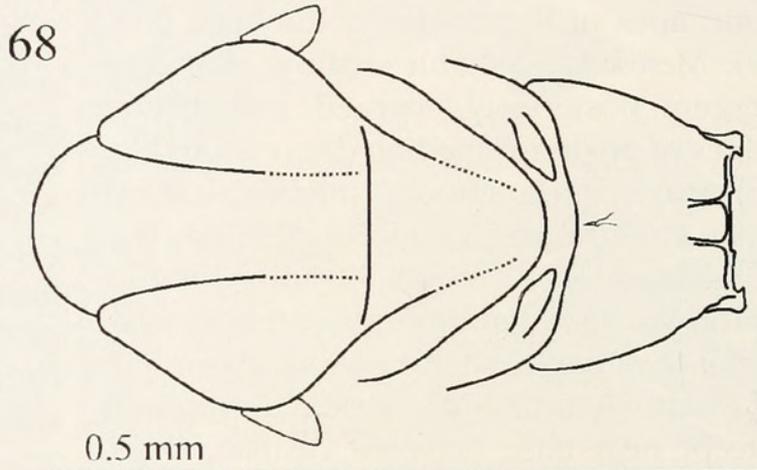
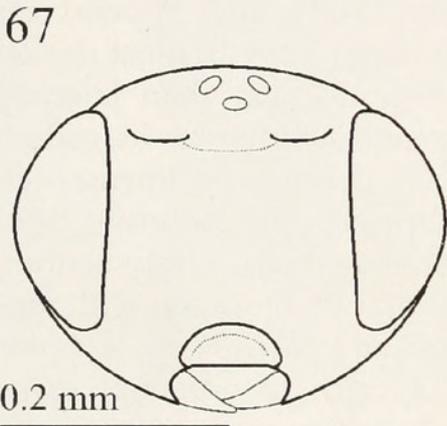
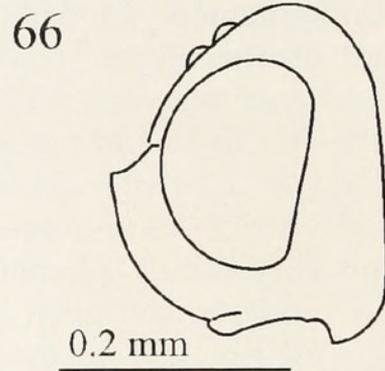
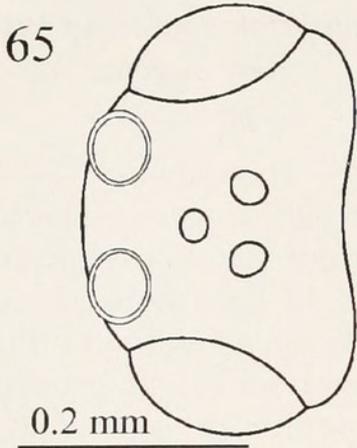
Remarks.—This species is known only from the holotype. The metasomal sculpture and hind wing spur on the M/r-m angle are distinctive characters that support the separation of this specimen from other *Pseudognaptodon* species.

Etymology.—The name *striatus* refers to the sculpture of T2 and T3 of the metasoma.

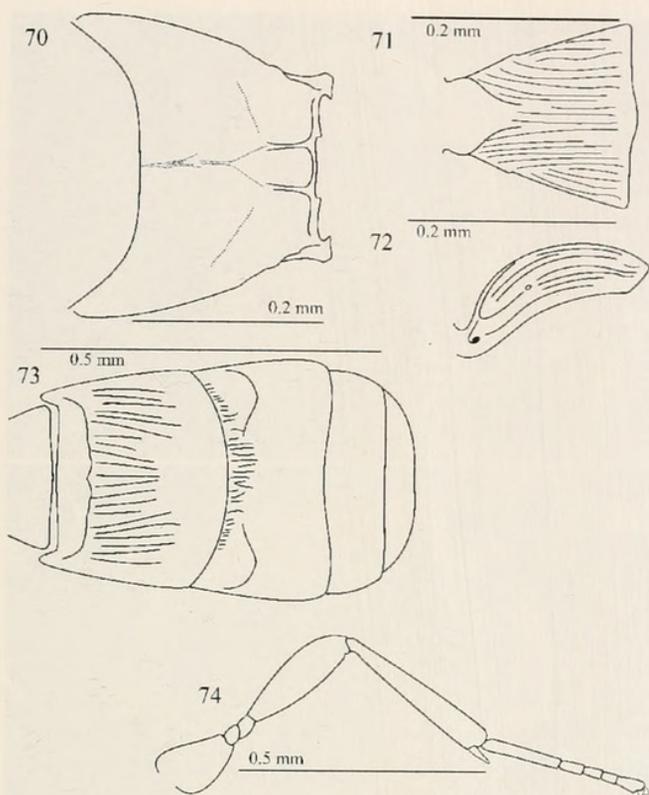
Pseudognaptodon xanthus Williams,
new species
(Figs. 75–85)

Diagnosis.—This species is separated from other *omissus*-group species by the following combination of characters: Body pale yellow to light honey-brown; ocelli finely pitted on medial side (Fig. 75); T1 and T2 of metasoma with grooves smooth and microsculpture somewhat obsolete (Figs. 82, 84).

Female.—*Color*: Body and appendages pale yellow to honey-brown, most darker specimens darker dorsally than laterally or ventrally, except as follows: Flagellum of antenna brown in most specimens; ocellar triangle brown; propodeum light brown in most specimens; rarely scutum of thorax and terga of abdomen with various light brown patches or deeper shades. *Head*: Length of antennal scape 1.5 – 1.6 width; flagellum with 17–18 flagellomeres; L/W of first three flagellomeres 3.3 – 3.8 , 3.3 – 3.8 , 3.0 – 3.3 ; L/W of apical flagellomere 2.7 – 3.7 ; MOD 0.75 – $0.90\times$ as long as POD; POD 0.95 – $1.14\times$ as long as LOL, and 0.75 – $1.00\times$ as long as POL (Fig. 75); ocelli with fine pits medially (Fig. 75); OOL 2.00 – $2.33\times$ as long as POL (Fig. 76); head length 0.61 – $0.66\times$ width in dorsal view; occiput slightly evenly curved (Fig. 76); head L/H 0.79 – 0.89 in lateral view; eye L/H 0.71 – 0.82 , eyeH/headH 0.61 – 0.67 , eye width/gena width 2.0 – 2.17 ; gena uniformly wide over most of eye height to slightly widened ventrally (Fig. 77); face completely covered by granular microsculpture, setae as long as clypeus height, clypeus W/H 1.8 – 3.00 , clypeus width 1.13 – $1.28\times$ as long as malar space (Fig. 78). *Wings*: Forewing with RS vein straighter near apex than base, slightly decurved at point of attachment to R; RS+Ma with basal $\frac{1}{3}$ to entire vein unpigmented, basal $\frac{1}{3}$ thinner than remainder, point of attachment to M almost obsolete in some specimens, distance between attachment of RS+Ma to M and parastigma



Figs. 65-69. *Pseudognaptodon striatus*. 65, Head in dorsal view. 66, Head in lateral view. 67, Head in anterior view. 68, Mesosoma in dorsal view. 69, Wings.



Figs. 70–74. *Pseudognaptodon striatus*. 70, Head in dorsal view. 71, Head in lateral view. 72, Head in anterior view. 73, Mesosoma in dorsal view. 74, Wings.

0.50–0.75 \times as long as RS+Mb; 2M spur 1.60–2.25 \times as long as RS+Mb; 2–1A vein present as a crease to present but obsolete and very faintly pigmented on basal $\frac{2}{3}$, first subdiscal cell open (Fig. 79). Hind wing with r-m 0.5–1.0 \times as long as R; angle of M and r-m without spur or thickened area; apex of R slightly to moderately knobbed (Fig. 79). *Mesosoma*: Notauli shallow, indistinct on posterior half (Fig. 80); propodeum smooth, medioapical carinae slightly arcuate and convergent, medioapical cell open (Fig. 81). *Metasoma*: T1 length 0.85–0.96 \times as long as apical width, lateral margins straight to slightly concave posterior to spiracle, lateral carinae 0.5–0.8 of tergum length, weakly striate lateral to carinae and smooth to weakly striate at apex between carinae (Figs. 82, 83); basal raised area of T2 0.33–0.41 of total T2 length, posterior margin of basal raised area evenly curved, rarely slightly irregular and somewhat obsolete; T2 sculpture obsolete granulostriate to weakly striate near basal raised area to basal half; T3 0.60–0.73 \times as

long as T2, smooth, with anterior and lateral grooves smooth to slightly crenulate (Fig. 84). *Legs*: Hind femur length 3.13–3.88 maximum width, ventral hairs shorter than femur width at point of attachment (Fig. 85).

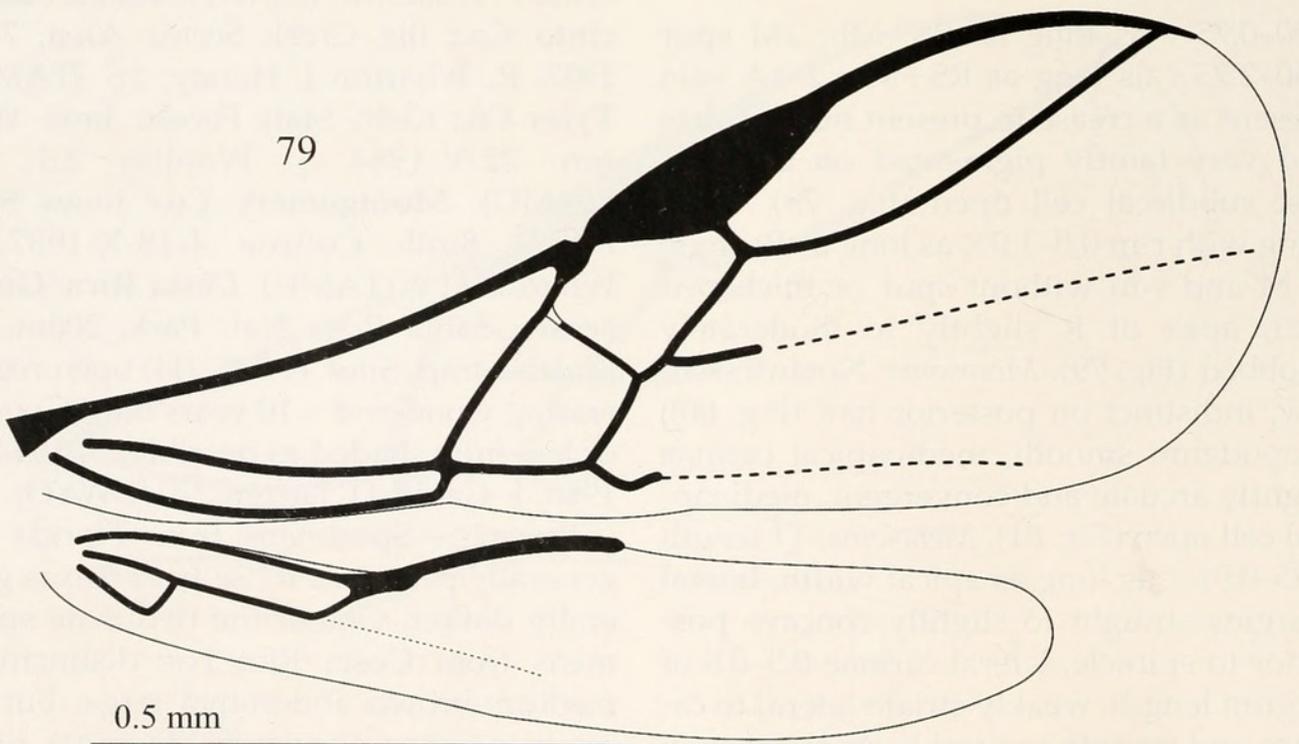
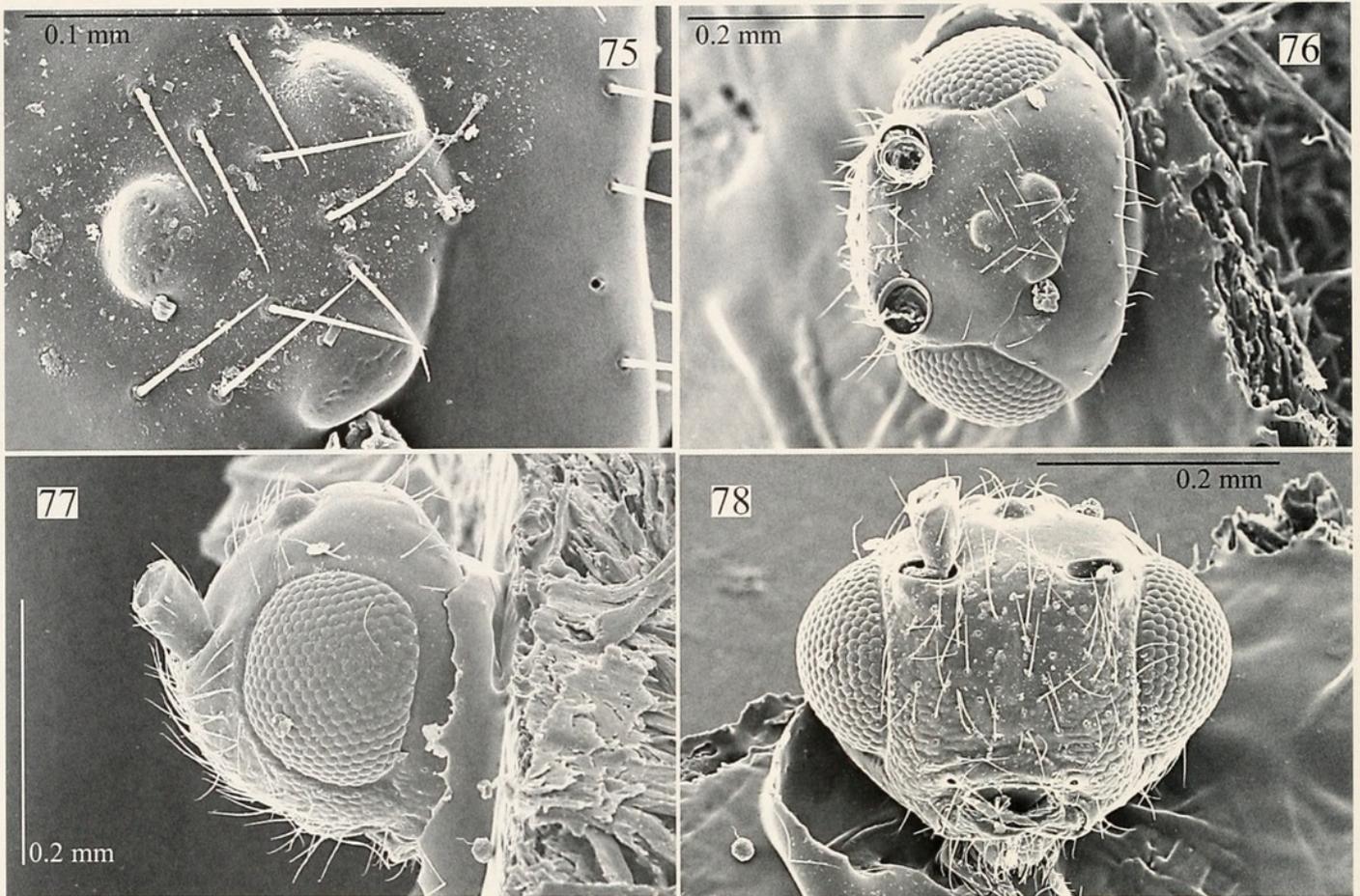
Material examined.—7 δ , 22 ϕ . HOLOTYPE FEMALE (CNCI), labelled as follows: "U.S.A Georgia 15 km. W. Fargo Okefenokee Swamp Nov. 1979 D. Williams coll.". Also red label "HOLOTYPE" and bordered label "*Pseudognaptodon xanthus* Williams Holotype det. D. Williams 2003". PARATYPES: **U.S.A. Georgia**: 15 km W. Fargo, Okefenokee Swamp, XI-1979, D. Williams, 1 δ , 1 ϕ (DJMW), 9 ϕ (CNCI). 15 km W. Fargo, Okefenokee Swamp, 82° 20'W: 40° 30'N, slash pine stand, 13-XI-1979, D. Williams 3 ϕ (RNHL). **Florida: Sarasota Co.**: Myakka, 16-18-I-1984, R. Wharton 1 δ , 2 ϕ (TAMU). **Florida**: Lake Dorr Rec. Area, Ocala Nat. Forest, 20-XI-1979, D. Williams 1 ϕ (gold coated for S.E.M.) (DJMW). **Texas: San Jacinto Co.**: Big Creek Scenic Area, 7-III-1987, R. Wharton J. Heraty, 1 δ (TAMU). **Tyler Co.**: Kirby State Forest, 3miS. Warren, 22-V-1984, J. Woolley 2 δ , 4 ϕ (TAMU). **Montgomery Co.**: Jones State Forest, 8miS. Conroe, 4-18-X-1987, R. Wharton, 1 ϕ (TAMU). **Costa Rica: Guanacaste**: Santa Rosa Nat. Park, 300m, ex. Malaise trap, Site# H-2-C, (H) open regenerating woodland <10 years old, (C) more or less fully shaded as possible, 24-V-14VI-1986, I. Gauld D. Janzen 2 δ (UWYO).

Remarks.—Specimens from Florida are generally pale, and those from Texas generally darker. One of the two male specimens from Costa Rica has distinctively medium-brown abdominal terga, but resembles other specimens in most other characters.

Etymology.—The name *xanthus* refers to the almost entirely yellow body color.

CURTICAUDA GROUP

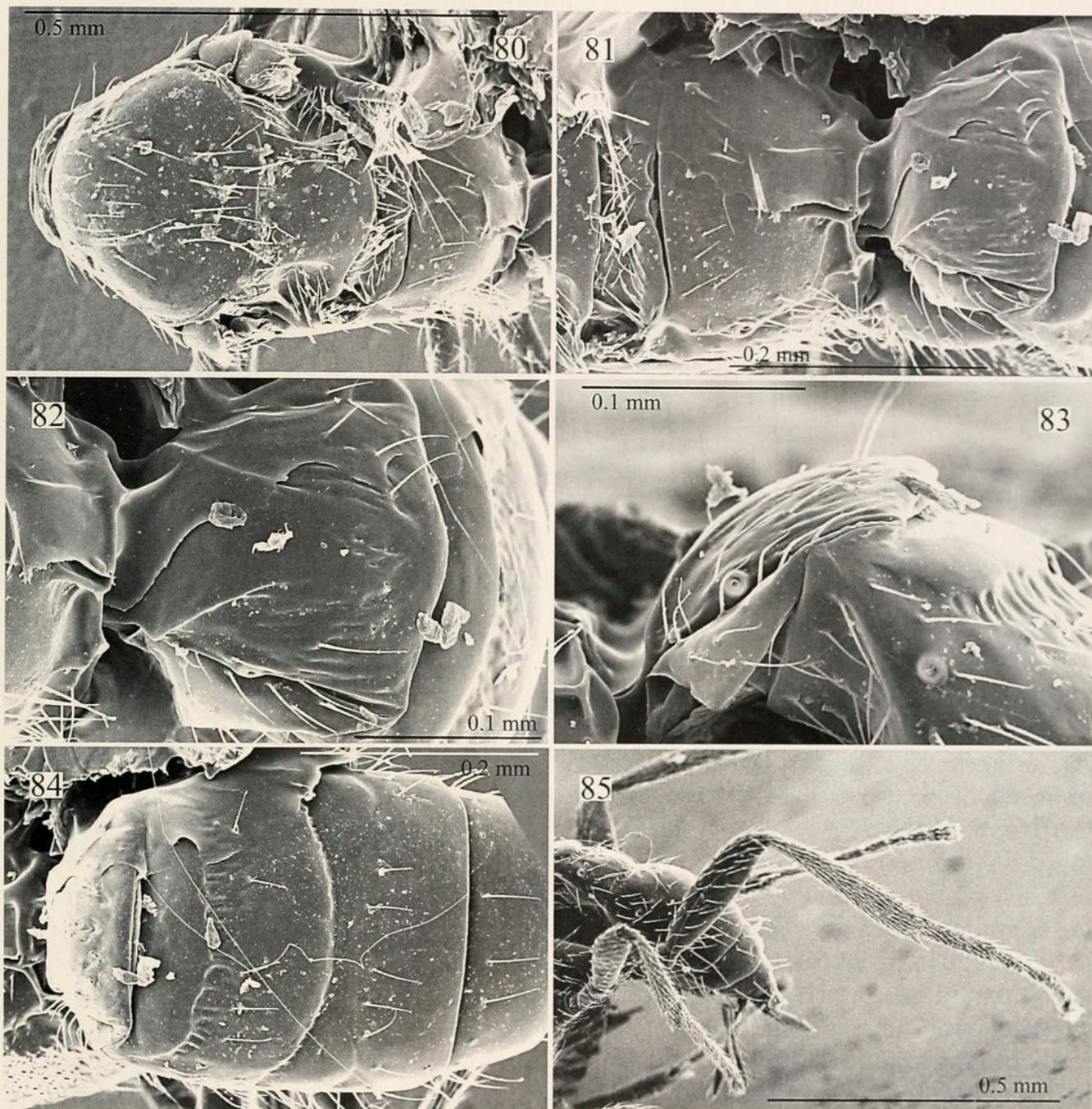
Included species.—This species group includes *Pseudognaptodon curticauda* Fischer,



Figs. 75–79. *Pseudognaptodon xanthus*. 75, Ocelli in dorsal view. 76, Head in dorsal view. 77, Head in lateral view. 78, Head in anterior view. 79, Wings.

P. minutus (Ashmead), and the following new species: *P. brevis*, *P. carinatus*, *P. gibsoni*, *P. hemicolor*, *P. labrus*, *P. minimus*, *P. nitidus*, *P. shawi*, *P. whartoni*, and *P. whitfieldi*.

Remarks.—The species of this group are separated from the *omissus*-group by the following combination of characters: Most species with frons, including ocellar trian-



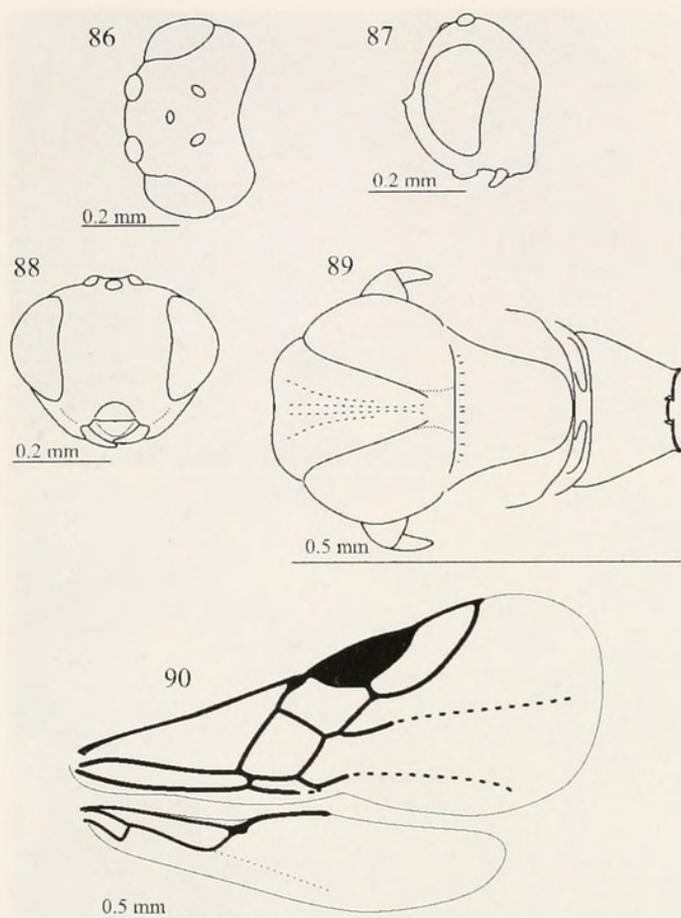
Figs. 80–85. *Pseudognaptodon xanthus*. 80, Mesosoma in dorsal view. 81, Propodeum in dorsal view. 82, T1 of metasoma in dorsal view. 83, T1 of metasoma in lateral view. 84, Anterior end of metasoma in dorsal view. 85, Hind leg.

gle, with fine but distinct granulate sculpture between posterior ocelli and antennal sockets (Figs. 86, 87). Episternal scrobe present as a faint depression or absent (Figs. 2, 3). Propodeum without small depression and/or area of fine wrinkles mediobasally (Figs. 111, 132). T3 of metasoma with anterolateral grooves lacking, or with grooves smooth and faintly impressed near lateral margins of tergite, or with anterolateral areas defined by microsculpture (Figs. 104,

114). Ovipositor barely exerted, setose portion of sheath less than half as long as hind basitarsus (Fig. 115).

Pseudognaptodon brevis Williams, new species
(Figs. 86–95)

Diagnosis.—This species is separated from other *curticauda*-group species by the following combination of characters: Sculpture of frons obsolete except in ocel-



Figs. 86–90. *Pseudognaptodon brevis*. 86, Head in dorsal view. 87, Head in lateral view. 88, Head in anterior view. 89, Mesosoma in dorsal view. 90, Wings.

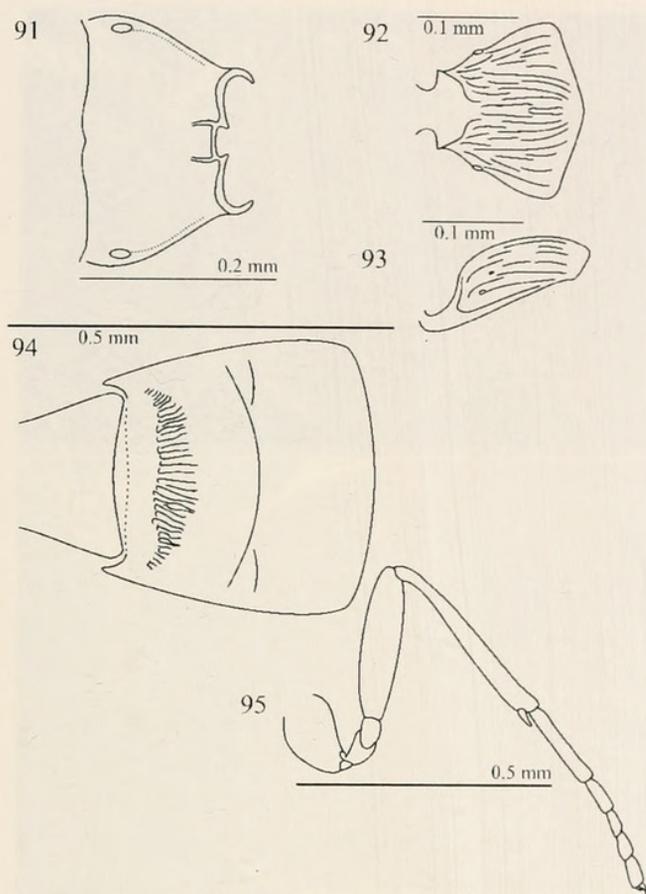
lar triangle; MOD and POD half as long as interocellar distances or less; vein R of forewing shorter than length of stigma on anterior wing margin (Fig. 90).

Holotype female.—*Color*: Body dark brown except for the following: Pedicel and first two flagellomeres orange-brown; legs light orange-brown with brown hind coxa. *Head*: Length of antennal scape $1.5\times$ width; flagellum with 16 flagellomeres: L/W of first three flagellomeres 4.3, 3.9, 3.2; L/W of apical flagellomere 3.0; MOD $0.9\times$ as long as POD; POD $0.5\times$ as long as LOL, and $0.4\times$ as long as POL (Fig. 86); OOL as long as POL (Fig. 86); vertex without granular microsculpture except in ocellar triangle; head length $0.6\times$ width in dorsal view; occiput narrowly indented (Fig. 86); head L/H 0.7 in lateral view; eye L/H 0.7, eyeH/headH 0.6, eye width/gena width 1.8 (Fig. 87); gena wider ventrally than dorsally (Fig. 87); face smooth on medial

$\frac{1}{3}$, with granular microsculpture laterally, setae as long as clypeus height, clypeus W/H 1.8, clypeus width $1.5\times$ as long as malar space (Fig. 88). *Wings*: Forewing with RS vein evenly sharply curved, with R vein shorter than length of stigma on anterior margin; RS+Ma slightly pigmented and evenly sclerotized throughout length; 2M spur $3.0\times$ as long as RS+Mb; 2-A1 present as a sclerotized vein on basal $\frac{2}{3}$ and a pigmented crease on remainder; spur of m-cu present, subdiscal cell closed (Fig. 90). Hind wing with r-m $1.5\times$ as long as R; Rs $5.4\times$ as long as R; apex of R with moderately developed knob (Fig. 90). *Mesosoma*: Mesoscutum with median groove distinct, merged with notauli near posterior margin of mesoscutum, posteromedial depression small (Fig. 89); propodeum with medioapical carinae straight, convergent, basal cell open (Fig. 91). *Metasoma*: T1 $0.9\times$ as long as apical width, lateral margins convex posterior to spiracle, spiracle moderately protuberant, lateral carinae indistinct, merged with other striae; T1 evenly convex and finely striate throughout, except for basal area which is separated from remainder by a transverse ridge (Figs. 92, 93); basal raised area of T2 0.25 of total T2 length, posterior margin of basal raised area irregular; basal raised area margin obscured by coarse striae, T2 otherwise smooth; T3 $0.75\times$ as long as T2, smooth, with anterior groove crenulate (Fig. 94). *Legs*: Hind femur length $4.3\times$ maximum width (Fig. 95).

Material examined.—HOLOTYPE ♀ (CNCI), labelled as follows: "Chile: Mallico: Princessa 20 km W Curacautin, 12.XII.1984–16.II.1985, S&J Peck, 300m, Notho. for.". Also red label "HOLOTYPE" and bordered label "*Pseudognaptodon brevis* Williams Holotype det. D. Williams 2003".

Etymology.—The name *brevis* refers to the very short R vein of the forewing, unique to this species within the genus.



Figs. 91–95. *Pseudognaptodon brevis*. 91, Propodeum in dorsal view. 92, T1 of metasoma in dorsal view. 93, T1 of metasoma in lateral view. 94, Anterior end of metasoma in dorsal view. 95, Hind leg.

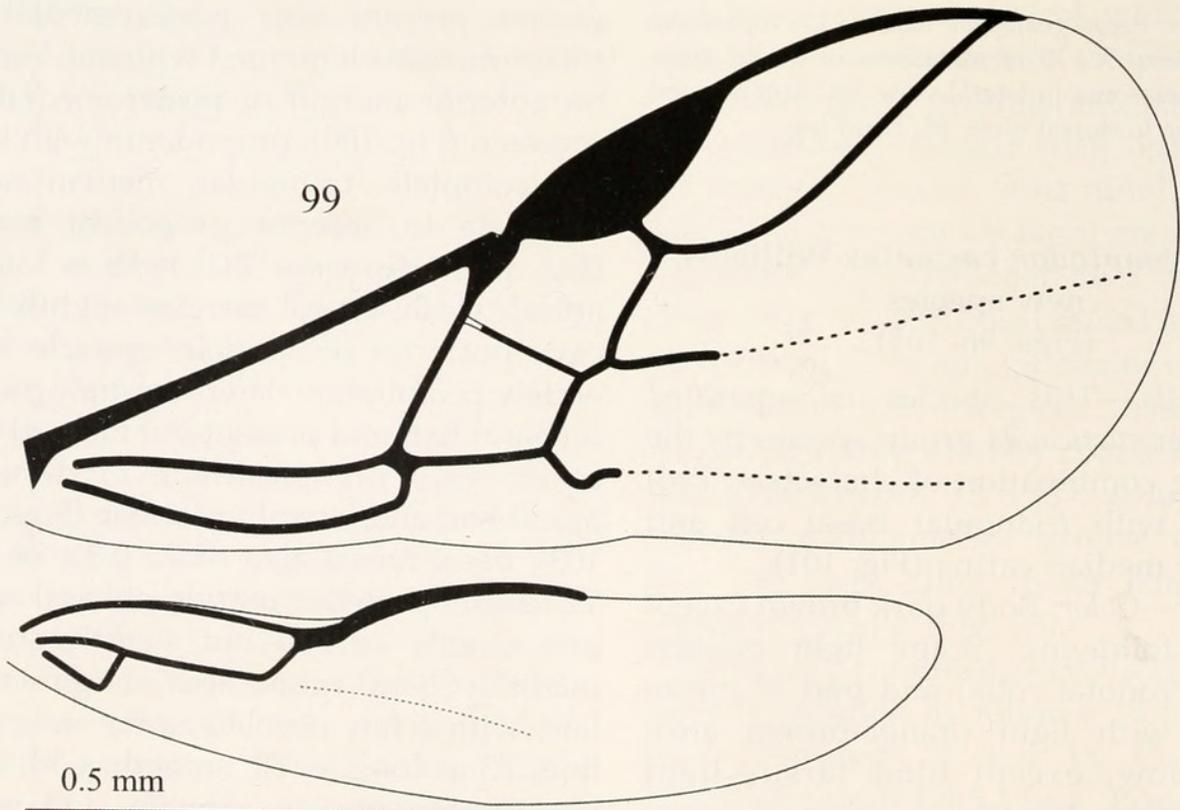
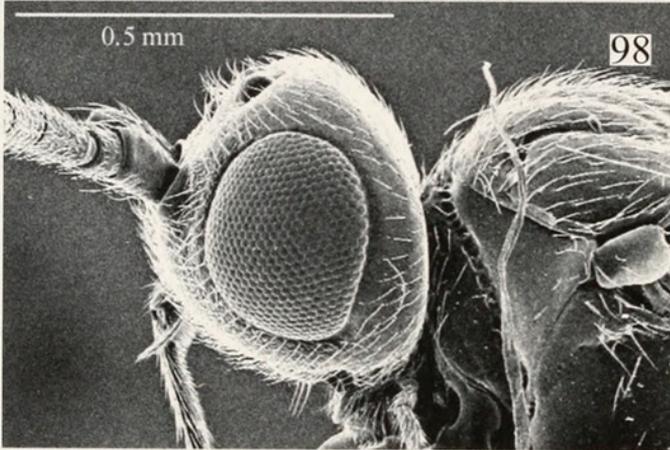
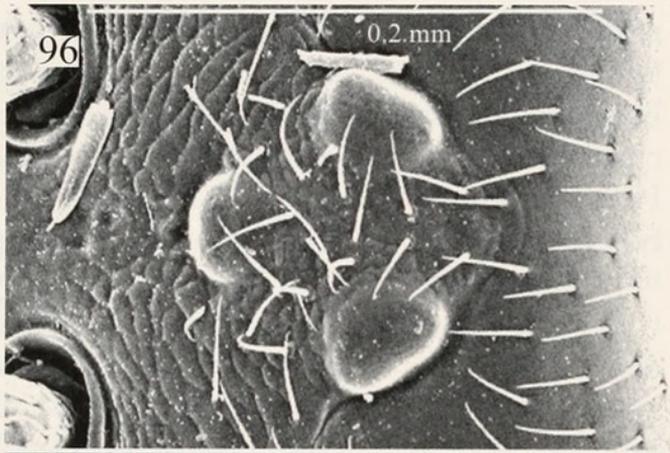
***Pseudognaptodon carinatus* Williams,
new species**
(Figs. 96–105)

Diagnosis.—This species is separated from other *curticauda*-group species by the following combination of characters: Propodeum with triangular basal cell and complete median carina (Fig. 101).

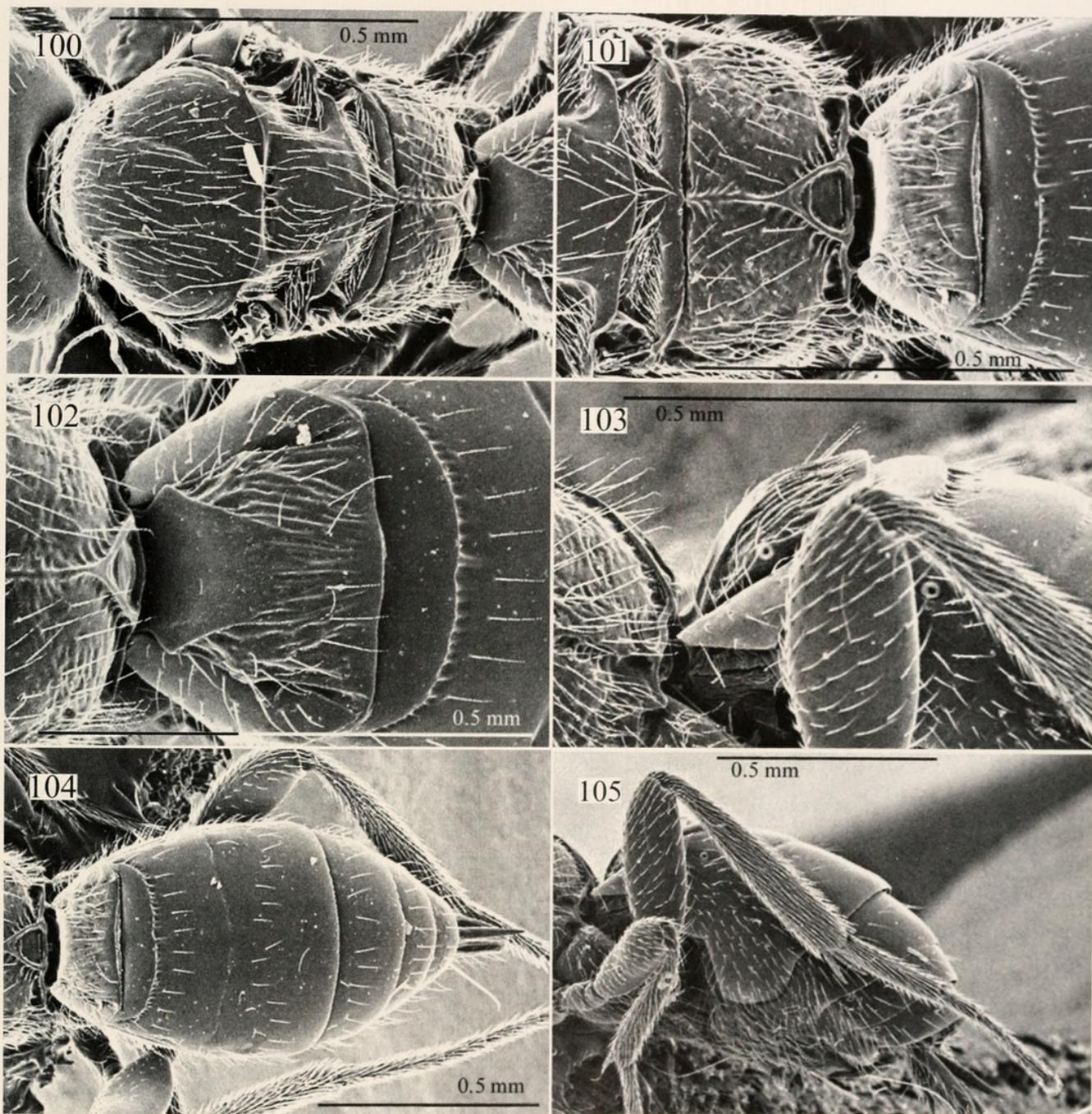
Female.—**Color:** Body dark brown except for the following: Scape light orange-brown; Pronotal collar and part of mesopleuron with light orange-brown area; legs yellow, except hind tarsus light brown. **Head:** Length of antennal scape 1.5–1.6 \times width; flagellum with 20–21 flagellomeres: L/W of first three flagellomeres 2.2, 2, 2.2–2.4; L/W of apical flagellomere 2.3; MOD as long as POD; POD as long as LOL, and 0.8–0.9 \times as long as POL (Fig. 96); OOL 2.0 \times as long as POL (Fig. 97); vertex with well developed granular

microsculpture and fine wrinkles between lateral ocelli and dorsal margin of eye; head length 0.6 \times width in dorsal view; occiput narrowly indented (Fig. 97); head L/H 0.7 in lateral view; eye L/H 0.7, eyeH/headH 0.6, eye width/gena width 1.8 (Fig. 98); gena wider ventrally than dorsally (Fig. 98); face granulate with a polished area dorsal to clypeus and a polished stripe that is narrow dorsally, setae as long as clypeus height, clypeus W/H 2.2, clypeus width as long as malar space. **Wings:** Forewing with RS vein apically decurved; RS+Ma pigmented and tubular, slightly thinner basally than apically; 2M spur 3.0 \times as long as RS+Mb; 2-A1 absent; spur of m-cu absent, first subdiscal cell open (Fig. 99). Hind wing with r-m 1.6 \times as long as R; Rs 6.0 \times as long as R and thickened basally; apex of R with poorly to moderately developed knob (Fig. 99). **Mesosoma:** Mesoscutum with median groove present near posteromedial depression, notauli merged with one another on anterior margin of posteromedial depression (Fig. 100); propodeum with basal cell complete, triangular, median carina complete to anterior propodeal margin (Fig. 101). **Metasoma:** T1 length as long as apical width, lateral margins slightly concave posterior to spiracle, spiracle moderately protuberant, lateral carinae present on basal half and present but merged with coarse striae on apical half; T1 striate on apical half and lateral to carinae (Figs. 102, 103); basal raised area of T2 0.3 \times of total T2 length, posterior margin of basal raised area evenly curved but slightly sinuate medially; basal raised area margin crenulate, with a few obsolete striae near midline; T3 as long as T2, smooth, with anterior groove smooth, sinuate, and somewhat obsolete laterally (Fig. 104). **Legs:** Hind femur length 2.9 \times maximum width (Fig. 105).

Material examined.—3 f , 1 m . HOLOTYPE f (TAMU), labelled as follows: "Mexico: Guerrero 6.2 mi SW Xochipala VII-6-1987 5670 ft R. Wharton". Also red



Figs. 96-99. *Pseudognaptodon carinatus*. 96, Ocelli in dorsal view. 97, Head in dorsal view. 98, Head in lateral view. 99, Wings.



Figs. 100–105. *Pseudognaptodon carinatus*. 100, Mesosoma in dorsal view. 101, Propodeum in dorsal view. 102, T1 of metasoma in dorsal view. 103, T1 of metasoma in lateral view. 104, Anterior end of metasoma in dorsal view. 105, Hind leg.

label "HOLOTYPE" and bordered label "*Pseudognaptodon carinatus* Williams Holotype det. D. Williams 2003". PARATYPES: **Chiapas:** Tapachula, 22-24-IX-1987, R. Wharton, 1♂ (TAMU). **Costa Rica: Guanacaste:** Santa Rosa Nat. Park, ex. Malaise, 300m, site 27.IX, (H) open regenerating woodland <10 years old, (O) in clearing, fully isolated part of day, 18-IX-1986, I. Gauld D. Janzen, 2♀ (UWYO).

Etymology.—The name *carinatus* refers

to the complete median carina of the propodeum.

Pseudognaptodon curticauda Fischer
1967

(Figs. 106–115)

Holotype female.—Mexico, on Mesquite leaf, Brownsville no. 34069, 12-X-1943 (USNM). Examined.

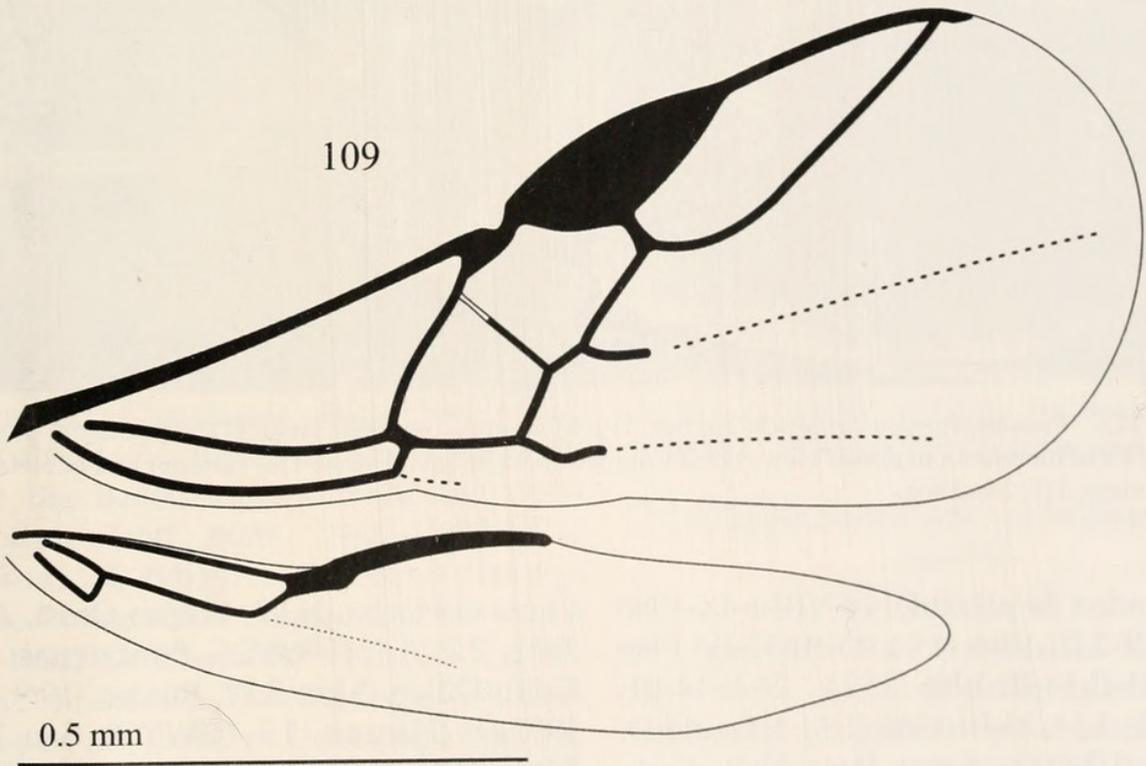
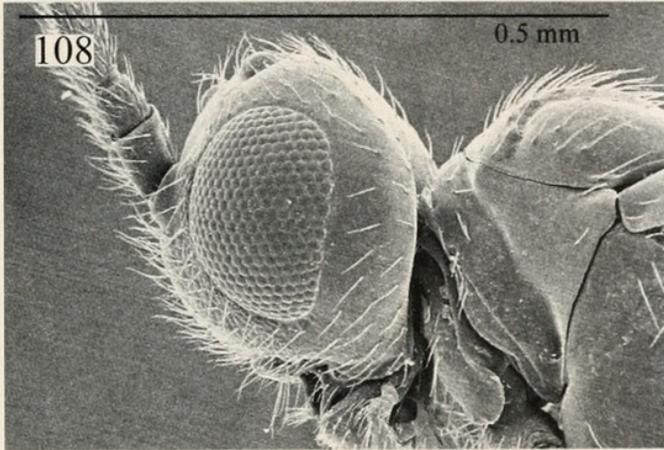
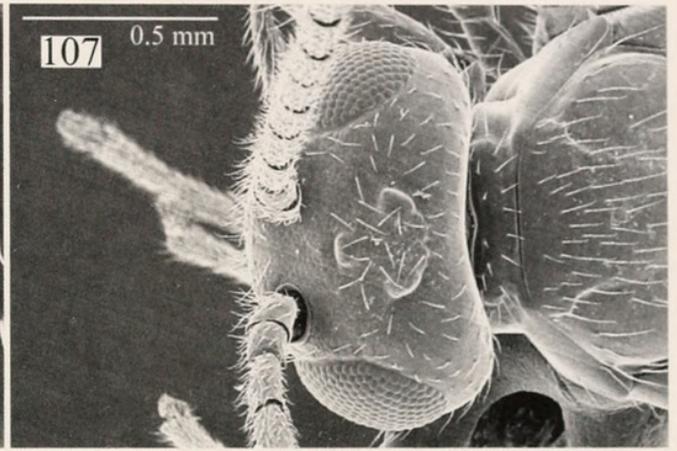
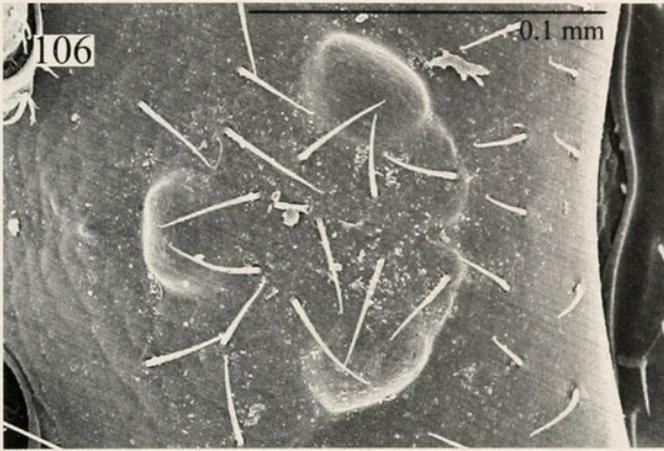
Diagnosis.—This species is separated from other *curticauda*-group species by the

following combination of characters: Head, mesosoma, and most or all of metasoma uniformly dark brown or black in color, rarely with lighter clypeus or pronotal collar; metasoma with T1 about as wide as long (Fig. 112), and T2 finely granulate near apex of basal raised area to most of center of tergum in a semicircular pattern (Fig. 114).

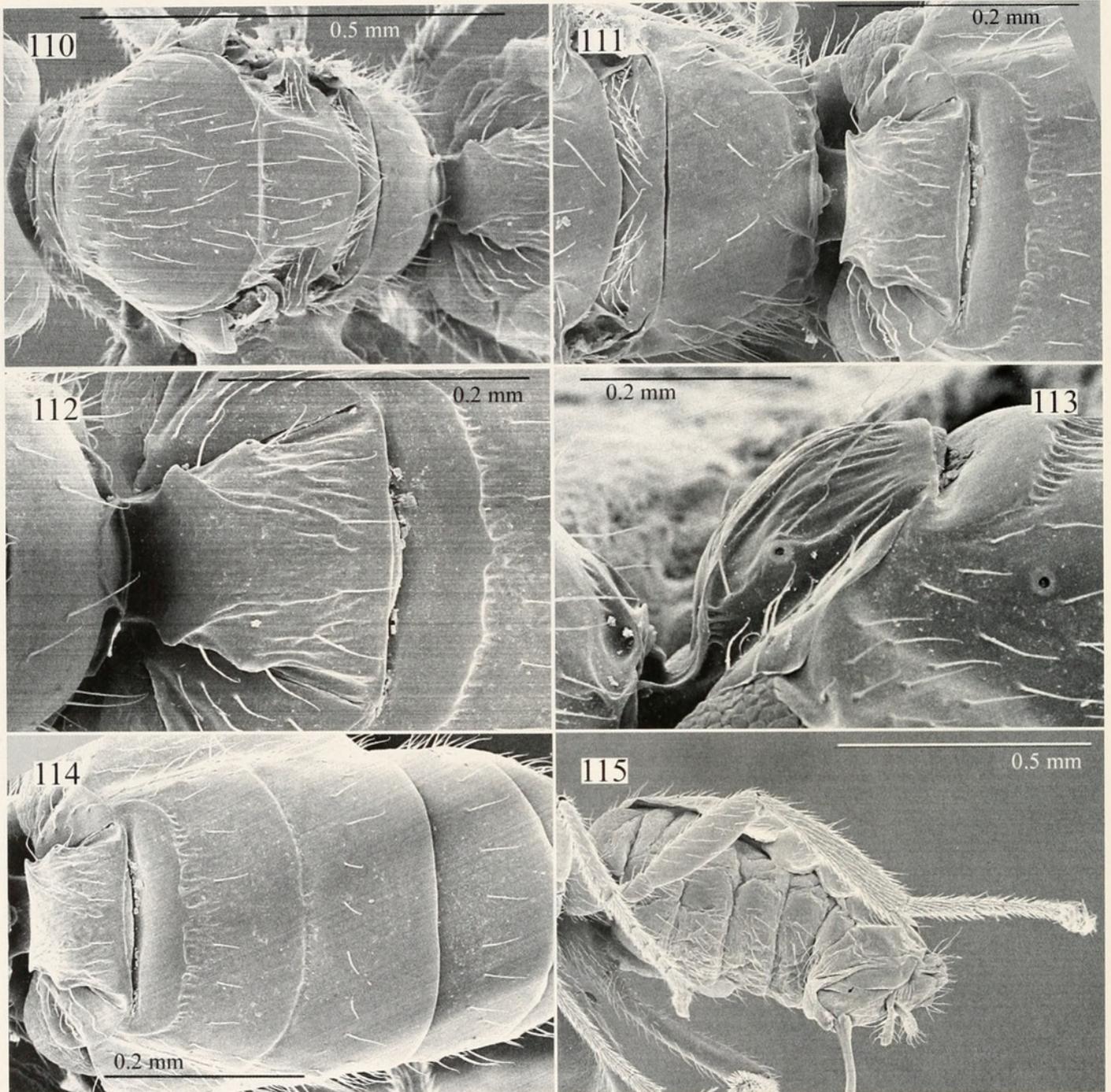
Female.—*Color*: Body dark red-brown to black except as follows: Scape and pedicel yellow to light brown; rarely with clypeus light brown; pronotal collar light orange-brown in some specimens; legs yellow to light orange-brown, rarely with light brown apical tarsomeres and hind tarsus, or hind tibia darker apically, or femora with darker area on dorsal surface. *Head*: Length of antennal scape 1.4–1.8× width; flagellum with 13–17 flagellomeres: L/W of first three flagellomeres 2.5–3.9, 2.2–3.3, 2.3–3.2, rarely with flagellomeres shorter apically; L/W of apical flagellomere 2.3–3.3; MOD 0.6–1.0× as long as POD; POD 0.8–1.0× as long as LOL, and 0.6–1.0× as long as POL (Fig. 106); OOL 1.4–2.1× as long as POL (Fig. 107); vertex with well developed granular sculpture anterior to ocelli to entire vertex granular, with very fine, incomplete suture or fine wrinkles present between lateral ocelli and dorsal eye margin; head length 0.6–0.7× width in dorsal view; occiput shallowly, narrowly to widely indented, head somewhat C-shaped in dorsal view (Fig. 107); head L/H 0.7–0.8 in lateral view; eye L/H 0.6–0.7, eyeH/headH 0.6–0.7, eye width/gena width 1.2–1.9 (Fig. 108); gena parallel sided (Fig. 108); face granulate, rarely with a small polished area dorsal of clypeus and a narrow median polished strip, setae shorter than or as long as clypeus height, clypeus W/H 1.8–3.0, clypeus width 0.8–1.3× as long as malar space. *Wings*: Forewing with RS vein curved but straighter apically than basally, decurved, or decurved and sinuate at midlength; RS+Ma unpigmented on basal 1/3 and tubular throughout length, rarely thinned on basal

half; 2M spur 1.6–3.3× as long as RS+Mb; 2-A1 absent to present as an unpigmented crease on basal half; spur of m-cu absent or present as a very small lobe, first subdiscal cell open (Fig. 109). Hind wing with r-m 0.8–1.3× as long as R; Rs 3.6–5.6× as long as R; apex of R moderately to well developed knob (Fig. 109). *Mesosoma*: Mesoscutum with median groove absent, notauli merged with one another on anterior margin of posteromedial depression (Fig. 110); propodeum with medioapical carinae straight, parallel, and widely separated to cell closed by complete carina, rarely with irregular very fine wrinkles, or with other irregular small carinae (Fig. 111). *Metasoma*: T1 length 0.9–1.2× as long as apical width, lateral margins slightly concave to straight posterior to spiracle, spiracle not to strongly protuberant, lateral carinae present on basal half to complete to apex or nearly so, rarely merged with coarse striae or continuous with lateral margins of a medial raised area; T1 striate throughout except for small area at base of tergum to striate on apical half, (Figs. 112, 113); basal raised area of T2 0.2–0.4 of total T2 length, posterior margin of basal raised area broadly concave with lateral lunules to evenly curved, irregular, slightly medially produced, or rarely toothed; basal raised area margin smooth or weakly crenulate, smooth to granulate on most of tergum posterior to basal raised area in a semicircular pattern; T3 0.8–1.0× as long as T2, smooth to granulate on basal 1/3 of disc, with anterior groove smooth to weakly crenulate, rarely with groove widened or decurved medially (Fig. 114). *Legs*: Hind femur length 2.7–3.6× maximum width (Fig. 115).

Material examined.—**Costa Rica: Guanacaste**: P.N. Santa Rosa, 200m, I-1991, P. Hanson, 2♀ (UWYO). Guanacaste Conservation Area, Santa Rosa hdq., 200m, light trap, 7-VII-1997, L. van der Ent, 1♀ (UWYO). Santa Rosa Natl. Park, 300m, ex. Malaise trap, (H) open regenerating woodland <10 years old, (C) more or less



Figs. 106–109. *Pseudognaptodon curticauda* Fischer. 106, Ocelli in dorsal view. 107, Head in dorsal view. 108, Head in lateral view. 109, Wings.



Figs. 110-115. *Pseudognaptodon curticauda* Fischer. 110, Mesosoma in dorsal view. 111, Propodeum in dorsal view. 112, T1 of metasoma in dorsal view. 113, T1 of metasoma in lateral view. 114, Anterior end of metasoma in dorsal view. 115, Hind leg.

fully shaded as possible, 14-VIII-6-IX-1986 (1♂), 8-II-2-III-1986 (1♀), 23-III-13-IV-1986 (1♀), 21-II-14-III-1986 (1♀), 26-II-14-III-1987 (3♀, 1♂), 23-III-1986 (1♂), I. Gauld D. Janzen, (UWYO). Santa Rosa Natl. Park, 300m, ex. Malaise trap, (H) open regenerating woodland <10 years old, (O) in clearing fully isolated part of the day, 28-XII-1985-18-I-1986, I. Gauld D. Janzen, 1♀ (UWYO). Estac. Pitilla, 9 km S. Santa Cecilia, 700m, V-1989, I. Gauld, 1♀ (UWYO).

Cerro el Hacha, N.W. Volcan Orosi, 300m 1988, 2♀, 1♂ (UWYO). **Puntarenas:** R.F. Golfo Dulce, 3 km S.W. Rincon, 10m, XII-1992, P. Hanson, 1♀ (UWYO). San Vito, Estac. Biol. Las Alturas, 1500m, III-1992, P. Hanson, 1♀ (UWYO). **Mexico: Guerrero:** 6.2mi S.W. Xochipala, 13-VII-1985, Woolley & Zolnerowich, 3♀ (TAMU). 6mi E. Xochipala, 13-VII-1985, Woolley & Zolnerowich, 3♂, 2♀ (TAMU). 6mi E. Xochipala, 18-VII-1985, Woolley & Zolnerowich, 2♀,

1♂ (TAMU). 15miW. Chichihualco, elev. approx. 1500', 15-VII-1984, J. Woolley, 1♀ (TAMU). 2miN. Cacahuamilpa, 19-VII-1984, J. Woolley, 1♂ (TAMU). 17miE. Tixtla, 11-VII-1985, J. Woolley G. Zolnerowich, 1♀, 1♂ (TAMU). 7miW. Chilapa, 16-VII-1984, J. Woolley, 3♀, 1♂ (TAMU). 32miS.E. Petalan, 10-VII-1985, Woolley & Zolnerowich, 2♀ (TAMU). **Michoacan:** 49miS.E. Aguila, 13-VII-1984, J. Woolley, 1♀ (TAMU). 2miS. Carapan, 6-VII-1985, Woolley & Zolnerowich, 1♂ (TAMU). **Oaxaca:** 8miN.E. El Punto, 18-VII-1985, Woolley & Zolnerowich, 1♀ (TAMU). 10.8miS. El Punto, 6100', 9-VII-1987, R. Wharton, 1♀ (TAMU). Puerto Escondido, 15-VII-1985, Woolley & Zolnerowich, 1♀ (TAMU). 6miN.E. Mitla, 20-VII-1985, J. Woolley G. Zolnerowich, 5♀, 4♂ (TAMU). 19miS. San Miguel Suchixtepec, 17-VII-1985, Woolley & Zolnerowich 2♀ (TAMU). 17miN.W. Tehuantepec, 15-VII-1987, R. Wharton, 1♀ (TAMU). 10miS.E. Totolapam, 4000', 20-VII-1987, R. Wharton, 1♀ (TAMU). 3.2miS.W. La Cumbre, 18-VII-1985, Woolley & Zolnerowich, 1♂ (TAMU). **Puebla:** 5miS.E. Izucar de Matamoros, 20-VII-1984, J. Woolley, 3♀, 1♂ (TAMU). **U.S.A.: Arizona: Santa Cruz Co.:** 1.0miS. Pena Blanca Lk., 4100', 6-VIII-1982, G. Gibson, 1♀ (DJMW). **California: S.L.O. Co.:** S.L.O. reservoir, 21-V-1975, R. Wharton, 1♀ (TAMU). **New Mexico: Otero Co.:** Cloudcroft, 8600', 24-VII-1982, G. Gibson, 2♂ (DJMW). **Texas: Brewster Co.:** Big Bend National Park, Oak Cyn, Window Trail, 5400', 24-27-VI-1982, G. Gibson, 2♀ (DJMW). Big Bend National Park, Cottonwood Campsite, 2300', 13-14-VII-1982, G. Gibson, 2♂ (DJMW). **Culberson Co.:** 3.6miS. Pine Springs, old Guadalupe Pass Road nr. Guadalupe Springs, 5200', sweeping flowering *Acacia constricta*, 20-22-VII-1982, G. Gibson, 1♀, 1♂ (DJMW). Guadalupe Nat'l Park, Choza Springs, 5100', 22-VII-1982, 1♀, 2♂ (DJMW). **Hidalgo Co.:** Bensten Rio Grande State Park, 15-XII-1983, J. Woolley H. Browning, 1♀, 1♂ (TAMU). **Kerr Co.:**

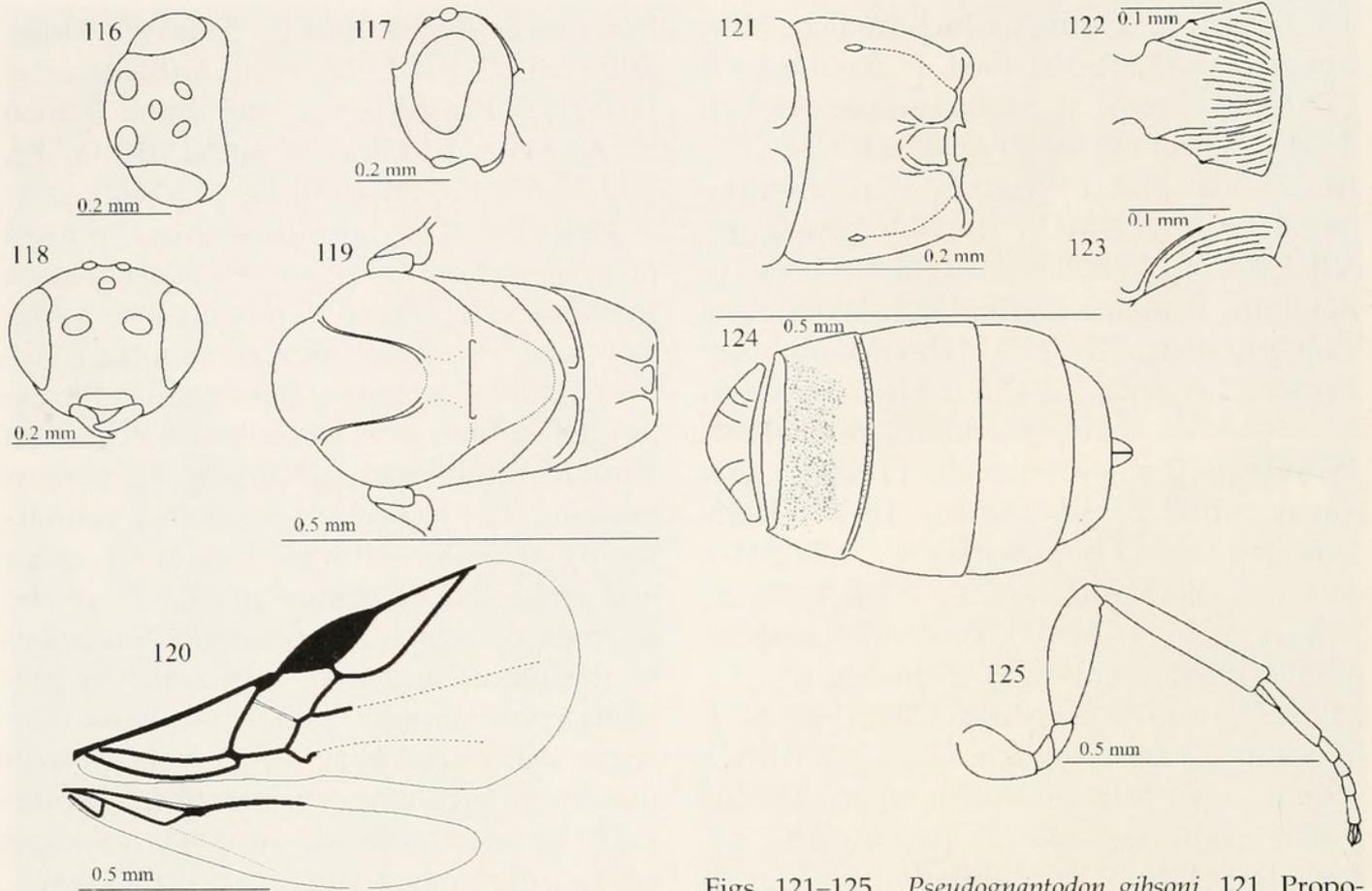
Stumbergs Patio Ranch, 5.6miW. Hunt, 2000', 1-2-VII-1982, G. Gibson, 2♂ (DJMW). **Presidio Co.:** Big Bend Ranch SNA, Agua Adentro, 29° 40'N, 104° 06'W, 14-V-1990, R. Wharton, 1♂ (TAMU).

Remarks.—This species shows the most character variation of any *Pseudognaptodon* in this study. There is much more variation in *P. curticauda* than *P. minutus* (Ashmead) and *P. whartoni* new species for example, which are described here from similar numbers of specimens. Specimens assigned to this species are united primarily by overall uniform dark body color and granulate sculpture of T2+T3 of the metasoma, which are common characters in the genus and may represent the plesiomorphic states. These specimens may represent several very similar species with overlapping ranges of characters. The majority of specimens are from the adjacent Mexican states Guerrero and Oaxaca. These specimens are the most uniform in appearance, and the most similar to the holotype. Short series or single specimens from Costa Rica and the United States vary in color, wing venation, shape and sculpture of metasomal T1, and other characters that are usually important in species diagnosis. These differences are consistent, but less in magnitude than difference among other species in the genus. It cannot be determined from the specimens available if this represents geographic variation or separate species.

Pseudognaptodon gibsoni Williams, new species

(Figs. 116–125)

Diagnosis.—This species is separated from other *curticauda*-group species by the following combination of characters: Metasoma yellow, with slight brown tint on middle of dorsal surface of terga from T3 to end of metasoma; T1 of metasoma slightly wider apically than long (Fig. 122); T2 of metasoma finely granulate, near apex of basal raised area to most of center of tergum (Fig. 124).



Figs. 116–120. *Pseudognaptodon gibsoni*. 116, Head in dorsal view. 117, Head in lateral view. 118, Head in anterior view. 119, Mesosoma in dorsal view. 120, Wings.

Female.—*Color*: Head and mesosoma dark brown except for the following: Scape yellow; clypeus light orange-brown; pronotal collar light to medium orange-brown; metasoma yellow, with light brown tint on dorsal surface of T3 to end of metasoma. *Head*: Length of antennal scape $1.6\text{--}1.8\times$ width; flagellum with 18 flagellomeres: $L\text{♀}W$ of first three flagellomeres $2.7\text{--}2.8$, 2.3 , $2.2\text{--}2.3$; $L\text{♀}W$ of apical flagellomere 2.3 ; MOD $0.8\text{--}0.9\times$ as long as POD; POD $0.8\text{--}0.9\times$ as long as LOL, and $0.7\times$ as long as POL; OOL $1.2\text{--}1.4\times$ as long as POL (Fig. 116); vertex with well developed granular sculpture anterior to ocelli; head length $0.6\text{--}0.6\times$ width in dorsal view; occiput narrowly indented (Fig. 116); head L/H $0.6\text{--}0.7$ in lateral view; eye L/H $0.5\text{--}0.6$, eyeH/headH 0.6 , eye width/gena width $0.9\text{--}1.2$ (Fig. 117), gena wider ventrally than dorsally (Fig. 117); face granulate with a narrow median polished

Figs. 121–125. *Pseudognaptodon gibsoni*. 121, Propodeum in dorsal view. 122, T1 of metasoma in dorsal view. 123, T1 of metasoma in lateral view. 124, Anterior end of metasoma in dorsal view. 125, Hind leg.

strip, setae much shorter than clypeus height, clypeus W/H $2.4\text{--}2.6$, clypeus width $1.4\times$ as long as malar space (Fig. 118). *Wings*: Forewing with RS vein straight on apical half; RS+Ma unpigmented, thinned on basal half to obsolete near base; 2M spur $1.8\text{--}2.2\times$ as long as RS+Mb; 2-A1 present as an unpigmented crease on basal half; spur of m-cu absent, first subdiscal cell open (Fig. 120). Hind wing with r-m $1.3\text{--}1.5\times$ as long as R; Rs $4.4\text{--}5.8\times$ as long as R; apex of R with well developed knob (Fig. 120). *Mesosoma*: Mesoscutum with median groove absent, notauli merged with one another on anterior margin of posteromedial depression (Fig. 119); propodeum with medioapical carinae slightly converging, widely separated, irregular very fine wrinkles inside basal cell nearly closing cell apex (Fig. 121). *Metasoma*: T1 length $1.1\text{--}1.3\times$ as long as apical width, lateral margins straight posterior to spiracle, spiracle slightly protuber-

ant, lateral carinae present on basal half; T1 striate on apical half and lateral to carinae (Figs. 122, 123); basal raised area of T2 0.3 of total T2 length, posterior margin of basal raised area evenly curved; basal raised area margin smooth to slightly crenulate, granulate on most of tergum posterior to basal raised area in a semicircular pattern; T3 0.8–0.9× as long as T2, smooth, with anterior groove weakly crenulate and evenly curved (Fig. 124). *Legs*: Hind femur length 3.5–3.7× maximum width (Fig. 125).

Material examined.—HOLOTYPE ♀ (CNCI), labelled as follows: "USA Texas Ward Co.: Monahans St. Pk., 6.0 mi N.E. Monahans 3000' 22.VI.82 G.A.P. Gibson, sweeping *Quercus havardi*". Also red label "HOLOTYPE" and bordered label "*Pseudognaptodon gibsoni* Williams Holotype det. D. williams 2003". PARATYPE: 1♀ with same data as holotype (CNCI).

Etymology.—This species is named for Gary Gibson, whose collection of specimens of several undescribed species (including the above) started me on this project.

***Pseudognaptodon hemicolor* Williams,
new species**
(Figs. 126–135)

Diagnosis.—This species is separated from other *curticauda*-group species by the following combination of characters: Ocular triangle darker in color than vertex, face lighter laterally than medially; propodeum with basal cell closed (Fig. 132); metasoma medium to dark brown apically, yellow to light orange-brown on lateral margins or most of first two or three terga; junction of RS+Ma and 1M apical of mid-length of discal cell (Fig. 130); T1 of metasoma slightly wider apically than long (Fig. 133); T2 of metasoma finely granulate, near apex of basal raised area to most of tergum disc in a semicircular pattern (Fig. 135).

Female.—*Color*: Body medium red-brown except as follows: Scape yellow;

clypeus yellow to light orange-brown in some specimens, face lighter brown near eye margins than medially; light orange-brown laterally on first two or three metasomal terga; legs yellow with light brown first hind tarsomere. *Head*: Length of antennal scape 1.5–1.8× width; flagellum with 16–19 flagellomeres: L/W of first three flagellomeres 2.3–3.0, 2.1–2.7, 2.1–2.5; L/W of apical flagellomere 2.7–2.9; MOD 0.9–1.0× as long as POD; POD 0.8–1.0× as long as LOL, and 0.6–0.8× as long as POL (Fig. 126); OOL 1.5–2.0× as long as POL (Fig. 127); vertex with well developed granular sculpture anterior to ocelli, very fine suture or fine wrinkles present between lateral ocelli and dorsal eye margin; head length 0.6× width in dorsal view; occiput narrowly, medially indented (Fig. 127); head L/H 0.7–0.8 in lateral view; eye L/H 0.6–0.7, eyeH/headH 0.6, eye width/gena width 1.2–1.5 (Fig. 128); gena parallel sided (Fig. 128); face completely granulate to a small polished area dorsal of clypeus and a narrow median polished strip, setae shorter than or as long as clypeus height, clypeus W/H 2.0–2.3, clypeus width 1.1× as long as malar space (Fig. 129). *Wings*: Forewing with RS vein decurved apically; RS+Ma unpigmented, tubular throughout length, rarely thinned on basal half and obsolete at extreme base, about as long as 1M; 2M spur 2.0–3.3× as long as RS+Mb; 2-A1 absent; spur of m-cu absent, first subdiscal cell open (Fig. 130). Hind wing with r-m 1.0–1.3× as long as R; Rs 4.2–5.2× as long as R; apex of R with well developed knob (Fig. 130). *Mesosoma*: Mesoscutum with median groove absent to faint, notauli merged with lateral margins of postero-medial depression (Fig. 131); propodeum with medioapical carinae enclosing a basal cell (Fig. 132). *Metasoma*: T1 length 0.9–1.1× as long as apical width, lateral margins straight posterior to spiracle, spiracle slightly protuberant, lateral carinae present on basal 1/3 to 2/3, poorly developed in some specimens; T1 weakly granulostriate

on apical half and lateral to carinae, rarely nearly smooth (Figs. 133, 134); basal raised area of T2 0.2–0.4 of total T2 length, posterior margin of basal raised area evenly curved, rarely obsolete; basal raised area margin smooth to slightly crenulate, granulate on most of tergum posterior to basal raised area in a semicircular pattern; T3 0.9–1.1× as long as T2, smooth, with anterior groove crenulate (Fig. 135). *Legs*: Hind femur length 2.9–3.7× maximum width.

Material examined.—HOLOTYPE ♀ (FSCA), labelled as follows: upper label "Florida: Alachua Co., Gainesville Doyle Connor Building", and lower label "H.V. Weems Jr. and C.R. Artaud 12-XI-1971 Malaise trap". Also red label "HOLOTYPE" and bordered label "*Pseudognaptodon hemicolor* Williams Holotype det. D. Williams 2003". PARATYPES: **U.S.A.:** **Florida: Alachua Co.:** Gainesville, Doyle Connor Building, Malaise trap, 12-XI-1971, H Weems C. Artaud, 1 ♀ (FSCA). S9-T10S-R18E, Pierce's Homestead, Malaise trap, 1-XI-1973 (1 ♀), 19-XI-1973 (1 ♀), 10-V-1974 (1 ♂), W. Pierce (FSCA). **Wakulla Co.:** F.W. Mead Sta. 20-IV-1955, C. Muesebeck 1 ♀ (FSCA). **North Carolina: Wake Co.:** Raleigh, 9-VIII-1983, J. Whitfield 1 ♀ (JWCI).

Etymology.—The name *hemicolor* refers to coloration of the metasoma.

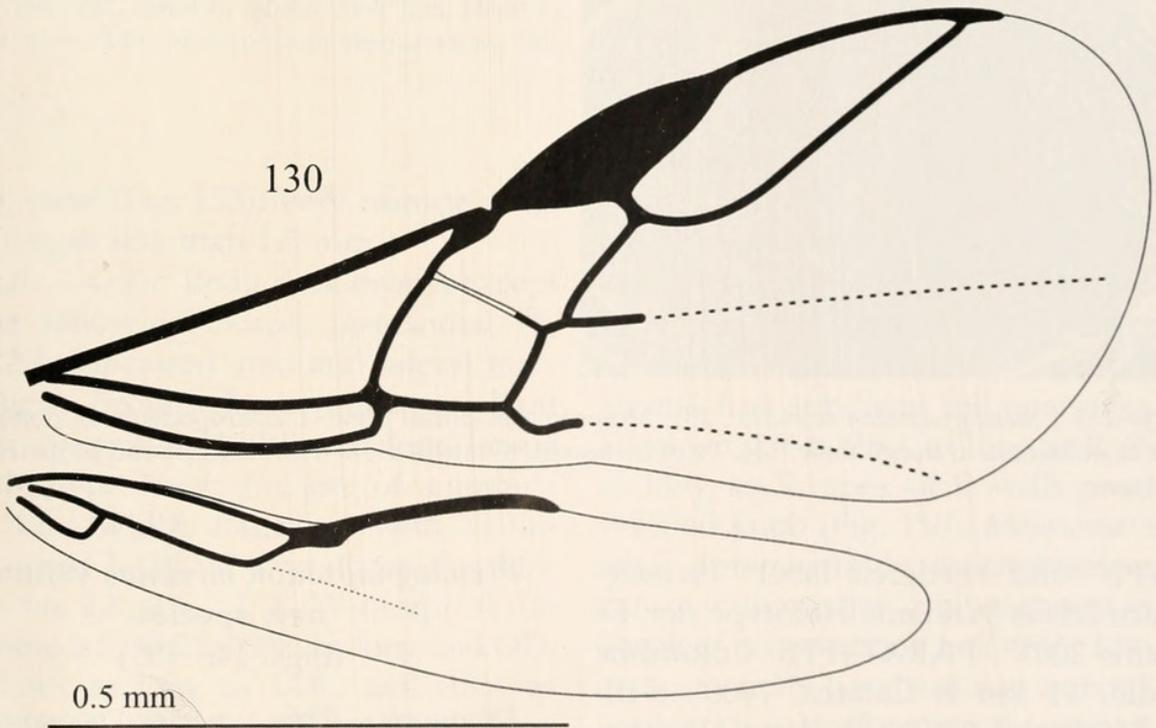
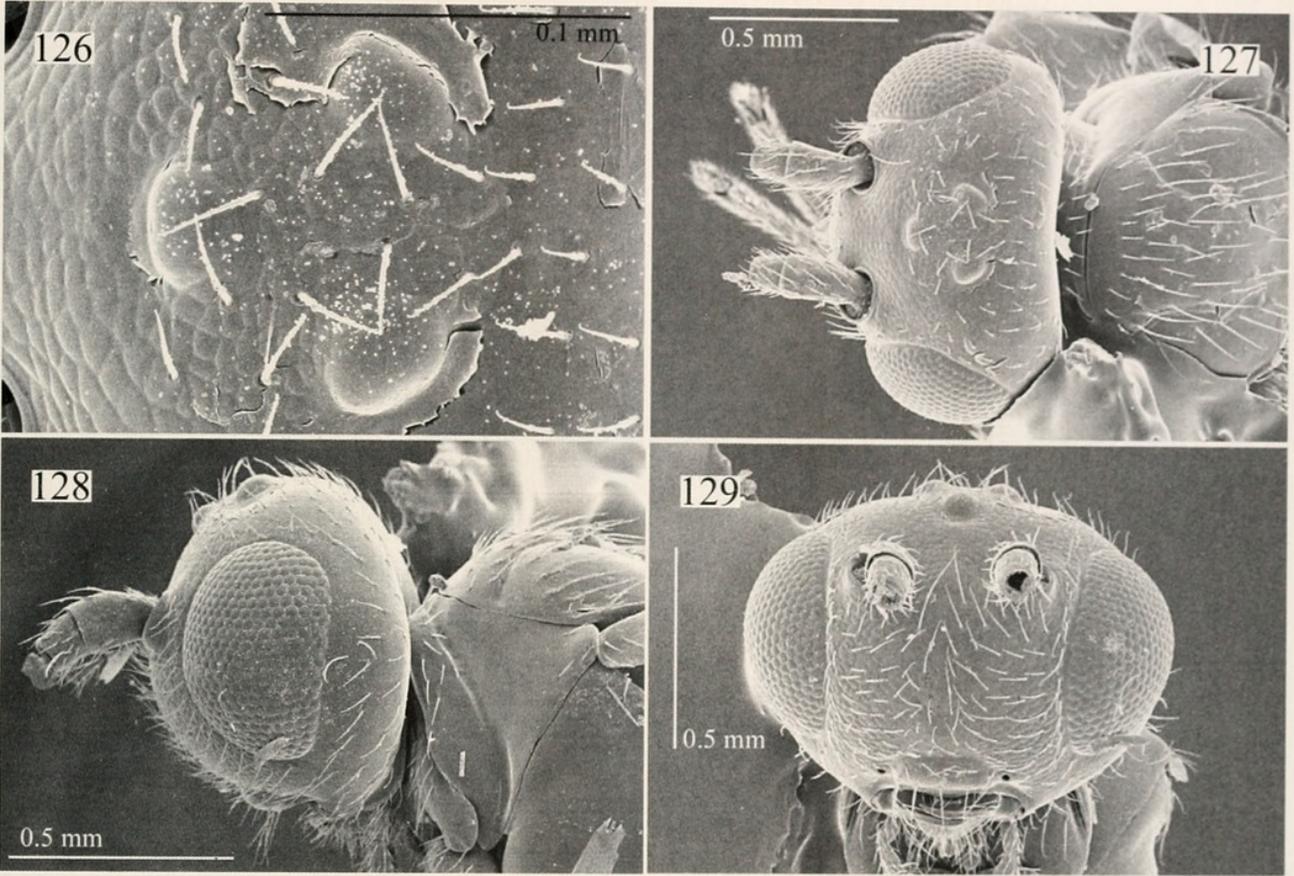
Pseudognaptodon labrus Williams, new species

(Figs. 136–145)

Diagnosis.—This species is separated from other *curticauda*-group species by the following combination of characters: Body dark brown; labrum apically truncate, as large as clypeus, dark brown (Fig. 138); Forewing vein 2M markedly longer than RS+Ma (Fig. 140); Forewing vein 2-A1 pigmented for most of length, first subdiscal cell closed (Fig. 140).

Holotype female.—*Color*: Body dark brown to black except for the following: legs orange-brown, with apical tarsomeres, base of hind coxa, apical half of hind

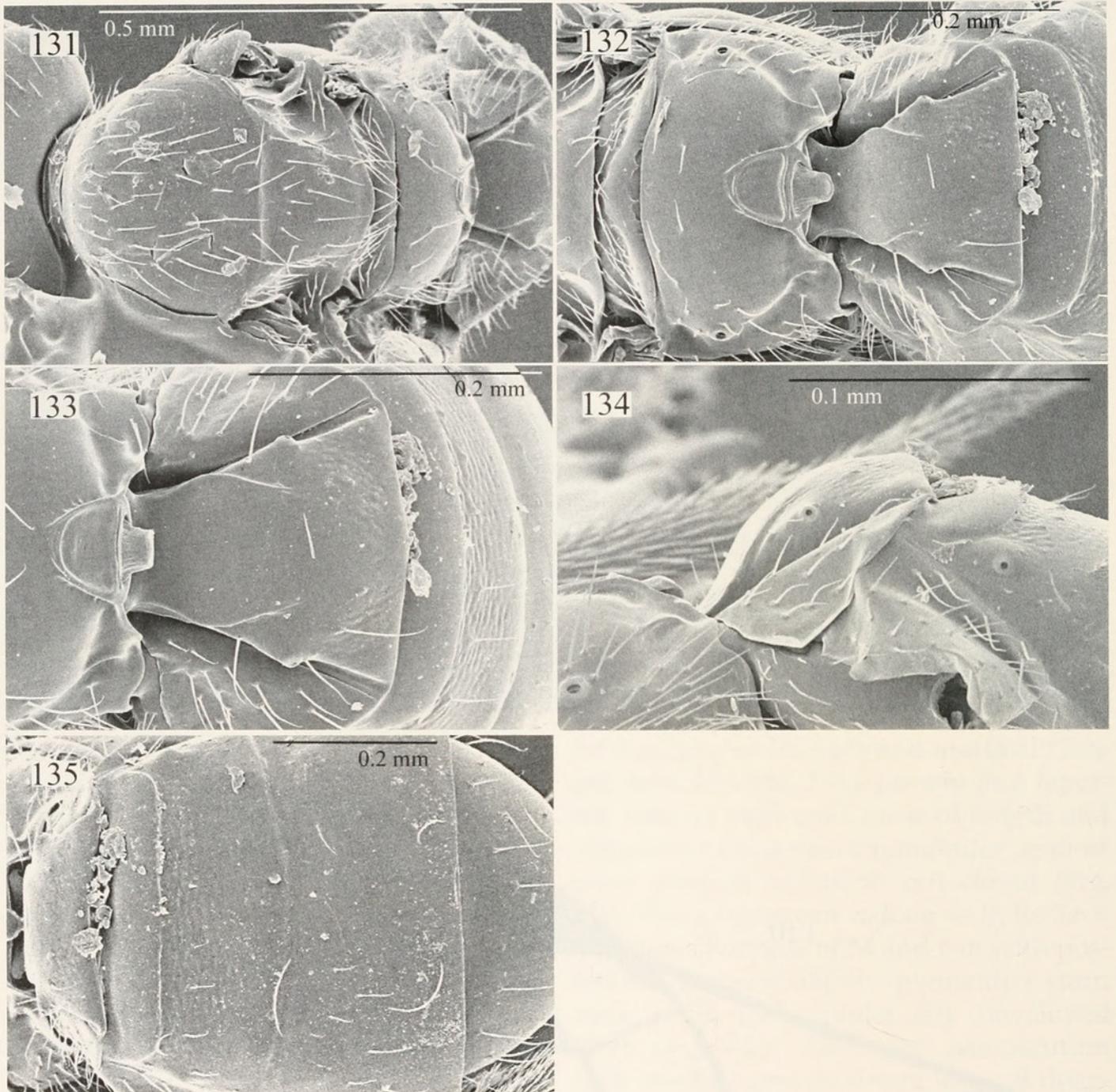
tibia and hind tarsus light brown. *Head*: Length of antennal scape 1.7× width; flagellum with 19 flagellomeres: L/W of first three flagellomeres 3.3, 2.8, 2.8; L/W of apical flagellomere 2.5; MOD as long as POD; POD long as LOL, and 0.67× as long as POL (Fig. 136); OOL 1.8× as long as POL (Fig. 136); head length 0.64× width in dorsal view; occiput evenly deeply indented, head somewhat 'c-shaped' in dorsal view (Fig. 136); head L/H 0.7 in lateral view; eye L/H 0.58, eyeH/headH 0.58, eye width/gena width 1.1 (Fig. 137); gena wider ventrally than dorsally (Fig. 137); face granulate with median polished stripe, setae as long as clypeus height, clypeus W/H 1.7, clypeus width 0.8× as long as malar space (Fig. 138); labrum as large as clypeus, with truncate apex (Fig. 138). *Wings*: Forewing with RS vein straighter apically than basally; RS+Ma pigmented and tubular; 2M spur 6.4× as long as RS+Mb and markedly longer than RS+Ma; 2-A1 present as a tapering tubular vein over most of length and pigmented crease over remainder; spur of m-cu present, subdiscal cell closed (Fig. 140). Hind wing. r-m as long as R; Rs 3.6× as long as R; angle of M and r-m with posteriorly directed faintly pigmented spur; apex of R with moderately developed knob (Fig. 140). *Mesosoma*: Mesoscutum with median groove absent, notauli deeply impressed, joining in a U posteriorly, posteromedial depression small (Fig. 139); propodeum with basal carinae short, parallel (Fig. 141). *Metasoma*: T1 length 1.4× as long as apical width, lateral margins concave posterior to spiracle, spiracle slightly protuberant, lateral carinae present on basal half, convergent, merged with striae on apical half; T1 finely striate on apical 2/3 (Figs. 142, 143); basal raised area of T2 0.2 of total T2 length, posterior margin of basal raised area evenly curved; T2 finely granulostriate on most of tergum posterior to basal raised area, striae longer medially than laterally; T3 0.7× as long as T2, smooth, with anterior groove slightly



Figs. 126–130. *Pseudognaptodon hemicolor*. 126, ocelli in dorsal view. 127, Head in dorsal view. 128, Head in lateral view. 129, Head in anterior view. 130, Wings.

crenulate, deeply impressed, slightly procurved medially (Fig. 144). *Legs*: Hind femur length $4.8\times$ maximum width (Fig. 145).

Material examined.—HOLOTYPE ♀ (CNCI), labelled as follows: “COLOMBIA, 2900 m. Putumayo 2.XII.72 1°10’N, 77°15’W. J. Helava”. Also red label “HO-



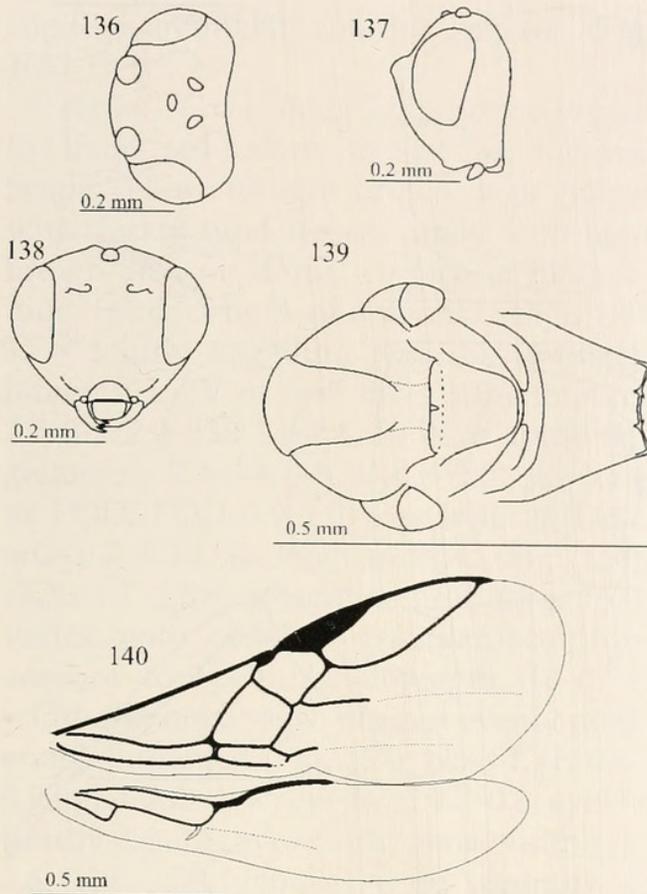
Figs. 131–135. *Pseudognaptodon hemicolor*. 131, Mesosoma in dorsal view. 132, Propodeum in dorsal view. 133, T1 of metasoma in dorsal view. 134, T1 of metasoma in lateral view. 135, Anterior end of metasoma in dorsal view.

LOTYPES" and bordered label "*Pseudognaptodon labrus* Williams Holotype det. D. Williams 2003". PARATYPES: **Colombia:** Quindio, 11 km E Calarca, 7000', 5-III-1974, S&J Peck 1♂ (CNCI). **Peru: Amazonas:** 6°50'S, 77°38'W, 3200', 13-II-1973, J. Helava, 2♂ (CNCI). **Peru: Amazonas:** 6°48'S, 77°38'W, 2800', 13-II-1973, J. Helava, 1♂ (CNCI).

Etymology.—The name *labrus* refers to the labrum, whose size shape, and color is unique within the genus.

Pseudognaptodon minimus Williams,
new species
(Figs. 146–155)

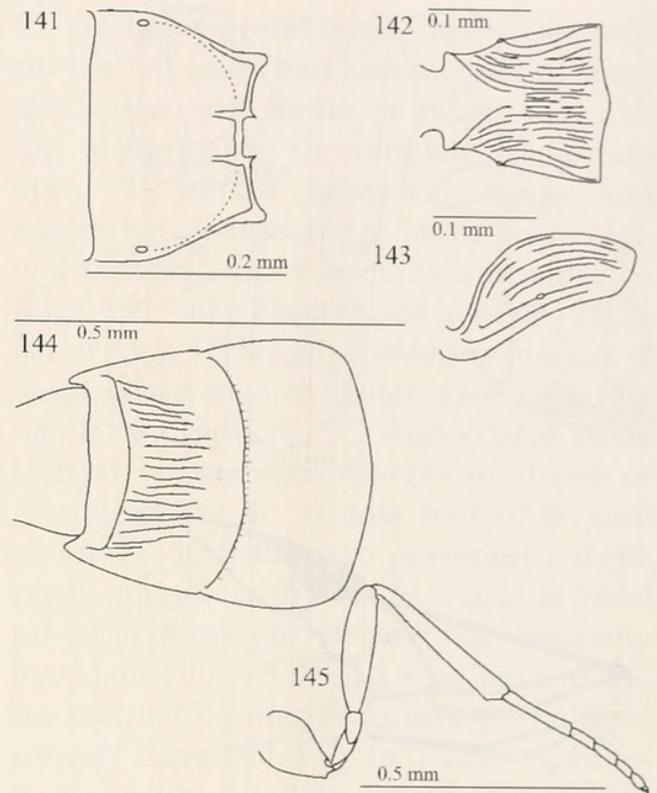
Diagnosis.—This species is separated from other *curticauda*-group species by the following combination of characters: Body dark brown with light brown metasomal T1 and basal raised area and lateral margins of T2; metasomal T1 distinctly wider at apex than long, with basal carinae and striae obsolete (Fig. 152), somewhat flat in



Figs. 136–140. *Pseudognaptodon labrus*. 136, Head in dorsal view. 137, Head in lateral view. 138, Head in anterior view. 139, Mesosoma in dorsal view. 140, Wings.

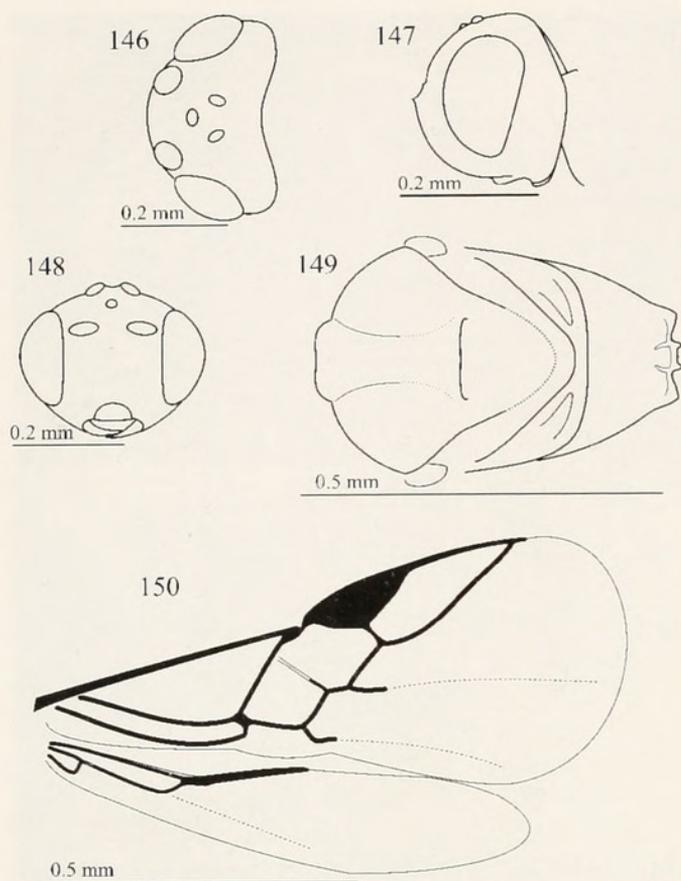
lateral view (Fig. 153); very minute, total body length less than 1.5 mm.

Female.—**Color:** Body dark brown except for the following: Scape, metasomal T1, and T2 basal raised area and lateral margins light brown; legs yellow to light brown, apex of hind tibia and hind tarsus light brown. **Head:** Length of antennal scape 1.6× width; flagellum with 13 flagellomeres: L/W of first three flagellomeres 3.6, 2.8, 2.6–2.7; L/W of apical flagellomere 2.5; MOD 0.9× as long as POD; POD 0.9× as long as LOL, and 0.8× as long as POL (Fig. 146); OOL 1.5× as long as POL (Fig. 146); head length 0.7× width in dorsal view; occiput evenly shallowly indented (Fig. 146); head L/H 0.8 in lateral view; eye L/H 0.6, eyeH/headH 0.7, eye width/gena width 1.2 (Fig. 147); gena wider ventrally than dorsally (Fig. 147); face granulate on lateral margins and



Figs. 141–145. *Pseudognaptodon labrus*. 141, Propodeum in dorsal view. 142, T1 of metasoma in dorsal view. 143, T1 of metasoma in lateral view. 144, Anterior end of metasoma in dorsal view. 145, Hind leg.

smooth medially, most setae shorter than clypeus height, clypeus W/H 2.0, clypeus width 1.2× as long as malar space (Fig. 148). **Wings:** Forewing with RS vein sinuate on apical half; RS+Ma unpigmented, tubular but slender, obsolete at base; 2M spur 2.0× as long as RS+Mb; 2-A1 present as a faint crease on basal 1/3; spur of m-cu absent, first subdiscal cell open (Fig. 150). Hind wing. r-m 0.9× as long as R; Rs 3.6× as long as R; apex of R with poorly developed knob (Fig. 150). **Mesosoma:** Somewhat dorsoventrally compressed; mesoscutum with median groove absent, notauli obsolete on posterior half (Fig. 149); propodeum with basal carinae curved, convergent, basal cell narrowly open at apex (Fig. 151). **Metasoma:** T1 length 0.8× as long as apical width, nearly flat dorsoventrally, lateral margins straight posterior to spiracle, spiracle not protuberant, lateral carinae present only on base; T1 with a few poorly developed striae on apical and lateral 1/3 (Figs. 152, 153); basal raised area

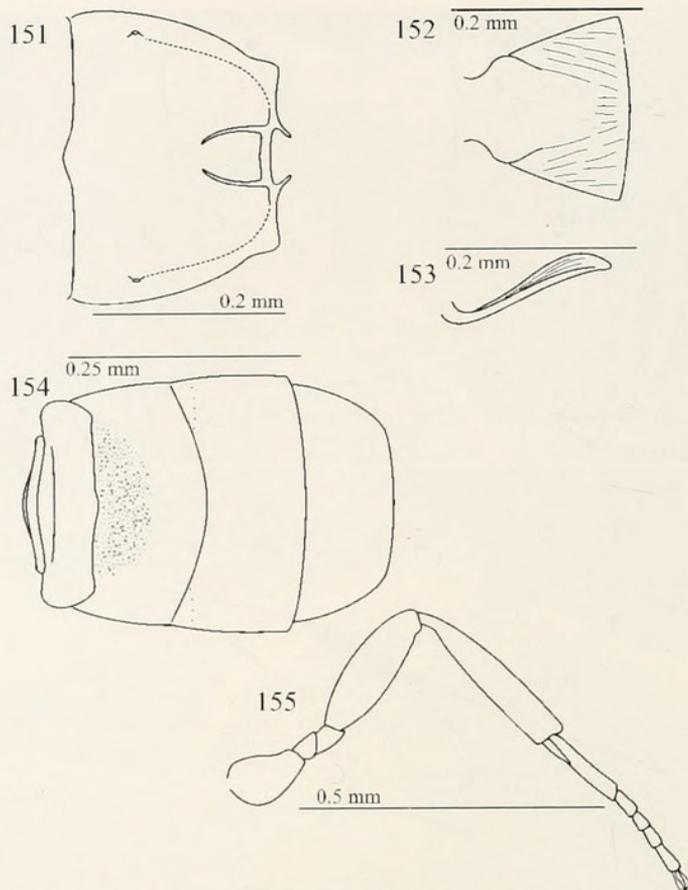


Figs. 146–150. *Pseudognaptodon minimus*. 146, Head in dorsal view. 147, Head in lateral view. 148, Head in anterior view. 149, Mesosoma in dorsal view. 150, Wings.

of T2 0.4 of total T2 length, posterior margin of basal raised area evenly curved, poorly impressed; T2 granulate on basal half of tergum posterior to basal raised area; T3 0.9× as long as T2, smooth, with anterior groove crenulate, poorly developed grooves defining anterolateral corners present near lateral margins (Fig. 154). *Legs*: Hind femur length 3.8× maximum width (Fig. 155).

Material examined.—HOLOTYPE ♀ (CNCI), labelled as follows: "USA Texas Brewster Co. Big Bend National Park Oak Cyn.—Window Trail 5400' 24–27.VI.82 G.A.P. Gibson". Also red label "HOLOTYPE" and bordered label "*Pseudognaptodon minimus* Williams Holotype det. D. Williams 2003". PARATYPES: **Pima Co.**: Brawley Wash, Mile Wide Rd., 1.5 mi E. Sandaro Blvd., 2500', sweeping *Bacharis glutinosa*, 3-VIII-1982, G. Gibson, 2 ♀ (CNCI).

Etymology.—The name *minimus* refers to



Figs. 151–155. *Pseudognaptodon minimus*. 151, Propodeum in dorsal view. 152, T1 of metasoma in dorsal view. 153, T1 of metasoma in lateral view. 154, Anterior end of metasoma in dorsal view. 155, Hind leg.

the very small size (<1.5 mm) of specimens of this species. It is the smallest species examined in this study.

Pseudognaptodon minutus (Ashmead) 1894

(Figs. 156–166)

Holotype male.—**St. Vincent**: W. Indies 93–331, *Leiophron minutus* Type Ash., B.M. TYPE 3:659, Type H.T., H.H. Smith (BMNH). Examined.

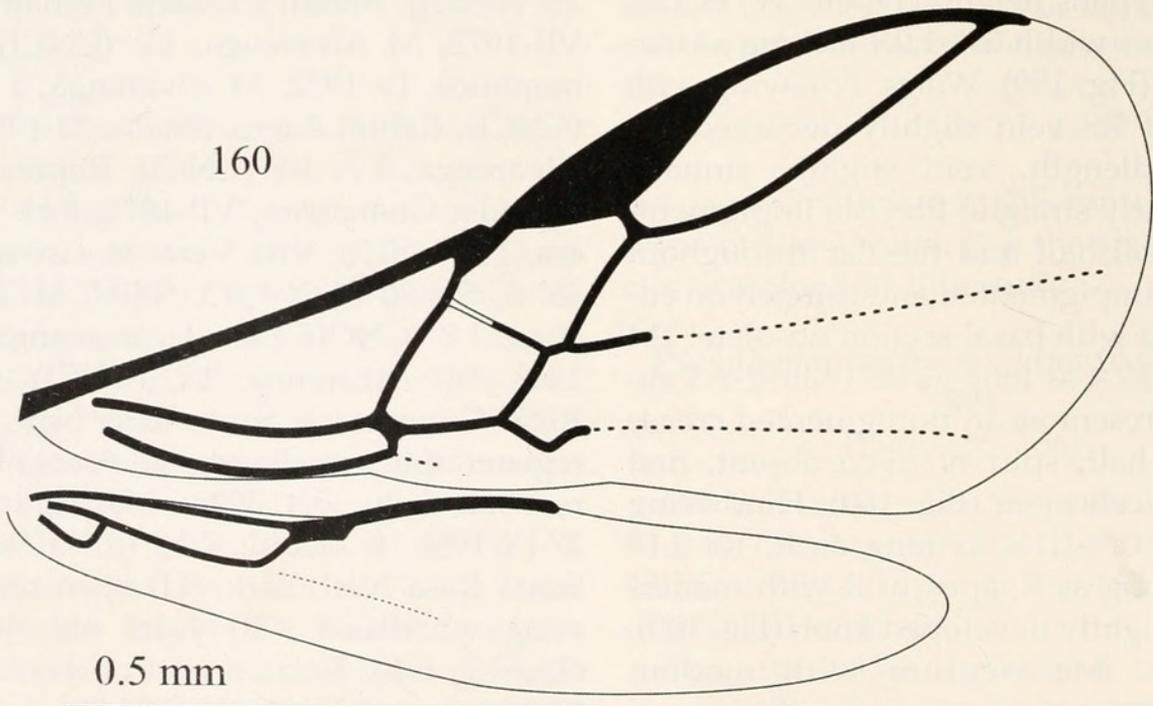
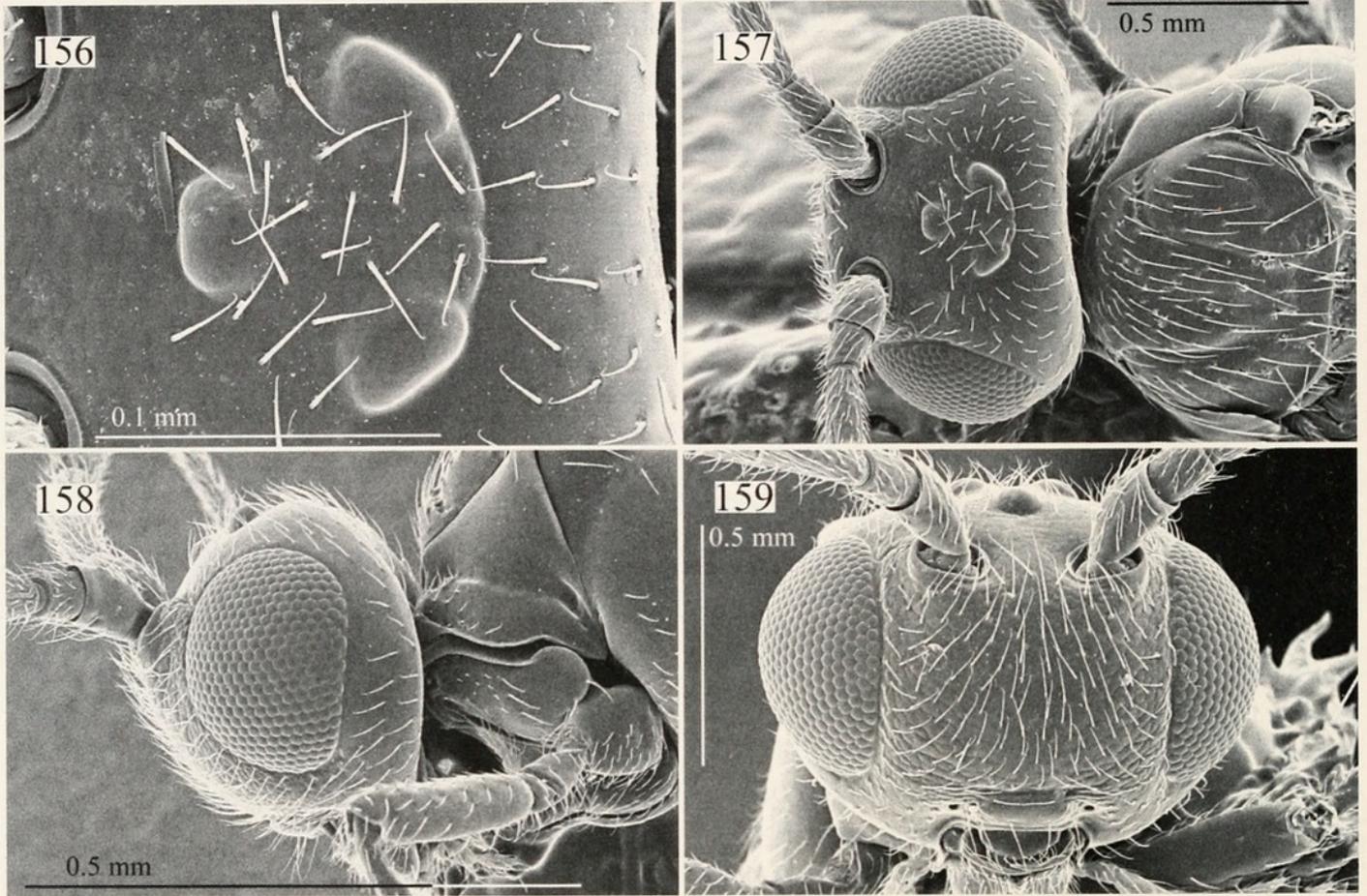
Diagnosis.—This species is separated from other *curticauda*-group species by the following combination of characters: Body uniformly light to dark brown in color; T1 of metasoma length markedly greater than apical width (Fig. 163); T2 of metasoma finely striate or granulostrate near basal raised area margin, rarely with striae extending to posterior margin of tergum (Fig. 165); T3 of metasoma smooth, with

slightly crenulate anterior groove (Fig. 165).

Female.—*Color*: Body light honey-brown to dark red-brown except as follows: Scape yellow to light brown; legs yellow with darker hind tarsus, rarely with light brown area on dorsal surface of hind femur. *Head*: Length of antennal scape 1.3–1.7× width; flagellum with 14–16 flagellomeres: L/W of first three flagellomeres 2.7–3.3, 2.3–3.0, 2.1–2.8; L/W of apical flagellomere 2.3–3.6; MOD 0.8–1.0× as long as POD; POD 0.9–1.2× as long as LOL, and 0.7–1.2× as long as POL (Fig. 156); OOL 1.7–2.5× as long as POL (Fig. 157); vertex with obsolete granular sculpture anterior to ocelli; head length 0.6–0.7× width in dorsal view; occiput evenly moderately indented (Fig. 157); head L/H 0.8–0.9 in lateral view; eye L/H 0.7–0.8, eyeH/headH 0.6–0.7, eye width/gena width 1.8–2.6 (Fig. 158); gena as wide ventrally as dorsally (Fig. 158); face granulate, setae as long as clypeus height, clypeus W/H 1.8–2.3, clypeus width 0.8–1.0× as long as malar space (Fig. 159). *Wings*: Forewing with middle of RS vein slightly decurved beyond midlength, vein slightly sinuate, rarely nearly straight; RS+Ma unpigmented on basal half and tubular throughout length to unpigmented and thinned on entire length with basal section obsolete; 2M spur 1.8–3.2× as long as RS+Mb; 2-A1 absent, to present as an unpigmented crease on basal half; spur of m-cu absent, first subdiscal cell open (Fig. 160). Hind wing with r-m 0.8–1.1× as long as R; Rs 3.1–5.0× as long as R; apex of R with moderately to slightly developed knob (Fig. 160). *Mesosoma*: Mesoscutum with median groove faint, notauli merged with postero-medial depression on posterior 1/3 (Fig. 161); propodeum with medioapical carinae enclosing a cell, or carinae curved toward each other but with small gap at the apex of the cell (Fig. 162). *Metasoma*: T1 length 1.1–1.6× as long as apical width, lateral margins straight or slightly concave posterior to spiracle, spiracle moderately

to strongly protuberant, lateral carinae present on basal half and merged in some specimens with striae or ridges originating at spiracles, to complete to tergum apex, T1 raised between carinae and somewhat distinct from flatter posterolateral corners, striate laterally and apically, (Figs. 163, 164); basal raised area of T2 0.2–0.4 of total T2 length, posterior margin of basal raised area irregular, rarely slightly medially produced; T2 with coarse striae at basal raised area margin to striate or granulo-striate on middle half of tergum about 0.8 of distance to posterior margin, rarely smooth with weakly crenulate basal raised area margin, striae longer medially than laterally; T3 0.9–1.1× as long as T2, smooth, with anterior groove partially or entirely crenulate (Fig. 165). *Legs*: Hind femur length 3.1–3.5× maximum width (Fig. 166).

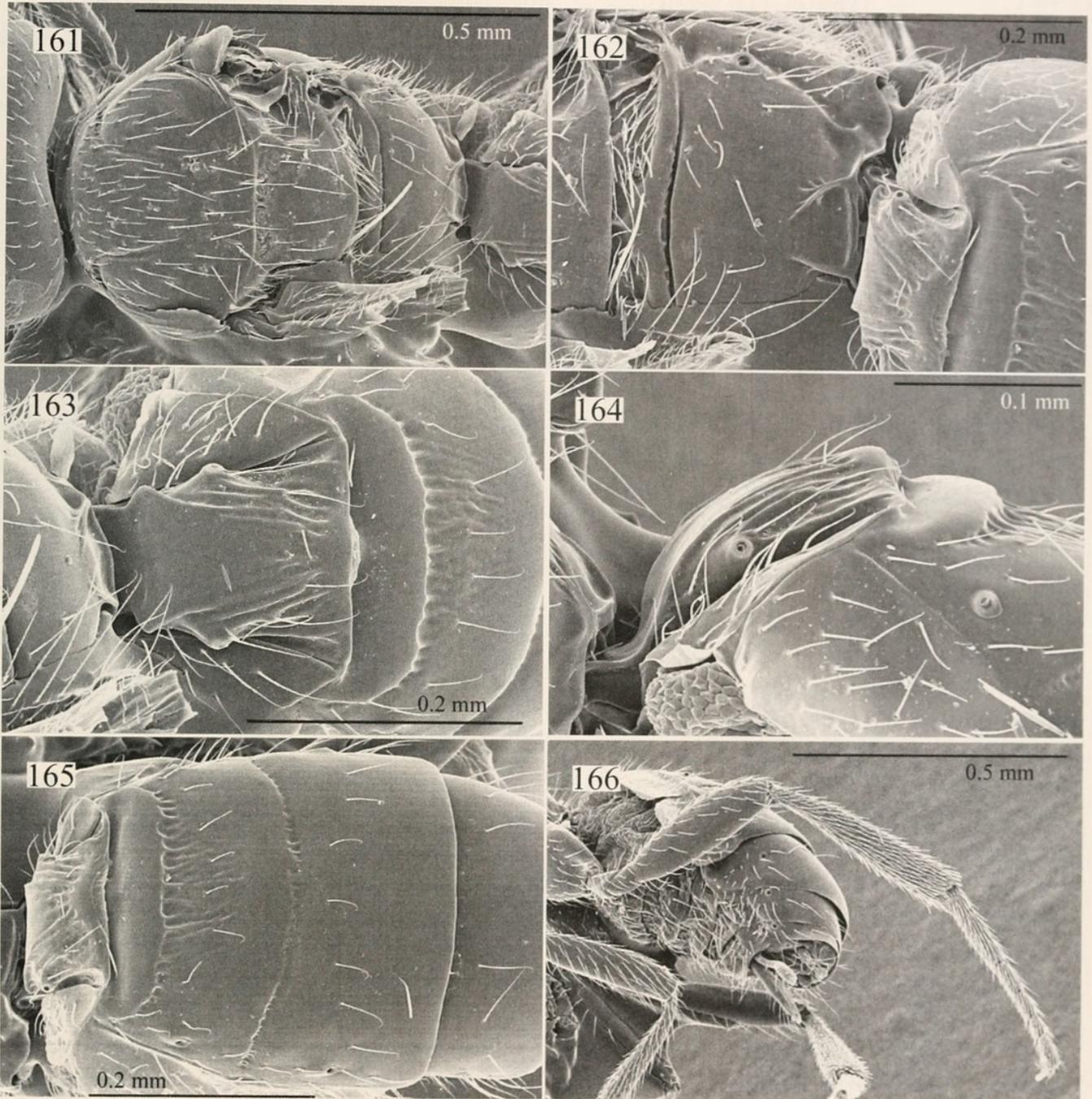
Material examined.—**Bolivia**: Yungas, 50 km N. La Paz, 27-I-1973, 2200m, J. Helava, 1♂ (CNCI). **Brazil**: **Caruaru**: Pernambuco, VII-1972, M Alvarenga, 1♀ (CNCI). Pernambuco, IV-1972, M Alvarenga, 1♀, 1♂ (CNCI). **Bahia**: Encruzilhada, XI-1974, M. Alvarenga, 2♀, 1♂ (CNCI). **Represa Rio Grande**: Guanabara, VII-1972, F.H. Oliveira, 1♀ (CNCI). **Vila Vera**: M. Grosso, 12° 46' S, 55° 30' W, X-1973, 500M, M. Alvarenga, 1♀ (CNCI). Para Jacareacanga, XII-1968, M. Alvarenga, 1♀ (CNCI). **Costa Rica**: **Guanacaste**: Santa Rosa Natl. Park, regenerating woodland <10 years old, direct sun daily, wet, 300m, Malaise trap, 6-27-IX-1986, I. Gauld, 7♀, 10♂ (UWYO). Santa Rosa Natl. Park, (H) open regenerating woodland <10 years old, (O) in clearing, fully isolated part of day, 300m, Malaise trap, 27-IX-18-X-1986 (3♀, 6♂), 26-X-16-XI-1986 (2♂), 14-VIII-6-IX-1986 (2♂), 8-29-XI-1986 (1♂), 29-XI-20-IX-1986 (1♂), 26-X-16-XI-1986 (1♀), I. Gauld D. Janzen, (UWYO). Santa Rosa National Park, regenerating woodland <10 years old, clearing, 300m, Malaise trap, 5-26-VII-1986, I. Gauld, 1♀, 1♂ (UWYO). Santa Rosa Natl. Park, (H) open regenerating woodland



Figs. 156–160. *Pseudognaptodon minutus* (Ashmead). 156, Ocelli in dorsal view. 157, Head in dorsal view. 158, Head in lateral view. 159, Head in anterior view. 160, Wings.

<10 years old, (C) more or less fully shaded as possible, 300m, Malaise trap, 14-VIII-6-IX-1986 (3♀, 3♂), 8-II-2-III-1986 (1♀, 2♂), 2-23-III-1986 (1♀, 1♂), 8-18-III-1986 (2♂), 21-II-14-III-1986 (1♂), I. Gauld

D. Janzen, (UWYO). Santa Rosa Natl. Park, (SE) Bosque San Emilio 30yr old deciduous forest, (O) in clearing, fully isolated part of day, 300m, Malaise trap, 26-VII-14-VIII-1986, I. Gauld D. Janzen, 1♂



Figs. 161–166. *Pseudognaptodon minutus* (Ashmead). 161, Mesosoma in dorsal view. 162, Propodeum in dorsal view. 163, T1 of metasoma in dorsal view. 164, T1 of metasoma in lateral view. 165, Anterior end of metasoma in dorsal view. 166, Hind leg.

(UWYO). Santa Rosa Natl. Park, (SE) Bosque San Emilio 30yr old deciduous forest, (C) more or less fully shaded as possible, 300m, Malaise trap, 13-IV-4VI-1986, I. Gauld D. Janzen, 1♂ (UWYO). P.N. Santa Rosa, 200m, I-1991, P. Hanson, 1♂ (UWYO). P.N. Guanacaste, below Pitilla, 500m, 7-8-III-1990, J. Noyes, 2♀ (UWYO). Estac. Pitilla, 9 km S. Santa Cecilia, 700m, V-1989, I Gauld, 6♀, 1♂ (UWYO). **Limon:** 7 km S.W. Bribri, 50m, 1-II-1990, P. Han-

son, 2♀ (UWYO). 7 km S.W. Bribri, 50m, 4-VI-1990, P. Hanson, 1♀ (UWYO). 7 km S.W. Bribri, 50m, XI-1989, P. Hanson, 1♀ (UWYO). 16 km W. Guapiles, 400m, 1-IV-1991, P. Hanson, 1♂ (UWYO). **Puntarenas:** Peninsula Osa, Puerto Jimenez, grassy weedy site, 10m, 1-II-1992, P. Hanson, 2♀ (UWYO). Peninsula Osa, Puerto Jimenez, grassy disturbed site, 10m, 10-XI-1991, P. Hanson, 1♀, 1♂ (UWYO). Golfo Dulce, 3 km S.W. Rincon, 10m, XII-1989-I-1990, P.

Hanson 1♂ (UWYO). R.F. Golfo Dulce, 24 km W. Piedras Blancas, 200m, III-1993, P. Hanson 2♀ (UWYO). Monteverde, seasonal forest, II-1980, 1400m, W. Mason, 1♀ (CNCI). **Alajuela:** 5 km W. San Ramon, 1200m, X-1997, O. Castro & P. Hanson, 1♀, 1♂ (UWYO). 5 km W. San Ramon, 1200m, II-1997, O. Castro & P. Hanson, 1♂ (UWYO). San Pedro de la Tigra Cacao, 200m, 1-II-1990, R. Cespedes, 1♀ (UWYO). **San Jose:** San Antonio de Escazu, 1300m, IV-1999, W. Eberhard, 1♀, 3♂ (UWYO). Ciudad Colon, 800m, III-IV-1990, L. Fournier, 1♂ (UWYO). Ciudad Colon, 800m, XII-1989-I-1990, L. Fournier, 1♀ (UWYO). Zurqui de Moravia, 1600m, X-1995, P. Hanson, 1♂ (UWYO). Zurqui de Moravia, 1600m, 24-XII-1988, P. Hanson, 1♂ (UWYO). Zurqui de Moravia, 1600m, Malaise, II-1996, P. Hanson, 1♀ (UWYO). **Heredia:** 3 km S. Puerto Viejo, OTS-La Selva, 100m, V-VI-1993, P. Hanson, 1♀, 3♂ (UWYO). 3 km S. Puerto Viejo, OTS-La Selva, 100m, IV-1991, P. Hanson, 1♂ (UWYO). **Carthago:** Dulce Nombre, Viviero Linda Vista, 1300m, VII-IX-1994, P. Hanson, 1♀ (UWYO). La Cangreja, 1950m, VII-1991, P. Hanson, 1♀ (UWYO). **Ecuador:** **Napo:** Limoncocha, 15-28-VI-1976, S&J Peck, 1♂ (CNCI). 5 km S. Baeza, 13-II-1983, 1700m, Masner & Sharkey, 1♀ (CNCI). **Pichincha:** S. Domingo, 16 km S. Tinalandia, 15-30-VI-1975, 680m, S. Peck, 1♀ (CNCI). Rio Palenque R.S., 4-II-1983, 200m, Masner & Sharkey 1♀ (CNCI). **Mexico:** **Guerrero:** 32 mi S.E. Petalan, 10-VII-1985, Woolley & Zolnerowich, 2♀, 1♂ (TAMU). 2 mi N. Cacahuamilpa, 19-VII-1984, J. Woolley, 1♂ (TAMU). 2 mi N. Cacahuamilpa, 5300', 4-VII-1987, R. Wharton, 1♂ (TAMU). **Jalisco:** 16 mi S. Autlan on Hwy. 80, 8-VII-1984, J. Woolley, 1♀ (TAMU). 5.4 mi N. Autlan 7-VII-1984, Schaffner Woolley Carroll Friedlander, 1♂ (TAMU). **Oaxaca:** 4.4 mi N.E. San Pedro Mixtepec, 16-VII-1985, Woolley & Zolnerowich, 3♀, 3♂ (TAMU). 2 mi N. Candelaria Loxicha, 17-VII-1985, J. Woolley G. Zolnerowich, 4♂ (TAMU). **Sinaloa:** 20 mi

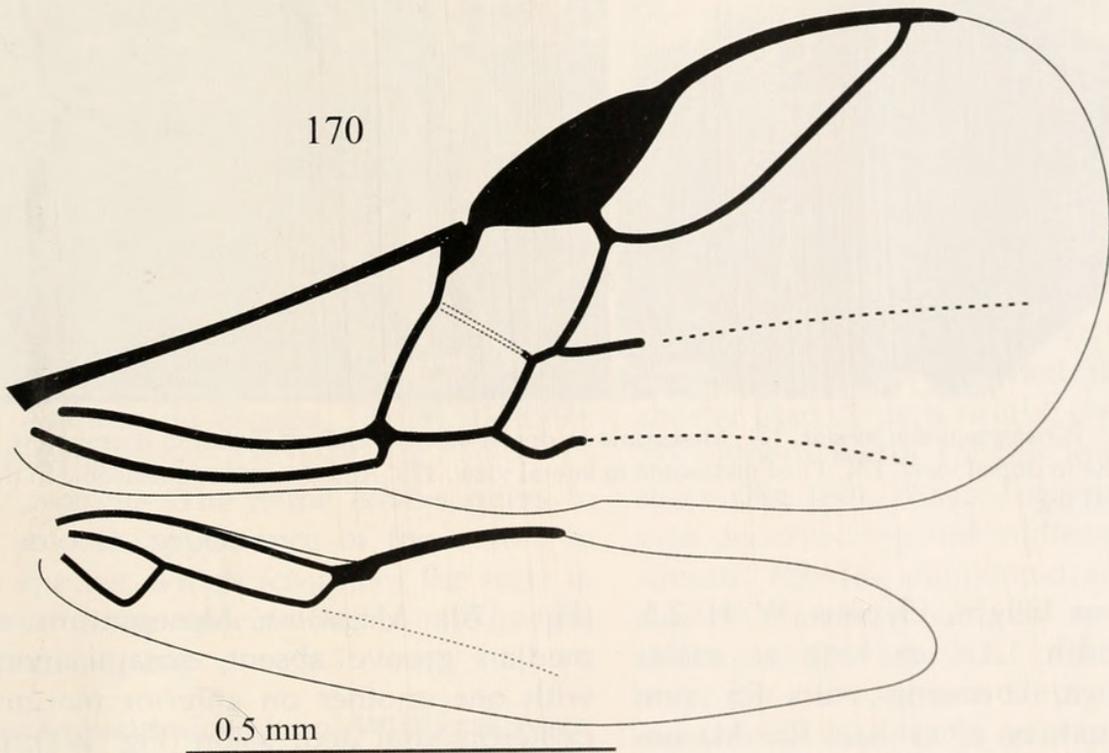
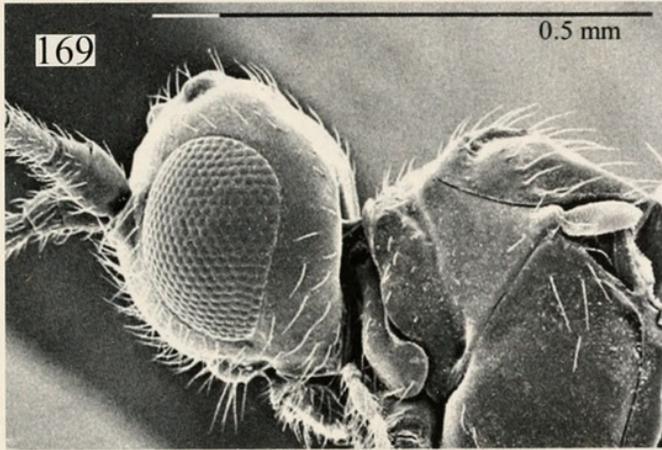
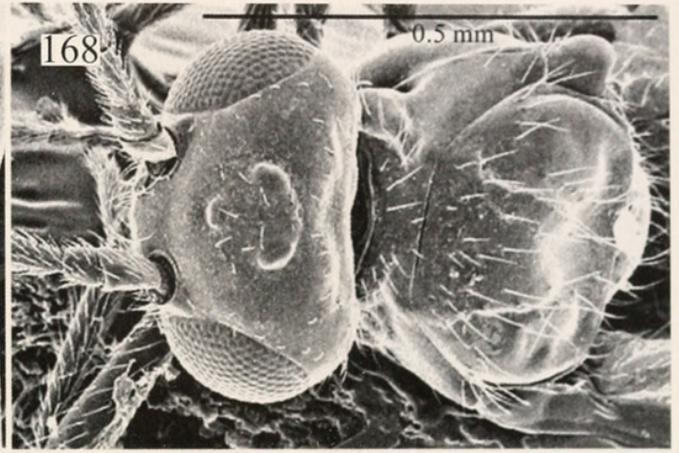
E. Concordia, 12-VIII-1964, 3000m, W. Mason, 1♂ (CNCI). **Peru:** Cuzco, 13° 40'S, 70° 40'W, 18-I-1973, J. Helava, 1♀ (CNCI). **Suriname:** Kobo forest Reserve, S.W. of line 391, Malaise trap, 1-5-IX-1978, E. Nee... (hand written label, collector name illegible), 1♀ (RNHL).

Pseudognaptodon nitidus Williams, new species

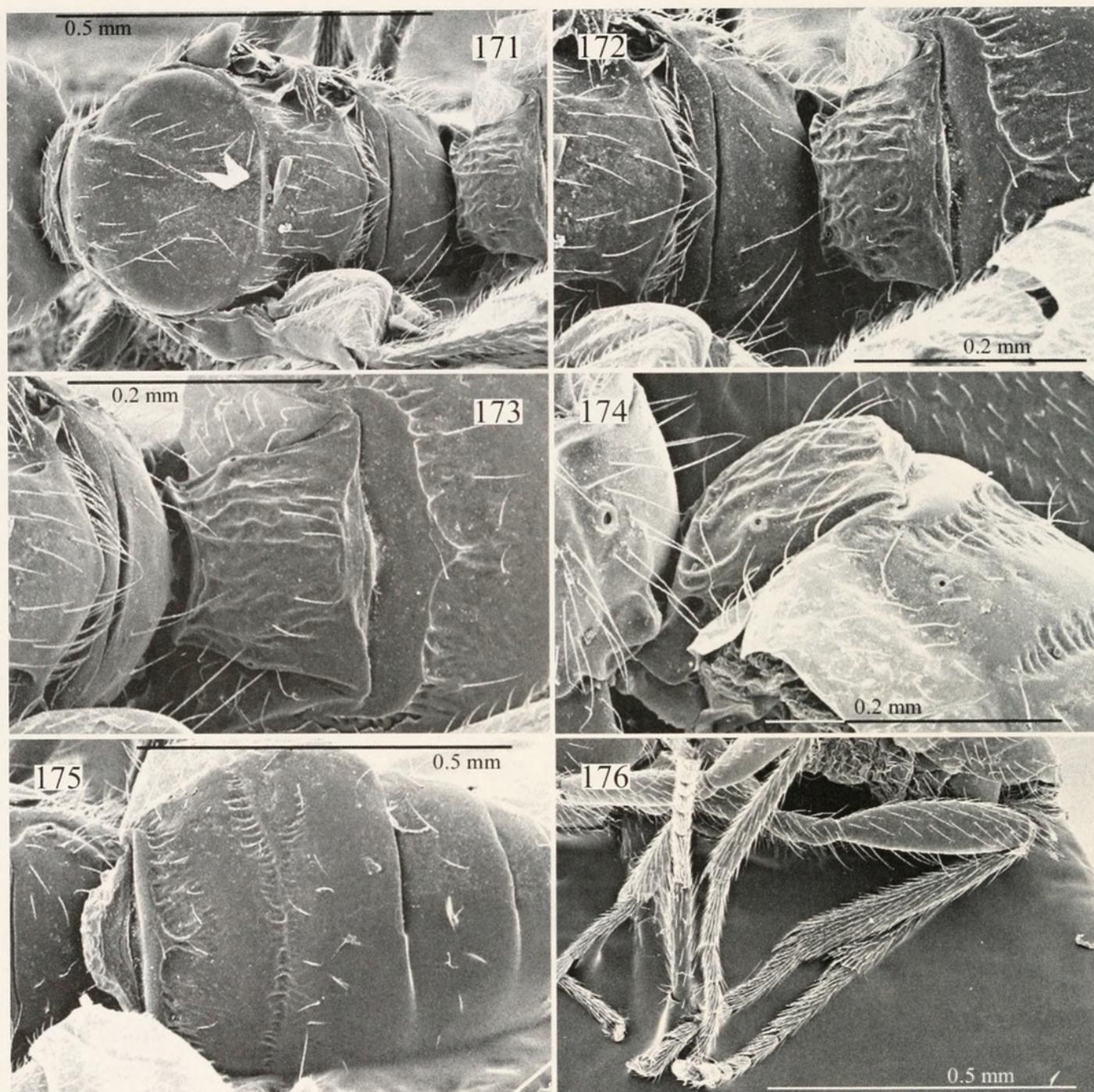
(Figs. 167–176)

Diagnosis.—This species is separated from other *curticauda*-group species by the following combination of characters: Vertex of head smooth, or with obsolete granulate microsculpture (Figs. 167, 188); ocellar triangle large, interocellar distances longer than POD (Fig. 167); base of T1 of metasoma separated from remainder by a transverse ridge or sharp convexity, apex irregularly rugose (Fig. 173); T2 of metasoma with coarse striae on basal half or more posterior to basal raised area; T3 of metasoma medially striate on base, with anterolateral corners defined by bands of sculpture (Fig. 175).

Female.—*Color:* Body medium to dark brown except for the following: Scape and pedicel yellow; mesosoma with lighter brown area on pronotal collar and ventral portion of mesopleuron in some specimens; legs yellow, except hind tarsus light brown. *Head:* Length of antennal scape 1.6× width; flagellum with 14–16 flagellomeres: L/W of first three flagellomeres 2.9–3.0, 2.8–2.9, 2.7; L/W of apical flagellomere 3.3; MOD 0.8× as long as POD; POD 0.8–0.9× as long as LOL, and 0.7× as long as POL (Fig. 137); OOL 1.6–1.8× as long as POL (Fig. 168); vertex smooth or with very faint granular microsculpture; head length 0.7× width in dorsal view; occiput broadly but unevenly indented (Fig. 168); head L/H 0.9 in lateral view; eye L/H 0.6–0.7, eyeH/headH 0.7, eye width/gena width 1.9 (Fig. 169); gena wider ventrally than dorsally (Fig. 169); face granulate with a narrow median polished ridge on dorsal half, setae shorter



Figs. 167-170. *Pseudognaptodon nitidus*. 167, Ocelli in dorsal view. 168, Head in dorsal view. 169, Head in lateral view. 170, Wings.



Figs. 171–176. *Pseudognaptodon nitidus*. 171, Mesosoma in dorsal view. 172, Propodeum in dorsal view. 173, T1 of metasoma in dorsal view. 174, T1 of metasoma in lateral view. 175, Anterior end of metasoma in dorsal view. 176, Hind leg.

than clypeus height, clypeus W/H 2.3, clypeus width $1.1\times$ as long as malar space. *Wings*: Forewing with RS vein slightly sinuate on apical half; RS+Ma unpigmented, tubular except extreme base, obsolete; 2M spur $2.0\text{--}2.5\times$ as long as RS+Mb; 2-A1 present as a crease on basal $\frac{1}{3}$; spur of m-cu absent, first subdiscal cell open (Fig. 170). Hind wing with r-m $0.9\text{--}1.0\times$ as long as R; Rs $3.5\text{--}4.5\times$ as long as R; apex of R with well developed knob

(Fig. 170). *Mesosoma*: Mesoscutum with median groove absent, notauli merged with one another on anterior margin of posteromedial depression (Fig. 171); propodeum with basal cell complete, somewhat transverse and slightly raised, carinae more developed laterally than at cell apex (Fig. 172). *Metasoma*: T1 length $1.1\times$ as long as apical width, lateral margins slightly concave posterior to spiracle, spiracle slightly protuberant, lateral carinae

present on basal $\frac{1}{3}$, joined medially by a transverse ridge that defines a semicircular basal smooth area; T1 coarsely irregularly striate throughout and very convex, except for basal area, (Figs. 173, 174); anterior basal raised area of T2 0.3 of length, posterior margin of basal raised area evenly curved to slightly irregular, crenulate, and medially produced, T2 striate on basal half most of tergum posterior to basal raised area except for a narrow apical band; T3 0.9 \times as long as T2, striate medially on basal $\frac{1}{3}$, with anterior groove crenulate, and anterolateral areas delimited by narrow bands of sculpture (Fig. 175). *Legs*: Hind femur length 2.9 \times maximum width (Fig. 176).

Material examined.—HOLOTYPE ♀ (UWYO), labelled as follows: upper label "Costa Rica: Guanacaste Santa Rosa Natl. Park 300m ex. Malaise trap site#: 1 Dates: 18-i.8-ii 1986 I.D. Gauld & D. Janzen" lower label "(H) open regenerating woodland <10 years old, (O) in clearing, fully isolated part of the day". Also red label "HOLOTYPE" and bordered label "*Pseudognaptodon nitidus* Williams Holotype det. D. Williams 2003". PARATYPES: **Costa Rica: Guanacaste**: Santa Rosa Natl. Park, 300m, (H) open regenerating woodland <10 years old, (C) more or less fully shaded as possible, Malaise trap, 26-VII-14-VIII-1986, I. Gauld D. Janzen, 1 ♀ (UWYO). **San Jose**: San Antonio de Escazu, 1300m, IV-1999, W. Eberhard, 1 ♀, 1 ♂ (UWYO).

Etymology.—The name *nitidus* refers to the smooth appearance of the vertex in this species, which resembles the state in *omissus*-group species but is rare in the *curticauda*-group.

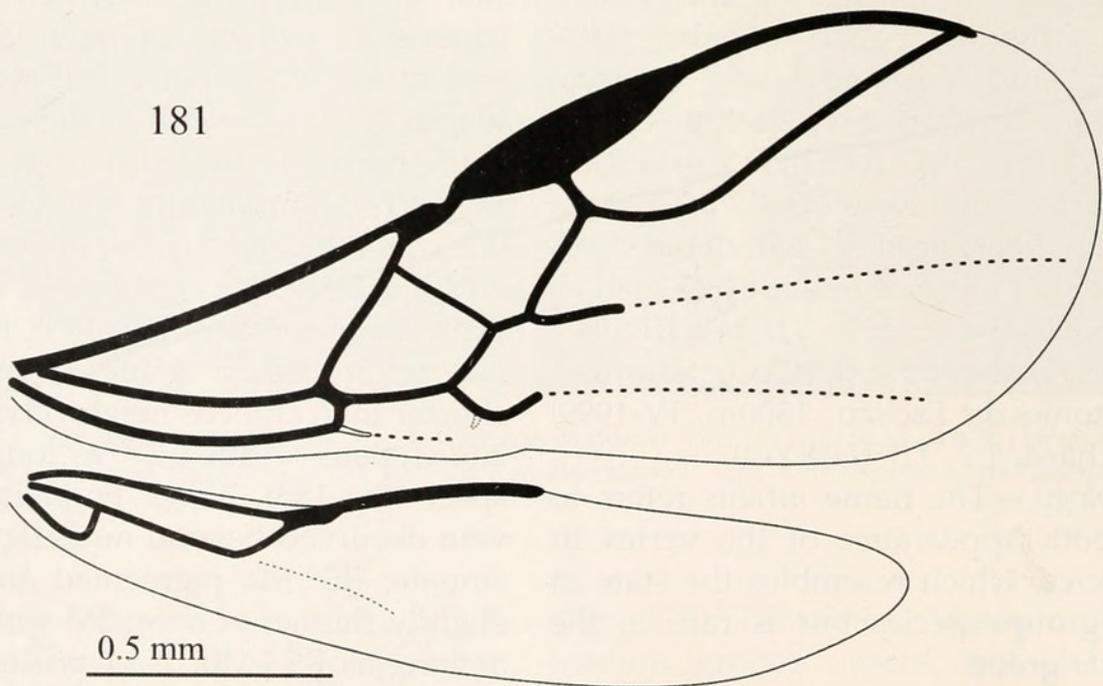
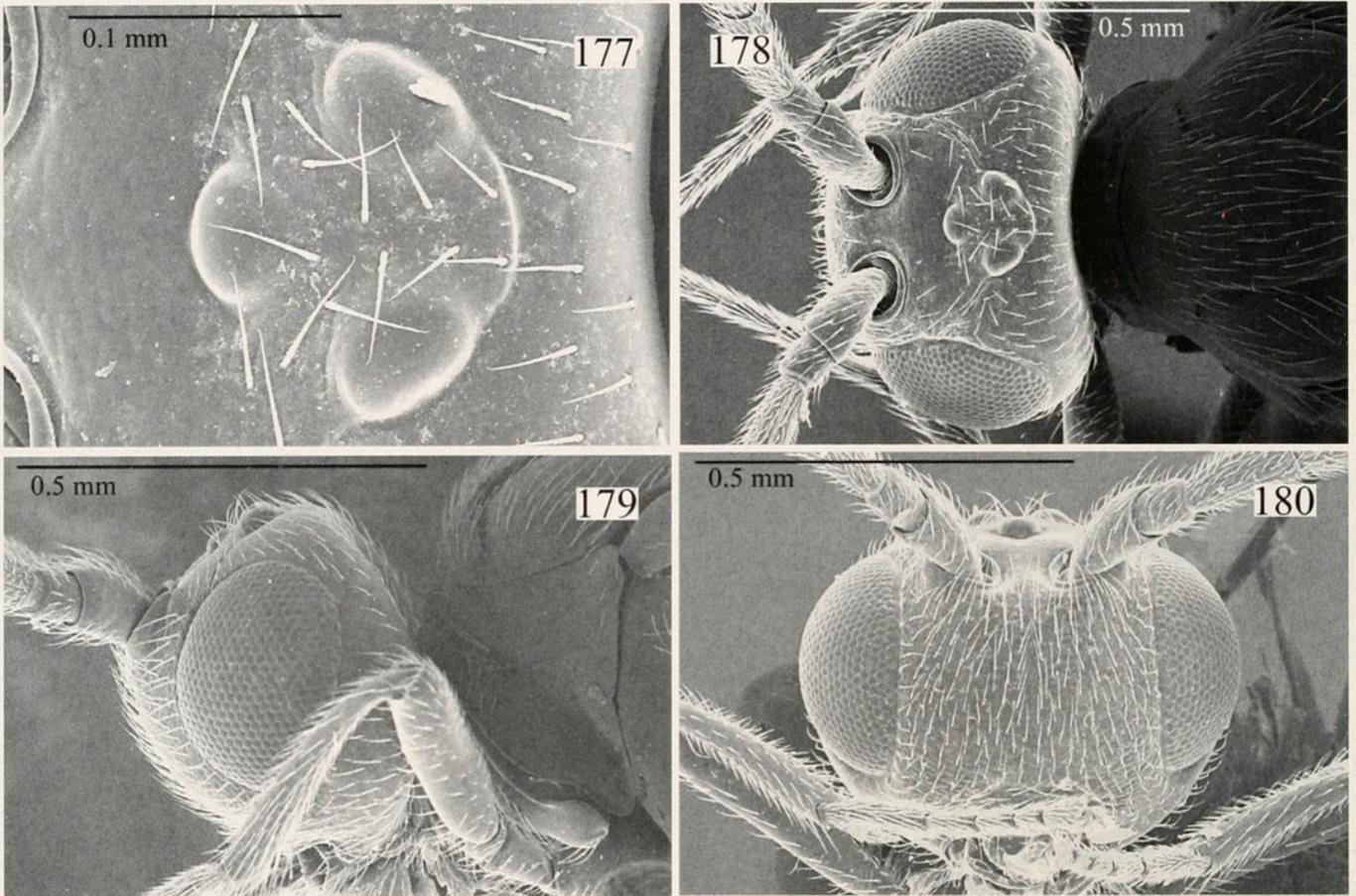
Pseudognaptodon shawi Williams, new species

(Figs. 177–187)

Diagnosis.—This species is separated from other *curticauda*-group species by the following combination of characters: Ocelli as long as or longer than inter-ocellar distances (Fig. 177); T3 of metasoma with

deeply impressed, crenulate, laterally decurved anterior groove, widened medially with a narrow band of striae extending posteriorly (Fig. 186); forewing 2-A1 vein pigmented for most of length, first subdiscal cell closed by veins and pigmented creases (Fig. 181).

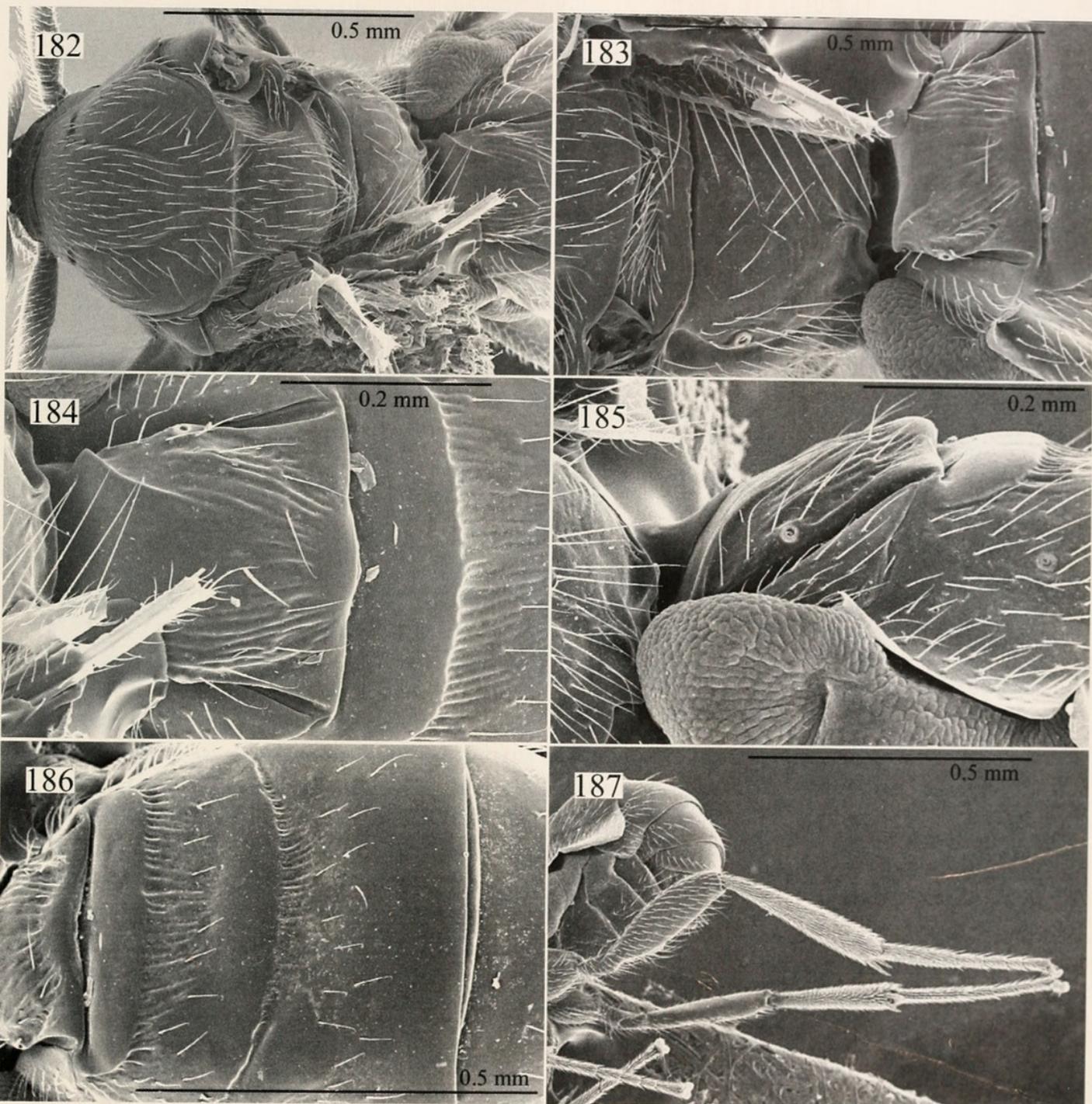
Female.—*Color*: Body black except for the following: Scape yellow, pedicel light brown; pronotal collar light orange-brown; legs yellow, apical tarsomeres, base of hind coxa, and entire hind tarsus light brown, rarely with dorsal surface of femur and apex of tibia light brown. *Head*: Length of antennal scape 1.7–1.9 \times width; flagellum with 17–19 flagellomeres: L/W of first three flagellomeres 2.7–2.8, 2.4–2.5, 2.4–2.5; L/W of apical flagellomere 2.8–3.3; MOD 0.8–0.9 \times as long as POD and longer than LOL and POL; POD 1.3–1.7 \times as long as LOL, and 1.0–1.3 \times as long as POL (Fig. 177); OOL 2.0–2.5 \times as long as POL (Fig. 178); vertex with obsolete granular microsculpture and well developed grooves or wrinkles between lateral ocelli and dorsal margin of eye (Fig. 178); head length 0.6–0.7 \times width in dorsal view; occiput narrowly indented (Fig. 178); head L/H 0.6–0.8 in lateral view; eye L/H 0.6–0.7, eyeH/headH 0.6–0.7, eye width/gena width 1.5–1.8 (Fig. 179); gena wider ventrally than dorsally (Fig. 179); face granulate with median polished stripe, setae shorter than clypeus height; clypeus W/H 2.6, clypeus width 1.2 \times as long as malar space (Fig. 180). *Wings*: Forewing with RS vein decurved beyond midlength, slightly sinuate; RS+Ma pigmented and tubular, slightly thinner at base; 2M spur 2.5–3.0 \times as long as RS+Mb; 2-A1 present as a tubular spur at base and faintly pigmented crease over most of length; spur of m-cu present as a faintly pigmented line, first subdiscal cell closed (Fig. 181). Hind wing with r-m 1.1–1.3 \times as long as R; Rs 3.5–4.2 \times as long as R; apex of R with well developed knob (Fig. 181). *Mesosoma*: Mesoscutum with median groove absent, notauli deeply impressed, joining in a U pos-



Figs. 177–181. *Pseudognaptodon shawi*. 177, Ocelli in dorsal view. 178, Head in dorsal view. 179, Head in lateral view. 180, Head in anterior view. 181, Wings.

teriorly in some specimens, posteromedial depression small (Fig. 852); propodeum with basal carinae convergent, ending in several fine wrinkles, cell broadly open (Fig. 183). *Metasoma*: T1 length 1.1× as

long as apical width, lateral margins slightly concave posterior to spiracle, spiracle slightly protuberant, lateral carinae present on basal half, rarely merged with coarse striae on apical half: T1 striate on



Figs. 182–187. *Pseudognaptodon shawi*. 182, Mesosoma in dorsal view. 183, Propodeum in dorsal view. 184, T1 of metasoma in dorsal view. 185, T1 of metasoma in lateral view. 186, Anterior end of metasoma in dorsal view. 187, Hind leg.

apical half and lateral to carinae, (Figs. 184, 185); basal raised area of T2 0.2–0.3× of total T2 length, posterior margin of basal raised area irregular, slightly sinuate or evenly curved; basal raised area margin crenulate, coarsely striae on basal half to most of tergum posterior to basal raised area, striae longer medially than laterally; T3 0.9–1.0× as long as T2, with anterior groove crenulate, deeply impressed, de-

curved laterally, and merged with a narrow band of coarse striae medially, striae extending onto disc of T3 (Fig. 186). *Legs*: Hind femur length 3.4–3.6 maximum width (Fig. 187).

Material examined.—HOLOTYPE ♀ (UWYO), labelled as follows: "Costa Rica: San Jose: Zurqui de Moravia 1600m vii-1992 Col. Paul Hanson". Also red label "HOLOTYPE" and bordered label "*Pseu-*

dognaptodon shawi Williams Holotype det. D. Williams 2003". PARATYPES: **Alajuela:** 5 km W. San Ramon, 1200m, X-1996 (1♂), XII-1996 (1♂), II-1997 (1♂), IV-1997 (3♂), X-1997 (1♀, 3♂), VII-1997 (3♂), O. Castro, P. Hanson, (UWYO). **Guanacaste:** ACT Bagaces, P.N. Palo Verde Sec. P Verde, 200 N.E. Est., Extremo E. de Cameo de Atterizaje, Malaise, 0–50m, 8-XI-9-XII-1999, I. Jiminez, 1♂ (UWYO). Guanacaste Conservation Area, Santa Rosa Hdq., Malaise, 200m, 3-7-VII-1997, L. van der Ent, 1♂ (UWYO). **San Jose:** P.N. Braulio Carrillo, 9.5 km E. Tunel, 1000m, 1-III-1990, P. Hanson, 1♀ (UWYO). **Ecuador: Napo:** Baeza, 9-12-II-1983, L. Huggert, 1♀ (RNHL).

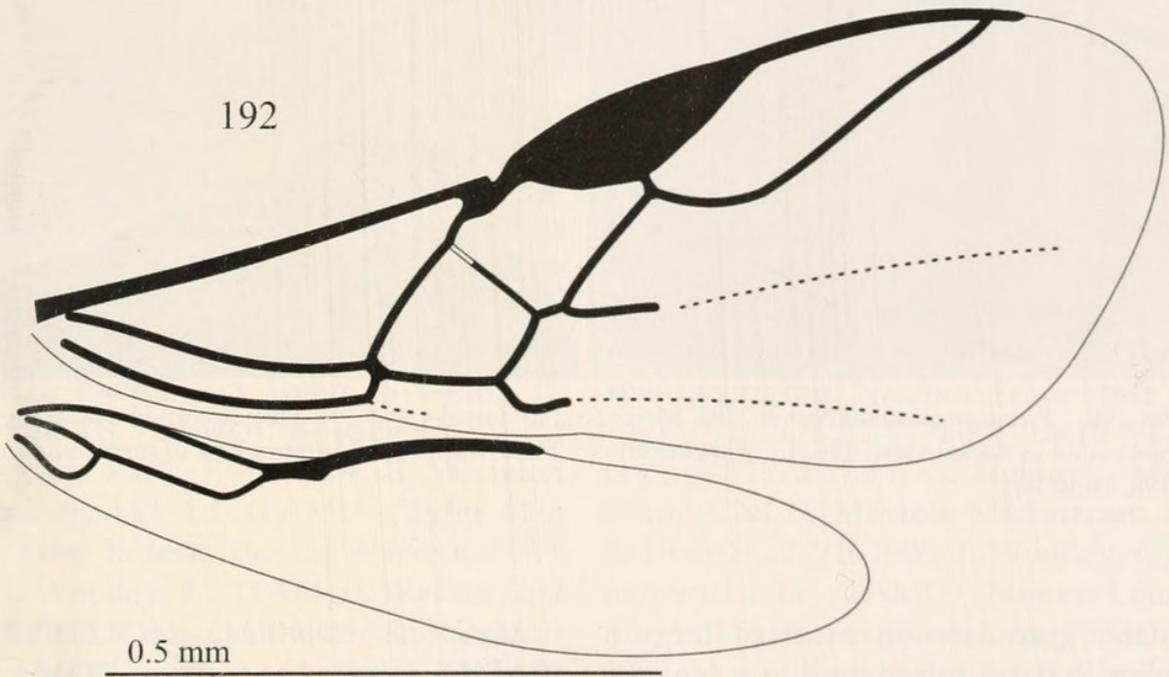
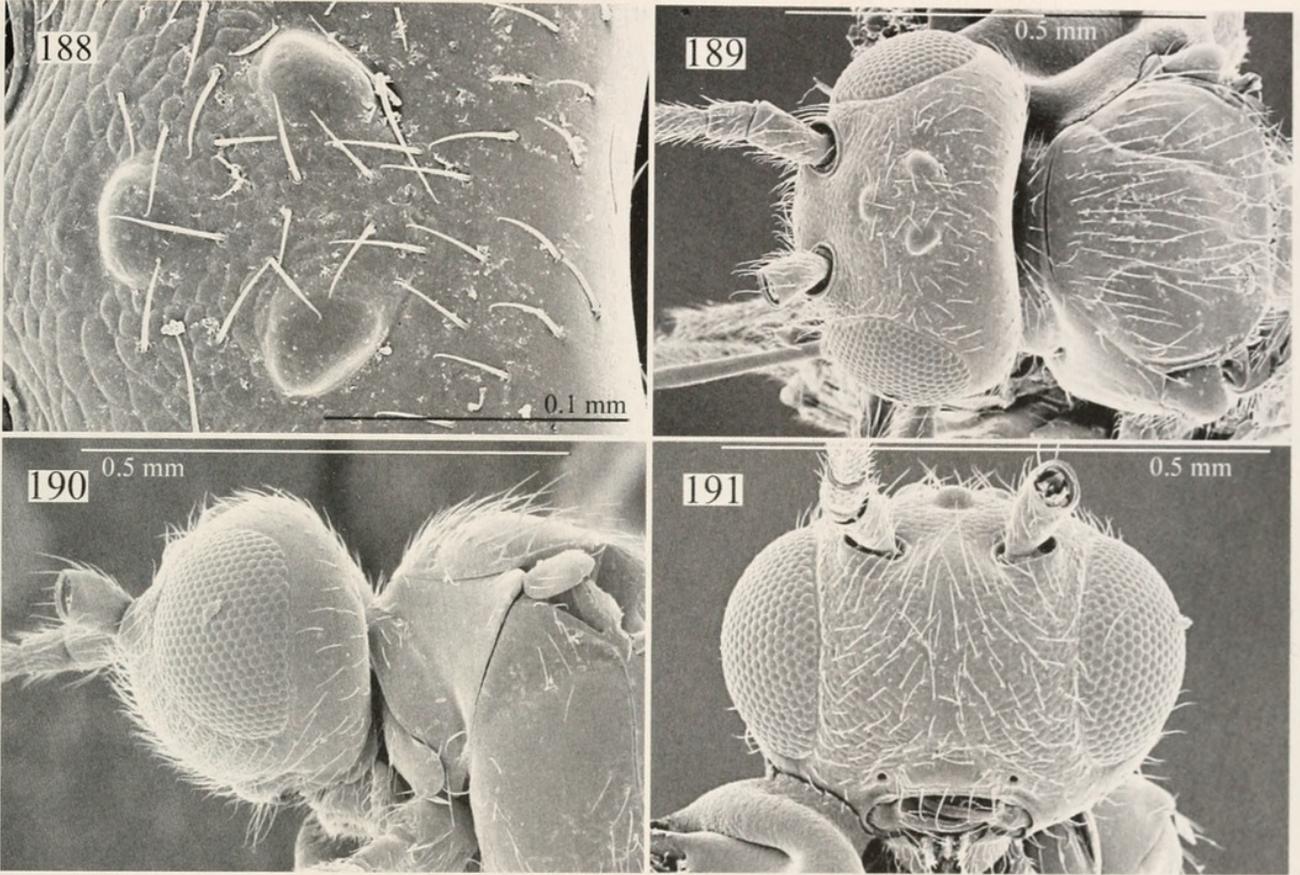
Etymology.—This species is named for Scott Shaw, who has been one of the major contributors of specimens to this study.

Pseudognaptodon whartoni Williams,
new species
(Figs. 188–198)

Diagnosis.—This species is separated from other *curticauda*-group species by the following combination of characters: Metasoma medium to dark brown apically, yellow to light brown on lateral margins or most of first two or three terga; T1 of metasoma slightly wider apically than long, granulostriate (Fig. 195); T2 of metasoma finely granulate, near apex of basal raised area to most of tergum disc in a semicircular pattern (Fig. 197).

Female.—*Color:* Body dark brown to black except as follows: Scape yellow; clypeus yellow to light orange-brown in some specimens; pronotal collar light orange-brown in some specimens; mesopleuron with lighter bands in some specimens; T1 and T2 of metasoma light brown laterally to entirely yellow on first three metasomal terga; legs yellow with light brown hind tarsus, apical tarsomeres and apex of hind tibia darker in some specimens. *Head:* Length of antennal scape 1.5–1.9× width; flagellum with 15–19 flagellomeres; L/W of first three flagello-

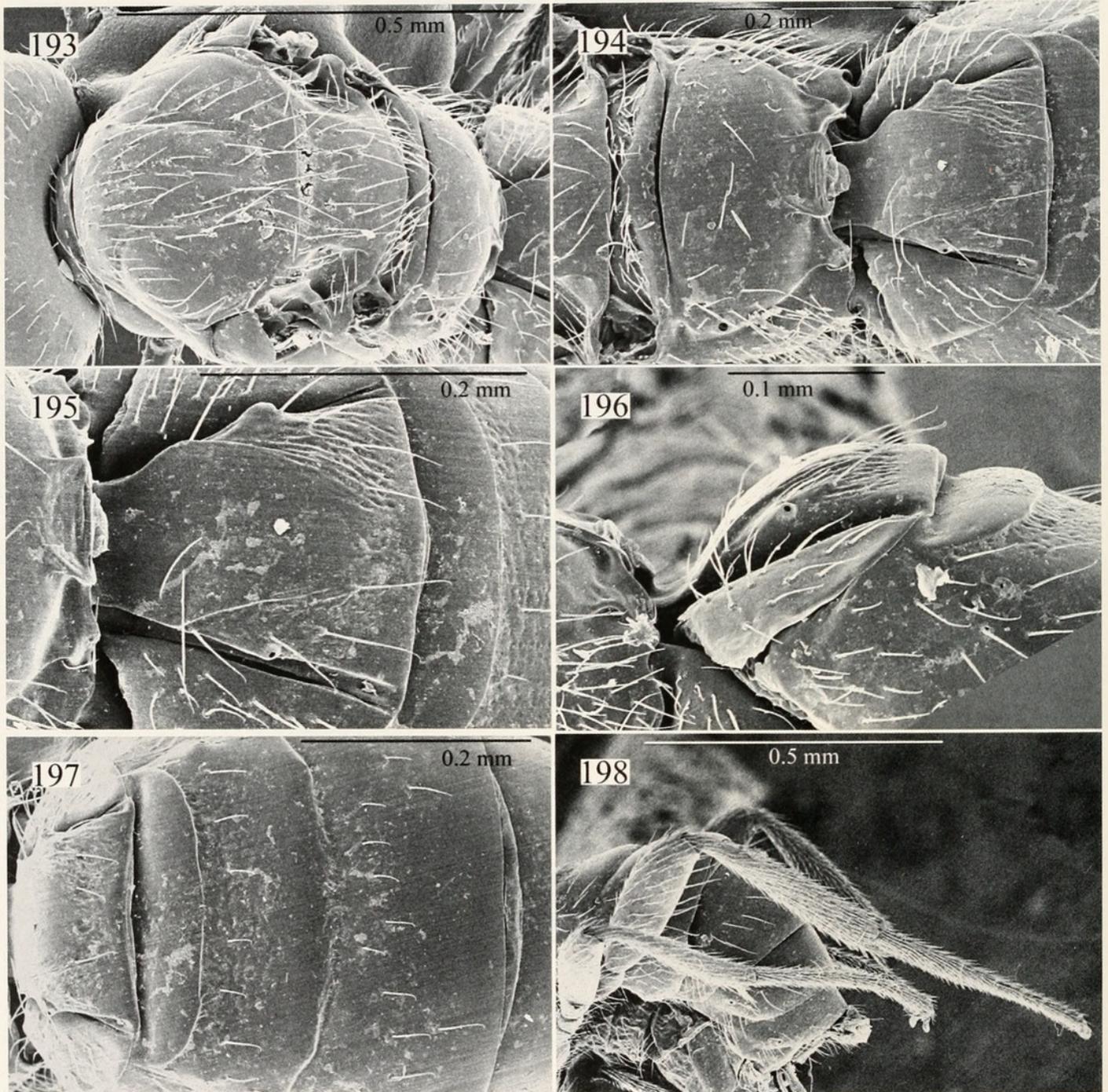
meres 2.1–3.7, 2.1–2.8, 1.9–2.7; L/W of apical flagellomere 2.3–2.8; MOD 0.8–0.9 POD; POD 0.8–1.0× as long as LOL, and 0.7–0.9× as long as POL (Fig. 188); OOL 1.3–2.0× as long as POL (Fig. 189); vertex with well developed granular sculpture anterior to ocelli, very fine, incomplete suture or fine wrinkles present between lateral ocelli and dorsal eye margin (Fig 189); head length 0.6–0.7× width in dorsal view; occiput shallowly, evenly indented, head somewhat C-shaped in dorsal view (Fig. 189); head L/H 0.6–0.8 in lateral view; eye L/H 0.6–0.7, eyeH/headH 0.6–0.7, eye width/gena width 1.5–1.9 (Fig. 190); gena parallel sided (Fig. 190); face completely granulate to a small polished area dorsal of clypeus and a narrow median polished strip, setae shorter than or as long as clypeus height, clypeus W/H 1.8–2.2, clypeus width 0.9–1.2× as long as malar space (Fig. 191). *Wings:* Forewing with RS vein decurved apically; RS+Ma unpigmented on basal 1/3 to entire length and tubular throughout length, rarely thinned on basal 1/2, longer than 1M; 2M spur 2.5–5.3× as long as RS+Mb; 2-A1 absent to present as an unpigmented crease on basal half; spur of m-cu absent, first subdiscal cell open (Fig. 192). Hind wing with r-m 0.9–1.3× as long as R; Rs 3.4–4.6× as long as R; apex of R moderately to well developed knob (Fig. 192). *Mesosoma:* Mesoscutum with median groove absent to faint, notauli merged with one another on anterior margin of posteromedial depression (Fig. 193); propodeum with medioapical carinae straight, parallel, and widely separated, rarely with irregular very fine wrinkles or transverse obsolete carina enclosing a compressed cell (Fig. 194). *Metasoma:* T1 length 0.9–1.1× as long as apical width, lateral margins slightly concave to straight posterior to spiracle, spiracle not protuberant, lateral carinae present on basal 1/3 to complete to apex or nearly so, in some specimens continuous with lateral margins of a weakly raised medial area; T1 granulos-



Figs. 188–192. *Pseudognaptodon whartoni*. 188, Ocelli in dorsal view. 189, Head in dorsal view. 190, Head in lateral view. 191, Head in anterior view. 192, Wings.

triate on apical half and lateral to carinae, rarely somewhat more granulate between carinae and striate laterally (Figs. 195, 196); basal raised area of T2 0.3–0.4 of total

T2 length, posterior margin of basal raised area evenly curved, slightly medially produced or toothed in some specimens; basal raised area margin smooth to slightly



Figs. 193–198. *Pseudognaptodon whartoni*. 193, Mesosoma in dorsal view. 194, Propodeum in dorsal view. 195, T1 of metasoma in dorsal view. 196, T1 of metasoma in lateral view. 197, Anterior end of metasoma in dorsal view. 198, Hind leg.

crenulate, granulate on most of tergum posterior to basal raised area in a semicircular pattern; T3 0.8–1.0× as long as T2, smooth, with anterior groove smooth to weakly crenulate, rarely with groove wider medially (Fig. 197). *Legs*: Hind femur length 3.0–3.8× maximum width (198).

Hosts: Reared from *Nepticula* sp. and *Coptodisca* sp. (Lepidoptera: Nepticulidae) on *Myrica certifera* (Fagales: Myricaceae).

Material examined.—HOLOTYPE ♀ (TAMU), labelled as follows: "Texas: Brazos Co. College Station Lick Creek Park November 1–14, 1987 R. Wharton Malaise". Also red label "HOLOTYPE" and bordered label "*Pseudognaptodon whartoni* Williams Holotype det. D. Williams 2003". PARATYPES: USA: Texas: Brazos Co.: College Station, Lick Creek Park, Malaise, 1-14-XI-1987 (4♀, 4♂). 20-IX-4-X-1987 (3♀,

7♂), 4-18-X-1987 (3♀, 1♂), R. Wharton, (TAMU). College Station, Lick Creek Park, 16-III-9-IV-1988 (1♂), 16-31-V-1988 (2♀), 22-XI-6-XII-1987 (2♀), 2-16-V-1988 (1♀), 13-18-V-1988 (1♂), Wharton, Praetorius, (TAMU). College Station, Lick Creek Park, 3-9-X-1988 (2♂), 11-18-IX-1988 (2♀, 1♂), 11-18-X-1988 (2♀, 2♂), 18-30-X-1987 (2♀, 3♂), 23-X-6-XI-1988 (3♀, 1♂), 7-20-XI-1988 (2♀), R. Wharton, (TAMU). College Station, Lick Creek Park, dissected, 14-IX-1990, R. Wharton, 1♀, 1♂ (TAMU). Lick Creek Park, 22-30-VI-1987, J Heraty J. Woolley, 1♂ (TAMU). **Harris Co:** Bear Cr. Pk., ex. *Nepticula* on *Myrica certifera*, JAP No. 82M13, 28-XII-1982, D. Wagner, 1♀, 1♂ (JWCI). Bear Cr. Pk., ex. *Coptodisca* on *Myrica certifera*, JAP No. 82M14, 28-XII-1982, D. Wagner, 1♀ (JWCI). **Montgomery Co.:** Jones State Forest, 8 mi S. Conroe, 8-19-IX-1987, Wharton, Carroll, Praetorius, 1♀, 2♂ (TAMU); 18-31-X-1987, Wharton, Praetorius, 2♀, 1♂ (TAMU); 1-6-IX-1987, Wharton, Steck Carroll, 2♀ (TAMU); 20-26-IV-1987, Wharton, Praetorius, Wang, 1♀ (TAMU); 13-19-IV-1987, Wharton, Praetorius, Wang, 2♂ (TAMU); 1-7-VI-1987, Wharton, Steck, Carroll Wang, 1♂ (TAMU); 9-16-VIII-1987, Wharton, Steck, Carroll, 1♀ (TAMU). **Bandera Co.:** Lost Maples State Park, 18-VIII-1988, G. Zolnerowich, 2♀, 1♂ (TAMU). Lost Maples State Park, 22-VIII-1987, R. Wharton, 1♂ (TAMU). **Travis Co.:** Austin, 8-X-1983, R. Wharton, 1♂ (TAMU). **Bosque Co.:** 3 mi W. Laguna Park, 13-IV-1984, R. Wharton J. Woolley, 1♀, 1♂ (TAMU). **Tyler Co.:** Kirby State Forest, 3 mi S. Warren, 22-V-1984, J. Woolley, 1♀ (TAMU). **Walker Co.:** Stubblefield Lake, 7-VI-1985, R. Wharton 1♀ (TAMU). **Kerr Co.:** Center Point, Malaise trap, 26-VII-2-VIII-1987, Wharton, Praetorius, 2♀ (TAMU). **Gonzales Co.:** Palmetto State Pk., 1-IV-1984, J. Woolley, 2♀, 1♂ (TAMU). **Harrison Co.:** 9 mi S. Marshall, 27-VII-1982, R. Wharton, 1♀ (TAMU). **OTHER SPECIMENS EXAMINED:** **Brazil:** Ceará: Barbalha, V-1969, 1♀ (CNCI). **Bahia:** Encruzilhada, IX-1974, M.

Alvarenga, 2♀ (CNCI). **Jatai:** Goias, XI-1972, F.M. Oliviera, 1♀, 1♂ (CNCI). **Canada:** **Ontario:** Aylmer West, 23-27-VII-1972, Malaise Trap, 1♂ (CNCI). **Dominican Republic:** El Rio (La Vega), 17-III-1978, 1000m, L. Masner, 1♀ (CNCI). **USA:** **Arkansas:** **Mountain Pine:** L. Ouachita State Park, V-1972, G. Heinrich, Malaise Trap, 1♀ (CNCI). **Florida:** **Alachua:** Gainesville, DPI, 1-23-VI-1987, J. Wiley, Malaise Trap, 2♀ (CNCI). **Georgia:** Forsyth, 1-8-X-1970 (3♀), 25-VII-1970 (1♀), 25-X-1970 (1♀), 20-XI-1970 (1♀, 1♂), VII-1970 (1♀), 7-IX-1970 (1♀, 1♂), 23-30-VIII-1970 (3♀), F.T. Naumann, Malaise trap, (CNCI). **Louisiana:** **Evangeline Co.:** Bayou Chicot, 15-V-4-VI-1971, D. Shanek, 2♀ (CNCI). **Nachitoches:** 20 mi W. Gorum, 3-18-V-1989, R. Wharton, 1♀ (TAMU). **County?:** Lake Bistineau State Park, 15-18-IV-1972, G. Heinrich, Malaise Trap, 1♀ (CNCI). Lake Bistineau State Park, 22-27-IV-1972, G. Heinrich, Malaise Trap, 1♂ (CNCI). **Maryland:** Laurel, 11-V-1965, Malaise Trap, 1♂ (CNCI). **Missouri:** Williamsville, 10-IX-5-X-1969, J.T. Becker, 1♂ (CNCI). Williamsville, 15-VII-10IX-1969, J.T. Becker, 1♀ (CNCI). Williamsville, X-VII?-1969, E.C. Becker, 1♂ (CNCI). **North Carolina:** Highlands, 3-VI-1957, 3800', J.R. Vockeroth, 1♂ (CNCI). **Oklahoma:** **Lati. Co.:** 4 mi W. Red Oak, sweep, 1-4-VII-1987, D. Chandler, 1♀ (UWYO). **Tennessee:** **Lexington:** Natchez Trace State Park, 11-15-VI-1972 (1♀, 1♂), 15-19-VI-1972 (1♀), VI-1972 (1♂), G. Heinrich, Malaise Trap, (CNCI). **Mexico:** **Michoacan:** 10 mi S. Uruapan, 7-VII-1985, J. Woolley, G. Zolnerowich, 3♀ (TAMU). **Nuevo Leon:** 29 mi W. Linares, S. Rosa Cyn, 730m, 3-VI-1983, M. Kaulbars, 1♀ (CNCI). **Sinaloa:** 20 mi E. Concordia, 3000', 8-VIII-1964, W.R.M. Mason, 1♂ (CNCI). **Costa Rica:** **San Jose:** Ciudad Colon, 800m, VI-VII-1990, Luis Fournier, 1♀ (UWYO). **Guana-caste:** Guanacaste Conservation Area, Santa Rosa Hdq., Malaise, 200m, 373-VII-1997, L. van der Ent, 1♀ (UWYO). Santa Rosa Natl. Park, Malaise trap, (H) open regen-

erating woodland <10 years old, (O) in clearing, fully isolated part of day, 14-VI-5-VII-1986, I. Gauld, D. Janzen, 1 ♀ (UWYO). Santa Rosa Natl. Park, Malaise trap, (H) open regenerating woodland <10 years old, (C) more or less fully shaded as possible, 10-31-I-1987, I. Gauld, D. Janzen, 2 ♂ (UWYO). P.N. Santa Rosa, 200m, I-1991, P. Hanson, 1 ♀ (UWYO).

Remarks.—This species is distributed from Canada to Brazil. Specimens are relatively uniform in appearance, although there is variation in color, the size of ocelli, and the shape and sculpture of the first metasomal tergum in specimens from the northern and southern extremes. Because of this I have selected the type series only from the central part of the range in Texas and Mexico.

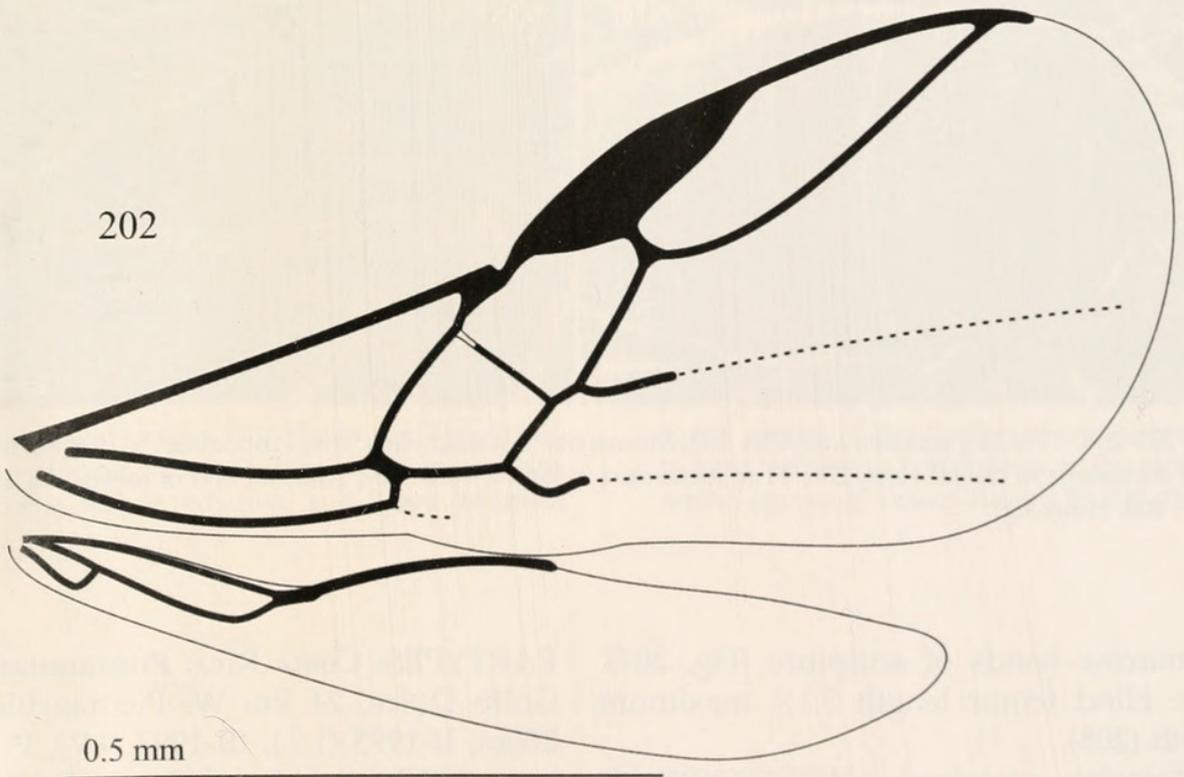
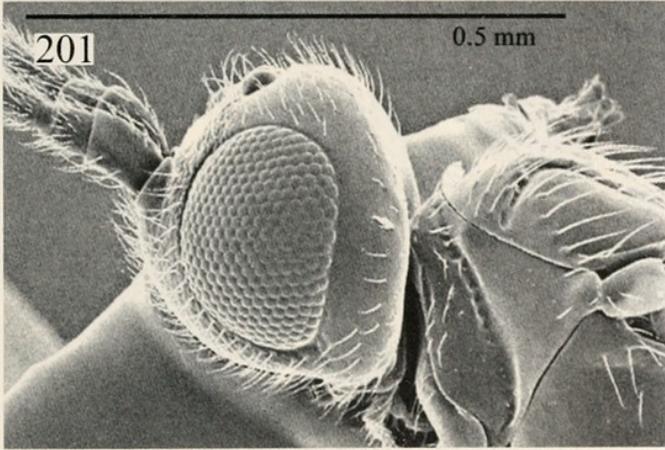
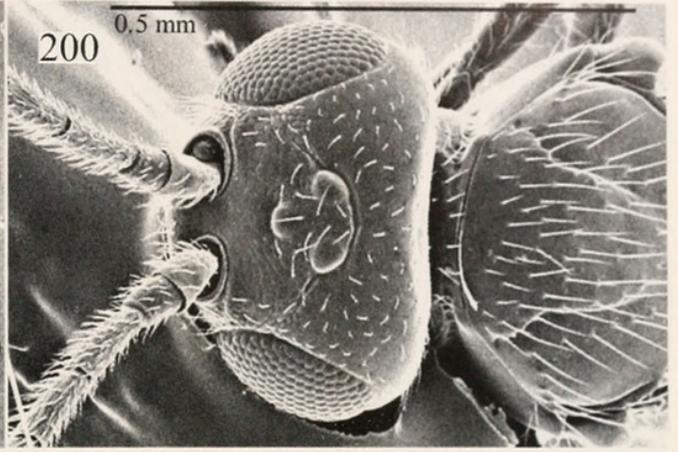
Etymology.—This species is named for Robert Wharton, who collected the holotype and most of the specimens of this species, who has been one of the major contributors of specimens to this study, and who has been patient while I retained specimens needed for his work on other Gnamptodontinae.

Pseudognaptodon whitfieldi Williams,
new species
(Figs. 199–208)

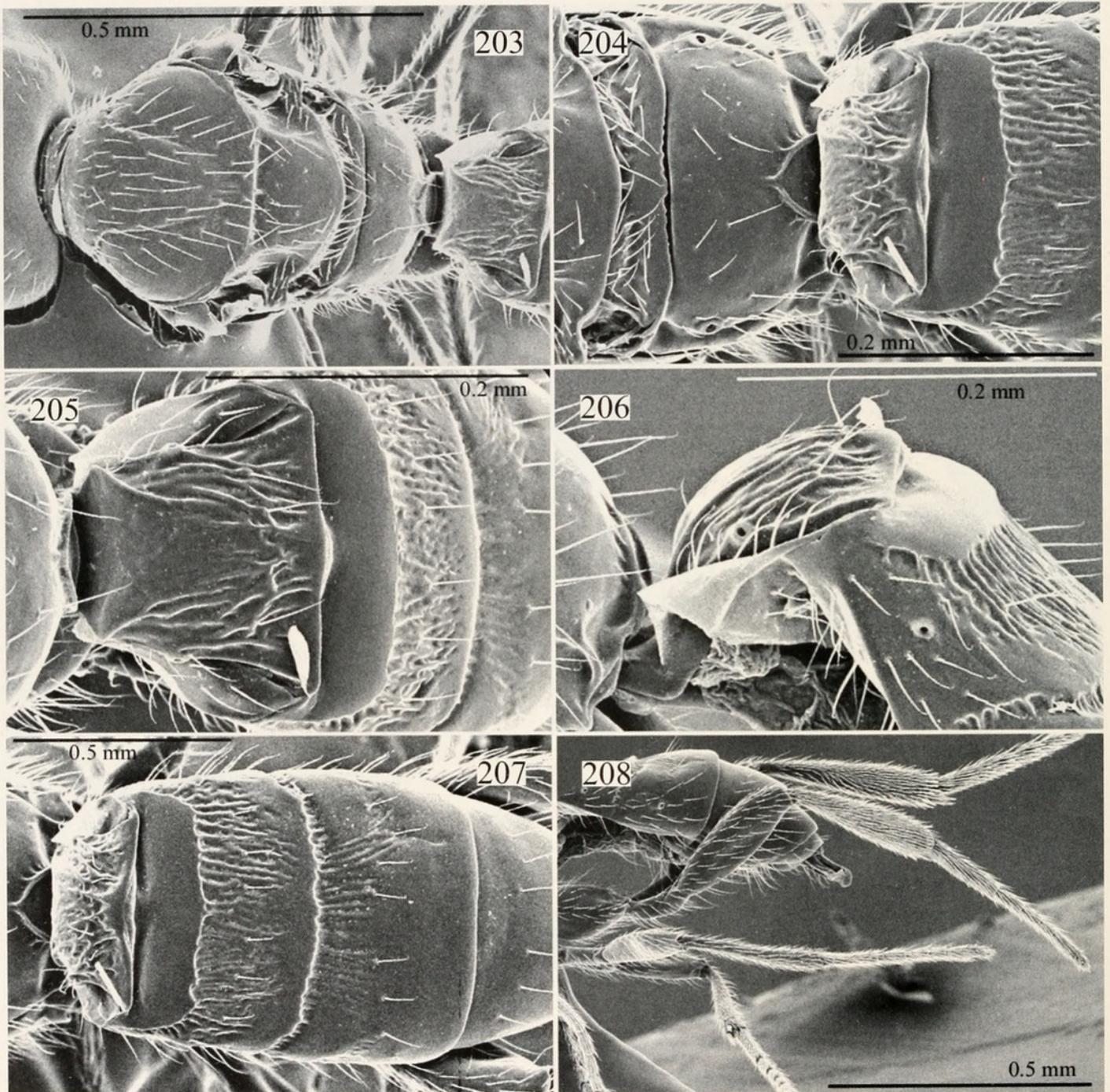
Diagnosis.—This species is separated from other *curticauda*-group species by the following combination of characters: Vertex of head with weak granular microsculpture; LOL as long as or shorter than LOD (Fig. 200); T2 of metasoma almost entirely covered by coarse striae except for narrow apical band; T3 of metasoma medially striate on basal 1/3, with polished anterolateral corners defined by bands of sculpture (Fig. 207).

Female.—*Color:* Body medium to dark brown except for the following: Scape and pedicel yellow; legs yellow, except hind tarsus light brown. *Head:* Length of antennal scape 1.8× width; flagellum with 14–16 flagellomeres: L/W of first three flagellomeres 2.9–3.0, 2.8–2.9, 2.7; L/W of apical

flagellomere 3.3; MOD 0.8× as long as POD; POD 1.0–1.3× as long as LOL, and 1.0–1.1× as long as POL (Fig. 199); OOL 2.0–2.3× as long as POL; vertex with well developed granular microsculpture (Fig. 200); head length 0.7× width in dorsal view; occiput broadly evenly indented (Fig. 200); head L/H 0.8–0.9 in lateral view; eye L/H 0.6–0.7, eyeH/headH 0.7, eye width/gena width 1.7–1.8 (Fig. 201); gena wider ventrally than dorsally (Fig. 201); face granulate with a narrow median polished ridge on dorsal half, setae shorter than clypeus height, clypeus W/H 2.3, clypeus width 1.1× as long as malar space. *Wings:* Forewing with RS vein straight or slightly sinuate on apical half; RS+Ma pigmented and tubular except extreme base obsolete; 2M spur 3.0–3.3× as long as RS+Mb; 2-A1 present as a crease on basal 1/3; spur of m-cu absent, first subdiscal cell open (Fig. 202). Hind wing with r-m 1.3× as long as R; Rs 4.5–5.0× as long as R; apex of R with poorly developed knob (Fig. 202). *Mesosoma:* Mesoscutum with median groove present but faint near posteromedial depression, notauli merged with one another on anterior margin of posteromedial depression (Fig. 203); propodeum with basal cell complete, somewhat transverse, carinae more developed laterally than at cell apex (Fig. 204). *Metasoma:* T1 length 1.1–1.3× as long as apical width, lateral margins slightly concave posterior to spiracle, spiracle slightly protuberant, lateral carinae complete to apex but merged with coarse striae and ridges originating from spiracles on very convex medioapical area; T1 coarsely striate throughout except for basal area between carinae (Figs. 205, 206); basal raised area of T2 0.3 of total T2 length, posterior margin of basal raised area evenly curved or slightly irregular and medially concave; basal raised area margin crenulate, striate on most of tergum posterior to basal raised area except for a narrow apical band; T3 0.9–1.1× as long as T2, striate medially on basal 1/3, with anterior groove crenulate, and anterolateral smooth areas delimited



Figs. 199–202. *Pseudognaptodon whitfieldi*. 199, Ocelli in dorsal view. 200, Head in dorsal view. 201, Head in lateral view. 202, Wings.



Figs. 203–208. *Pseudognaptodon whitfieldi*. 203, Mesosoma in dorsal view. 204, Propodeum in dorsal view. 205, T1 of metasoma in dorsal view. 206, T1 of metasoma in lateral view. 207, Anterior end of metasoma in dorsal view. 208, Hind leg.

by narrow bands of sculpture (Fig. 207). *Legs*: Hind femur length $3.1\times$ maximum width (208).

Material examined.—HOLOTYPE ♀ (UWYO), labelled as follows: “Costa Rica: Puntarenas Golfo Dulce, 24 km W. Piedras Blancas, 200m xii-1991. Paul Hanson”. Also red label “HOLOTYPE” and bordered label “*Pseudognaptodon whitfieldi* Williams Holotype det. D. Williams 2003”.

PARTYPES: Costa Rica: Puntarenas: R.F. Golfo Dulce, 24 km W. Piedras Blancas, 200m, II-1993 (1♀), III-1993 (1♀), P. Hanson, (UWYO). U.S.A.: Texas: Erath Co.: Stephenville, suction trap, 25-31-III-1982, C. Agnew, 1♀ (TAMU).

Etymology.—This species is named for James Whitfield, who has provided the only specimens in this study for which there are confirmed host data.

REMARKS ON OTHER SPECIMENS EXAMINED

I have examined three problematic *Pseudognaptodon* specimens from CNCI that have not been included in the species treatments above. Two are single males that probably each represent new species but are not described here because females are unknown. Their label data is as follows: "Constance Bay Carleton Co., ONT VIII-24-1983 M. Sanbourne" (CNCI), and "USA: FL: Alachua Co. Gainesville, DPI 1-23.VI.1987, MT J Wiley" (CNCI). Both specimens have also been labelled "*Pseudognaptodon* n. sp. det. D.J.M. Williams 2003". The third specimen is a teneral female with pale color and incompletely sclerotized legs and wing veins, whose identity cannot be determined with certainty. It is labelled as follows: "9 mi. N. Forrest, Man. 29.VIII.1958 R.L. Hurley" (CNCI). I have also added a label "*Pseudognaptodon omissus* prob, teneral det. D.J.M. Williams 2003". I have not included it in the treatment of *P. omissus* above because it does not possess all of the diagnostic characters of that species. Determination of whether this specimen is a geographical variant of *P. omissus* or represents a new species cannot be made with this specimen.

ACKNOWLEDGEMENTS

I thank David Langor, John Huber, and Henri Goulet for providing a critical review of the manuscript. Scott Shaw, Robert Wharton, and James Whitfield

provided numerous specimens and waited patiently while this manuscript was produced on a very part-time basis. This study was supported by David Langor, who allowed me time that should have been devoted to other projects.

LITERATURE CITED

- Achterberg, C. van, 1983. Revisionary notes on the subfamily Gnaptodontinae, with description of eleven new species (Hymenoptera, Braconidae). *Tijdschrift voor Entomologie* 126: 25-57.
- Ashmead, W.H. 1894. Report on the parasitic Cynipidae, part of the Braconidae, the Ichneumonidae, the Proctotrypidae, and part of the Chalcididae. Part II. Braconidae. *Journal of the Linnean Society of London, Zoology* 25: 108-138.
- Fischer, M. 1965. Der Opiinae der Nearktischen Region II. *Polskie Pismo Entomologiczne* 35:3-212.
- Fischer, M. 1967. Die Amerikanischen Arten der Gattungen *Euopius*, *Gnaptodon*, und *Pseudognaptodon*. *Beiträge zur Entomologie*, Band 17, Nr 5/8: 959-976.
- Fischer, M. 1977. Hymenoptera Braconidae (Opiinae II-Amerika). *Das Tierreich* 96:1-1001.
- Shenefelt, R.D. 1975. Pars 12, Braconidae 8, Exothecinae Rogadinae. Pp. 1115-1262. in: Vecht, J. van der and R.D. Shenefelt, (eds.). *Hymenopterorum Catalogus (nova editio)*. Dr. W. Junk, The Hague.
- Wharton, R.A. 1997. Subfamily Gnaptodontinae, pp. 256-259, in: Wharton, R.A., P.A. Marsh, and M.J. Sharkey, (eds.). *Manual of the New World genera of the family Braconidae. Special Publication of the International Society of Hymenopterists*, Number 1.
- Wharton, R.A., P.A. Marsh, and M.J. Sharkey, (eds.). *Manual of the New World genera of the family Braconidae. Special Publication of the International Society of Hymenopterists*, Number 1. 439 pp.
- Whitfield, J.M. and D.L. Wagner 1991. Annotated key to the genera of Braconidae (Hymenoptera) attacking leafmining Lepidoptera in the Holarctic region. *Journal of Natural History* 25: 733-754.



Williams, Daryl Joseph Michael. 2004. "Revision of the Genus *Pseudognaptodon* Fischer (Hymenoptera: Braconidae: Gnamptodontinae)." *Journal of Hymenoptera research* 13, 149–205.

View This Item Online: <https://www.biodiversitylibrary.org/item/21412>

Permalink: <https://www.biodiversitylibrary.org/partpdf/36916>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Smithsonian

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

Rights Holder: International Society of Hymenopterists

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.