

**REVISION OF WORLD SPECIES OF *PARATELENOMUS* DODD
(HYMENOPTERA: SCELIONIDAE)**

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Abstract

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The genus *Paratelenomus* Dodd is revised from a worldwide perspective. Three species are described as new: *P. angor* [Taiwan, Thailand], *P. indivisus* [Papua New Guinea, Australia], and *P. matinalis* [Vanuatu]. *Paratelenomus bicolor* (Dodd) [Australia], *P. saccharalis* (Dodd) [southern Europe, Africa, tropical Asia, Australia], *P. ophiusa* (Dodd) [Papua New Guinea, Australia], *P. striativentris* (Risbec) [Africa, India], and *P. tetartus* [Indonesia, Malaysia, Philippines] are redescribed. *Aphanurus graeffei* Kieffer, 1917 and *Asolcus minor* Watanabe, 1954 are junior synonyms of *P. saccharalis* (Dodd), 1913. An identification key to species is provided. The relationship of *Paratelenomus* within Telenominae is discussed; the hypothesized sister group is *Nirupama* Nixon.

Johnson, N.F. 1996. Révision à l'échelle mondiale des espèces du genre *Paratelenomus* Dodd (Hymenoptera: Scelionidae). *The Canadian Entomologist* **128**: 273–291.

Résumé

Le genre *Paratelenomus* Dodd est révisé ici à l'échelle mondiale. Trois espèces nouvelles sont décrites: *P. angor* [Taiwan, Thaïlande], *P. indivisus* [Papouasie, Nouvelle-Guinée, Australie] et *P. matinalis* [Vanuatu]. *Paratelenomus bicolor* (Dodd) [Australie], *P. saccharalis* (Dodd) [sud de l'Europe, Afrique, Asie tropicale, Australie], *P. ophiusa* (Dodd) [Papouasie, Nouvelle-Guinée, Australie], *P. striativentris* (Risbec) [Afrique, Indes] et *P. tetartus* [Indonésie, Malaisie, Philippines) sont décrites de nouveau. *Aphanurus graeffei* Kieffer, 1917 et *Asolcus minor* Watanabe, 1954 deviennent synonymes récents de *P. saccharalis* (Dodd), 1913. On trouvera ici une clé d'identification des espèces. La position systématique de *Paratelenomus* parmi les autres Telenomidae fait l'objet d'une discussion; le groupe soeur est probablement *Nirupama* Nixon.

[Traduit par la Rédaction]

INTRODUCTION

The subfamily Telenominae (Hymenoptera: Platygastroidea, Scelionidae) is a large and unwieldy taxon. Over 800 species have been formally described (Johnson 1992), but this is far from the final total. Attempts have been made to subdivide the two largest genera, *Telenomus* Haliday and *Trissolcus* Ashmead, into species groups (e.g. Kozlov and Kononova 1983; Johnson 1984a, 1984b), but the lineages and their relationships are still far from clear. I have argued that at least one group is easily recognizable and probably monophyletic: the *Psix* group of genera (Johnson 1988b). This includes *Psix* Kozlov and Lê (see Johnson and Masner 1985), *Nirupama* Nixon (see Nixon 1935; Johnson 1985), *Mudigere* Johnson (1988b), and the subject of this revision, *Paratelenomus* Dodd.

Species of *Paratelenomus* are restricted to the Eastern Hemisphere, from West Africa east to Japan and Vanuatu, and from central Europe and Honshu south to northern Australia and throughout India and Africa. The hosts of these parasitoids are known only for a single species, *P. saccharalis* (Dodd). It attacks the eggs of bugs of the family Plataspididae (Hemiptera: Heteroptera). Both *Paratelenomus* and plataspidids are found only in Africa, Asia, Europe, and Australasia. In studying the available material I have been surprised at the relative lack of undescribed species of *Paratelenomus*. To date, 10 names have been published for the eight species I recognize here. Only three appear to have no available name.

The first species of *Paratelenomus* was described in 1911, and even though the genus itself was distinguished by Dodd in 1914 (Dodd 1914d), subsequent species have been

placed in *Telenomus* Haliday, *Aphanurus* Kieffer, *Asolcus* Nakagawa, *Microphanurus* Kieffer, *Aporophlebus* Kozlov, and *Archiphanurus* Szabó. Subsequent authors did not accord Dodd's genus its proper place within the classification because of the failure to examine his holotype. Dodd provided characters to separate *Paratelenomus* from *Dissolcus* Ashmead (also possessing notauli) and *Telenomus* Haliday, but the real feature that brought the type species to his attention was its striking color pattern. The combination of a dark head with a yellow mesosoma and metasoma is quite unusual, but no longer unknown in other telenomines (e.g. *Telenomus xanthosoma* Johnson) and other platygastroids.

Kozlov (1970) described *Aporophlebus* with three included species, designating *A. aporus* Kozlov as the type. One of those species was the European *Aphanurus graeffei* Kieffer. The unifying character for the genus was postulated to be the short postmarginal vein in the fore wing. Later Kozlov and Lê (1976a) described and keyed numerous new species of *Aporophlebus* from Mongolia, and that same year described *Psix* in a separate publication (1976b). Masner (1976) simultaneously published keys and notes to world species of Scelionidae. He was unable to examine and recognize *A. aporus*, but was familiar with *A. graeffei*. Therefore, his key to telenomines included *Aporophlebus*, but, unfortunately, it represented an amalgamation of species presently recognized as *Paratelenomus* and *Psix*, none congeneric with *A. aporus* (which turns out to be a synonym of *Telenomus*, see below). To confuse the situation further, in 1975 Szabó described a series of new genera of telenomines based on European material. All but one were quickly recognized as synonyms of *Telenomus* or *Trissolcus*. The lone remaining genus was *Archiphanurus*, type species: *Aphanurus graeffei*. Therefore, for the next decade or so after Szabó's paper *Archiphanurus* was thought to be the valid name. On occasion, one can find isolated cases in which the name *Aporophlebus* continued to be applied (Mineo 1979; Ryu and Hirashima 1989), even though Kozlov himself synonymized that name in 1977 (Kozlov and Lê 1977). In 1987 I had the opportunity to examine Dodd's types in Canberra, Adelaide, and Brisbane. It was immediately apparent that Dodd's *Paratelenomus* could be based on much more than color pattern and that it forced *Archiphanurus* into synonymy (Johnson 1988a).

The goals of this paper are to determine the limits of a monophyletic genus *Paratelenomus*, to revise the existing species concepts from a worldwide perspective, and to ascertain the position of *Paratelenomus* in the larger context of the subfamily Telenominae.

MATERIALS AND METHODS

The material for this revision is deposited in the following institutions [acronyms following Arnett and Samuelson (1986) and Johnson (1992) in parentheses]: Australian National Insect Collection, Canberra (ANIC); Bishop Museum, Honolulu (BPBM); Canadian National Collection of Insects, Ottawa (CNCI); Museum National d'Histoire Naturelle, Paris (MNHN); The Natural History Museum, London (BMNH); Ohio State University Insect Collection, Columbus (OSUC); Queensland Museum, Brisbane (QMBA); South Australian Museum, Adelaide (SAMA); and the U.S. National Museum of Natural History, Washington (USNM).

Morphological terminology follows that of Masner (1979, 1980) and Johnson and Masner (1985). The clypeus and labrum appear to be fused into a single immovable structure, and I refer to it here as the clypeus/labrum. The term *metapleural triangle* refers to the anteroventral corner of the metapleuron. This area is usually defined by an oblique carina, and its anterior corner extends toward the mid coxa. The term *transscutal articulation* refers to the deep line of flexion running between the tegulae and separating the mesoscutum and scutellum.

PARATELENOMUS DODD

Paratelenomus Dodd, 1914d: 121. Type: *Telenomus bicolor* Dodd, by monotypy and original designation. Kieffer, 1926: 16, 126. Muesebeck and Walkley, 1956: 381. Johnson, 1988b: 27. Johnson, 1992: 563.

Archiphanurus Szabó, 1975: 269. Type: *Aphanurus graeffei* Kieffer, by monotypy and original designation. Synonymized by Johnson (1988a). Kozlov and Lê, 1977: 501. Lê, 1979: 26. Masner, 1980: 10. Mani and Sharma, 1982: 138. Kozlov and Kononova, 1983: 136. Yamagishi, 1990: 193.

Description. *Head* (Figs. 1, 3, 5–7): Hyperoccipital carina absent, occiput rounded onto vertex; frons and lower portion of head with strongly developed fanlike carinae arising near bases of mandibles; central keel arising dorsad of antennal insertions, bifurcating ventrally to pass around antennae, extending dorsad to area of median ocellus, bifurcating there to surround ocellus; orbital carinae arising from near anterior mandibular articulations, extending dorsally along inner orbits to mesal edge of lateral ocelli; submedian carinae often present on frons, these arising near anterior mandibular articulation, extending dorsally between central keel and orbital carinae; area below eye between orbital carina and malar sulcus, and surface of gena with fanlike ridges or striae; genal carina well developed, extending dorsad behind eye, sometimes difficult to differentiate from other striae; occipital carina complete, crenulate; clypeus and labrum apparently fused, apex usually medially bidentate; mandibles narrow, sicklelike, without apical dentation, broadly overlapping, apices usually hidden beneath clypeus/labrum; head usually elongate in malar region; eyes sparsely setose; lateral ocelli distinctly separated from inner orbits; preocellar pit absent; ♀ antennal clava pentamerous, claval formula 1-2-2-2.

Mesosoma (Figs. 2, 4, 8, 9, 12): Notauli usually present (Figs. 4, 12), long; scutellum sculptured; dorsellum crenulate dorsally, rugulose ventrally, usually somewhat elongate medially; lateral portion of pronotum with extensive longitudinal furrows, sometimes completely covering sclerite; netrion variable, usually small and obscured by pronotal furrows; fore and mid coxal cavities clearly, though narrowly, separated (Figs. 2, 8); mesopleuron with extensive pattern of fovea, usually with acetabular foveae expressed; foveae marking course of mesopleural carina variably developed, apically merging with sculpture along pronotal-mesopleural boundary; mesopleural suture clearly marked by foveae, this line sometimes bifurcating, with one branch extending posteriorly to metapleuron to delineate upper boundary of mesepimeron; postepimeral foveae usually distinct, but extending from fore wing base only half the distance to mesocoxal articulation; anteroventral corner of metapleuron with triangular area usually clearly delineated, glabrous; anterior edge of metapleuron along meso-metapleural suture without foveae.

Metasoma (Figs. 10, 11): First segment, at least, usually more-or-less xanthic, contrasting with dark brown color of mesosoma and remainder of metasoma; T1 without sublateral setae; laterotergite of segment 1 glabrous; T2 with longitudinal rugulae extending through most of length of tergite, without coriaceous microsculpture between rugulae, smooth and sparsely setose laterally; apex of T2 with narrow smooth band, under high magnification usually revealing extremely fine microsculpture; S2 with extensive arcuate sulci, setal fields rather small, elongate; remaining metasomatic segments with fine microsculpture.

Diagnosis. *Paratelenomus* is most closely related to *Psix* Kozlov and Lê and *Nirupama* Nixon. The unidentate, sicklelike mandibles of *Paratelenomus* are sufficient to distinguish it immediately, but these are often difficult to see because of the small size of some specimens, particularly when the mandibles are closely appressed within the buccal cavity. In most cases *Paratelenomus* may quickly be distinguished from *Psix* by the combination of the xanthic base of the metasoma and the elongate notauli (Figs. 4, 12). Species of *Nirupama* are extremely elongate and the orbital carinae are expressed as sulci; the submedian carinae are absent. The two species *Paratelenomus indivisus* and *Paratelenomus ophiusa* both lack notauli and could be confused with *Psix*. However, they lack the regular rugose-reticulate head and mesonotal sculpture characteristic of *Psix*, the mandibles are narrow and broadly

overlapping, the central keel forks to pass around the median ocellus, and there are no foveae on the posterior side of the meso-metapleural suture.

Discussion. Among telenomines, the sicklelike, unidentate mandibles are found only in *Paratelenomus*, and support its monophyly. The absence of a line of foveae on the metapleuron flanking the meso-metapleural suture and the dorsal bifurcation of the central keel are shared with *Nirupama* and may indicate a sister-group relationship between these two genera. The foveae are present in all other genera of telenomines, often developing into a longitudinal furrow connecting with the metapleural pit. Species of *Psix* may have the central keel reaching the median ocellus, but at this point it terminates. The two described species of *Nirupama* also have the base of the metasoma slightly lighter in color than either the following segments or the mesosoma. Nixon (1935) in his original description characterizes the basal segment as reddish-brown. Because we are still unable to postulate confidently a sister group for telenomines the polarization of these character states must be viewed as tentative.

Species of *Paratelenomus* have the well-developed sulci on the second metasomatic sternite that are also found in the genus *Psix* (Fig. 11). In *Paratelenomus*, though, the pattern of the sulci is much more constant, and I have not found them to be useful in discriminating among species.

Kozlov and Kononova (1983: 136) place *Paratelenomus* (as *Archiphanurus*) in an intermediate position between *Trissolcus* and *Telenomus*, and they further claim that it differs from all genera of the subfamily in the sculpture of the frons and gena. The latter assertion is clearly false, as the numerous species of *Psix* share many of the same facial carinae. I cannot support the former hypothesis as these same features appear to unite *Paratelenomus*, *Psix*, and *Nirupama*. Much has also been made of the shortened postmarginal vein in *P. graeffei* (= *saccharalis*). I have found this feature to be very difficult to measure properly and quite variable both intra- and interspecifically. Thus I have not focused on it in this revision.

I had postulated a close relationship among *Paratelenomus*, *Psix*, *Nirupama*, and *Mudigere* within Telenominae. I am no longer as confident in this hypothesis following this study. All four genera are remarkable for the well-developed carinae on the frons. The first three have the orbital and submedian carinae and the central keel very strongly developed, whereas those of *Mudigere* are not clearly differentiated. In the meantime I have also become aware of a number of other telenomines, some within *Trissolcus* and others related to *Phanuromyia* Dodd, *Phlebiaporus* Dodd, and *Aradoctonus* Masner, that also possess these fanlike carinae arising from the mandibles.

Lê recently described three Vietnamese species of *Paratelenomus* (as *Archiphanurus*): *P. aculus*, *P. irritus*, and *P. obtusus* (Lê 1980, 1982). The Institute of Biology in Hanoi is unwilling to mail these specimens and I have been unable to visit so as to examine them. I find the descriptions to contain little of value in recognizing his species. Most of the characters hardly serve to distinguish the taxa from any other species of telenomine, and are of no help in distinguishing among *Paratelenomus*. One species, *P. irritus*, is described in the English summary as having no notauli and the first metasomatic tergite brown. This may correspond to the new species described below, *P. indivisus*, or possibly to *P. ophiusa* (Dodd). The illustration of *P. irritus* shows short notauli and a creature more gracile than either of these. (Note that although the caption states that the drawing refers to *P. irritus*, the figure reference in the text is in the description of *P. aculus*.) There may be as many as five species of *Paratelenomus* in Vietnam, and I can find no way to identify *P. irritus*, *P. aculus*, and *P. obtusus* confidently on the basis of the original descriptions.

Check-list of World Species of *Paratelenomus*.

aculus (Lê, 1980) (status unknown)

angor new species

bicolor (Dodd, 1914*b*)
indivisus **new species**
irritus (Lê, 1980) (status unknown)
matinalis **new species**
obtusus (Lê, 1982) (status unknown)
ophiusa (Dodd, 1914*a*)
saccharalis (Dodd, 1914*c*)
 graeffei (Kieffer, 1917) **new synonymy**
 minor (Watanabe, 1954) **new synonymy**
striativentris (Risbec, 1950)
tetartus (Crawford, 1911)

KEY TO WORLD SPECIES OF *PARATELENOMUS* DODD (♀)

1. Notauli entirely absent (Fig. 9); transscutal articulation very broad and crenulate throughout, disk of scutellum distinctly separated from mesoscutum; mesoscutum strongly deflexed posteriorly near transscutal articulation; submedian carinae well developed on frons (Figs. 1, 6); T1 with numerous (four or more) setae arising from lateral margin (Fig. 10) 2
- 1'. Notauli present, usually well developed and extending nearly throughout length of mesoscutum (Figs. 4, 12); transscutal articulation strongly narrowed medially, disk of scutellum abutting mesoscutum (Fig. 4); mesoscutum posteriorly gently sloping toward transscutal articulation; T1 usually with no more than four lateral setae 3
- 2(1). Clypeus/labrum wider than long, apex with two submedial teeth (Fig. 1); T1 darkened, concolorous with mesosoma and remaining segments of metasoma, sometimes laterotergites slightly lighter in color [Australia (north Queensland), Papua New Guinea] 3. *indivisus* **sp.nov.**
- 2'. Clypeus/labrum clearly much longer than wide, apex rounded medially or drawn to a weak medial point (Fig. 6); T1 usually xanthic, markedly contrasting in color with remainder of body [Australia (north Queensland), Papua New Guinea] 5. *ophiusa* (Dodd)
- 3(1'). Mesopleural carina indicated by row of foveae arising from near mid coxal articulation, extending dorsad along anterior edge of scrobe toward mesopleural pit (Fig. 8) 4
- 3'. Mesopleural carina absent, scrobe not margined anteriorly by a row of foveae, rarely with weak indication of a fold in this area (Fig. 12) 6
- 4(3). Mesoscutum laterad of notauli and most of disk of scutellum smooth, without fine microsculpture (Fig. 4); acetabular area largely occluded by foveae along mesopleural carina and crenulae flanking pronotal-mesopleural suture [Vanuatu]. 4. *matinalis* **sp.nov.**
- 4'. Mesoscutum and disk of scutellum covered with fine coriaceous microsculpture throughout (similar to Fig. 12); acetabular area distinct, largely smooth 5
- 5(4'). Frons with submedian carinae well developed, expressed as a single distinct ridge on either side of frons (as in Figs. 1, 3, 6); base of metasoma dark, concolorous with following segments [Taiwan, Thailand] 1. *angor* **sp.nov.**
- 5'. Frons with submedian carinae doubled or tripled (Fig. 7); base of metasoma xanthic, usually strongly contrasting in color with following segments [sub-Saharan Africa (Benin, Ivory Coast, Kenya, Nigeria, Somalia, Togo, Uganda, Zimbabwe), India (Tamil Nadu)] 7. *striativentris* (Risbec)
- 6(3'). Head dark brown or black, sharply contrasting with xanthic mesosoma and metasoma (at least the first two segments) [eastern Australia] 2. *bicolor* (Dodd)
- 6'. Head and mesosoma dark brown, concolorous; metasoma with base xanthic, remainder dark brown. 7
- 7(6'). Clypeus/labrum drawn out medially into a long point (as in Fig. 6) [Malaysia, Indonesia, Philippine Islands]. 8. *tetartus* (Crawford)

- 7'. Clypeus/labrum much wider than long, terminating apically in two small submedial teeth (Fig. 5) [probably widespread in southern Palearctic (Austria, Hungary, Romania, Italy, Ukraine, Moldova, Russia, South Korea, Japan), Africa (Benin, Ivory Coast, Kenya, Nigeria, Rwanda, Somalia, South Africa, Uganda, Zambia, Zimbabwe), tropical Asia (Bangladesh, India, Indonesia, Malaysia, Philippine Is., Taiwan, Thailand), and northern Australia]..... 6. *saccharalis* (Dodd)

1. *Paratelenomus angor* new species

Description. ♀. Length 1.10–1.19 mm (\bar{x} = 1.13 mm, N = 3). *Head*: Central keel complete; submedian carinae well developed, running dorsally to mid-height of eye and mingling with sculpture extending ventrally from vertex; lower half of frons between submedian carinae smooth, glabrous; upper half of frons with two to three longitudinal rugae extending from vertex; orbital carina extending from anterior mandibular articulation along inner orbit to mesal edge of lateral ocellus; area between orbital and submedian carinae in upper half of frons with single longitudinal ruga; area below eye between orbital carina and malar sulcus with four to five ridges radiating from anterior mandibular articulation; a single carina present between malar sulcus and genal carina; clypeus/labrum pentagonal, apex bidentate. *Mesosoma*: Dark, concolorous with head; notauli well developed, nearly percurrent; disk of mesoscutum strongly coriaceous throughout, nearly pustulate; transscutal articulation noticeably narrowed medially, crenulae along posterior margin also narrower medially than laterally, but not so markedly, these define a transverse fusiform surface on scutellum, this with strong raised coriaceous microsculpture similar to mesoscutum; mesopleural carina present, flanked anteriorly by three to five deep foveae; space between fore and mid coxae bridged by costae from coxal margins; anteroventral portion of mesepisternum otherwise largely smooth, glabrous; acetabular field very small, circular, finely coriaceous; episternal foveae indistinguishable, foveae along mesopleural carina merging with those flanking pronotal-mesepisternal suture; mesopleural scrobe longitudinally costate, grooves not reaching mesopleural carina; mesepimeron indicated as a convex fusiform surface anterior to meso-metapleural suture; metapleural triangle well developed; metapleuron without crenulae flanking meso-metapleural suture. *Metasoma*: First segment dark brown, concolorous with mesosoma and remaining segments of metasoma; T1 with three lateral setae; apex of T2 with band of extremely fine microsculpture.

♂. Unknown.

Material Examined. Holotype ♀: TAIWAN: Pingtung, Kenting For. Rec. Area, 27.xi–1.xii.1990, pan trap (CNCI). Paratypes: 1 ♀ with same data as holotype. THAILAND: Doi Inthanon Nat. Pk., 70 km SW Chiang Mai, 1200 m, 31.i–7.ii.1989, malaise trap/pan trap, 1 ♀. (CNCI).

Etymology. The name *angor*, from the Latin for anguish, torment, trouble, refers to the relationship between parasitoid and host.

Distribution. Taiwan, Thailand.

Diagnosis. *Paratelenomus angor* is most similar to *P. striativentris*, from which it may be distinguished by the dark base of the metasoma and the presence of only a single pair of submedian carinae on the frons.

2. *Paratelenomus bicolor* (Dodd)

Telenomus bicolor Dodd, 1914b: 251, ♀. Holotype (examined) in South Australian Museum.

Paratelenomus bicolor: Dodd, 1914d: 121.

Paratelenomus bicolor: Kieffer, 1926: 126.

Paratelenomus bicolor: Johnson, 1988a: 231.

Paratelenomus bicolor: Johnson, 1992: 563.

Description. ♀. Length 0.68–0.69 mm (\bar{x} = 0.69 mm, N = 3). *Head*: Central keel complete; submedian carinae abbreviated, represented by low ridge extending from anterior mandibular articulation to only below mid-height of eye, weakly defined; orbital carina complete, extending from mandibular articulation to lateral ocellus; frons medially smooth, glabrous, in upper third with four to five low, weakly meandering longitudinal rugae; area between orbital carina and malar sulcus below eye with three to five fanlike ridges radiating upward from anterior mandibular articulation toward eye; gena with two ridges between malar sulcus and genal carina; crenulae arising from occipital carina short; gena near dorsal end of genal carina finely coriaceous; clypeus/labrum pentagonal, apex bidentate. *Mesosoma*: Golden yellow, contrasting with dark head; notauli present, nearly percurrent; mesoscutum with finely pebbled surface microsculpture; transscutal articulation narrowed medially; crenulae on posterior margin of scutellum narrowed medially, disk of scutellum coriaceous; mesopleural carina absent, without foveae marking its course; area between fore and mid coxae bridged by crenulae flanking coxal cavities; anteroventral portion of mesepisternum largely smooth; acetabular field small, finely coriaceous; episternal foveae not differentiated; mesopleural scrobe longitudinally sulcate; mesepimeron not differentiated; metapleural triangle well developed; metapleuron without crenulae flanking meso-metapleural suture. *Metasoma*: Extensively xanthic, central areas of T2, S2, and apex of metasoma dark brown, dark pigmentation gradually developing, without marked transition; T1 with two lateral setae; apex of T2 smooth.

♂. Unknown.

Material Examined. Holotype ♀: (label data from Dodd's original description) AUSTRALIA: Queensland, Nelson (near Cairns), 13.iv.1913; caught while sweeping in forest. Type #11169 in SAM. Other material: AUSTRALIA: Queensland, Port Douglas, 3 m, 23.ii.1984, screen-swept, pan traps, coastal thicket, sand dunes, 3 ♀ ♀. (CNCI).

Distribution. Northern Australia.

Diagnosis. This species is immediately recognizable by its striking coloration. It is otherwise very similar to *P. saccharalis* in that the submedian carinae are poorly developed and the mesopleural carina is not indicated. In xanthic species such as this the details of microsculpture are very difficult to see under a light microscope because the cuticle is almost translucent.

3. *Paratelenomus indivisus* new species

Description. ♀. Length: 0.89–1.13 mm (\bar{x} = 0.97 mm, N = 50). *Head* (Figs. 1, 9): Central keel complete, extending dorsad to median ocellus; submedian carinae well developed, extending dorsad to vertex sculpture; frons between submedian carinae smooth, glabrous; orbital carinae extending from anterior mandibular articulation dorsad along inner orbits to mesal margins of lateral ocelli; area below eye between orbital carina and malar sulcus with two deep grooves defining three more-or-less convex raised areas or ridges; one deep groove posterior to malar sulcus, genal sulcus flanked anteriorly by deep groove, the combination defining two ridges between malar sulcus and genal carina; clypeus/labrum pentagonal, apex bidentate; radicle yellow, concolorous with base of scape. *Mesosoma* (Figs. 2, 9): Notauli absent, disk of mesoscutum areolate-rugose with superimposed fine coriaceous microsculpture; crenulae on scutellum bordering outer margins and transscutal sulcus very wide, covering all but a narrow transverse area of sclerite, crenulae along transscutal sulcus not notably narrower medially, disk of scutellum with coriaceous microsculpture, setose, setal bases notably pustulate; mesopleural carina absent; space between fore and mid coxae bridged by crenulae flanking coxal cavities; anteroventral portion of mesepisternum occupied by expanded crenulae from coxal cavities and acetabular carina; acetabular field very

small, more-or-less triangular, finely coriaceous; episternal foveae crossing mesopleuron from apex of acetabular carina to mesopleural pit; two to three postepimeral foveae present near base of fore wing; legs, including all coxae, yellow. *Metasoma* (Figs. 10, 11): First segment almost completely dark, concolorous with remaining segments, occasionally laterotergites somewhat lighter in color; T1 with at least six lateral setae; apex of T2 with fine micropunctures.

♂. Length: 0.84–0.98 mm (\bar{x} = 0.91 mm, N = 17). Similar to female; crenulae generally not as exaggerated, leaving larger coriaceous areas on mesopleuron, gena, mesoscutum, and scutellum.

Material Examined. Holotype ♀ : PAPUA NEW GUINEA: Laing, st., 16.vii.1982 (CNCI). Paratypes: AUSTRALIA: Queensland, Gordonvale, nr. Mulgrave River, 30.iii.1991, river forest, 6 ♀ ♀. PAPUA NEW GUINEA: Laing, v–vi.1982, 10.vi.1982, 16.vii.1982, 24.vii.1982, 2.xi.1982, 30.xi.1982, 79 ♀ ♀, 29 ♂ ♂. Awar Village, 3.v.1982, 1 ♀. (ANIC, CNCI, OSUC).

Etymology. The name *indivisus* refers to the lack of division of the disk of the mesoscutum by notauli.

Distribution. Northern Australia and Papua New Guinea.

Diagnosis. Only two species of *Paratelenomus* lack notauli in some form, *P. indivisus* and *P. ophiusa*. This species is distinguished from *P. ophiusa* by the entirely dark metasoma, and the bidentate apex of the clypeus/labrum.

4. *Paratelenomus matinalis* new species

Description. ♀. Length 0.80–0.99 mm (\bar{x} = 0.90 mm, N = 38). *Head* (Fig. 3): Central keel complete, extending dorsad from bifurcation above antennal insertions to median ocellus; submedian carinae well developed, extending dorsad to merge with vertexial sculpture; lower half of frons between submedian carinae glabrous, smooth or with strongly effaced coriaceous microsculpture; upper half of frons with three to four rugulae parallel to central keel; orbital carina extending to mesal margins of lateral ocellus; area between orbital and submedian carinae above level of upper half of eye with setal bases strongly pustulate; area below eye between orbital carina and malar sulcus with three deep grooves defining four ridges; a single groove present posterior to malar sulcus and simultaneously flanking genal carina, thus a single ridge between malar sulcus and genal carina; crenulae arising from occipital carina extending to genal sulcus; clypeus/labrum pentagonal, apex bidentate. *Mesosoma* (Fig. 4): Notauli present, sinuate, nearly percurrent; mesoscutum between notauli weakly rugose-reticulate, with coriaceous microsculpture, setal bases strongly pustulate; sculpture effaced laterad of notauli, practically absent entirely near scutellum; transscutal sulcus strongly narrowed medially, crenulae within barely visible along midline of body; crenulae bordering posterior margin much shorter medially than laterally; crenulae and transscutal articulation define transverse fusiform surface on scutellum, this with fine coriaceous microsculpture laterally, nearly smooth medially, setal bases weakly pustulate; mesopleural carina present, flanked by two to four foveae at level of acetabular field of microsculpture; space between fore and mid coxae bridged by elongate crenulae flanking coxal cavities; anteroventral portion of mesepisternum occupied by expanded crenulae from coxal cavities and acetabular carina; acetabular field very small, oval, finely coriaceous; episternal foveae indistinguishable, anterior edge of mesopleural scrobe abutting crenulae flanking pronotal-mesepisternal suture, scrobe entirely transversely sulcate; two postepimeral foveae below fore wing base; metepisternal triangle well defined; meso-metapleural suture without crenulae posteriorly. *Metasoma*: First segment bright golden-yellow, contrasting with following dark brown segments; T1 with two lateral setae; apex of T2 with narrow band of extremely fine microsculpture.

♂. Length: 0.77–0.89 mm (\bar{x} = 0.86 mm, N = 8). Except for antennae, very similar to female, differing only in following characters: head slightly more elongate, facial carinae finer, crenulae arising from occipital carina short, not extending entirely over posterior surface of gena to genal carina.

Material Examined. Holotype ♀: VANUATU: Mallicolo I. [Malakula], S.W. Bay, 9.x.1971 (CNCI). Paratypes: VANUATU: Malakula (New Hebrides, Mallicolo), S.W. Bay, 9, 13.x.1971, 3 ♂♂, 14 ♀♀. Efaté, Vila (Villa), i.1976, xii.1978, 0–100 m, 6 ♀♀; Efaté, iii.1980, 1 ♂, 1 ♀; Efaté, Epuen (Eton), 21.viii.1979, 0–20 m, 2 ♀♀; Efaté, 3 km E Port Havannah, 23.viii.1979, 50 m, 6 ♀♀; Efaté, Mt. Bernier, 24.viii.1979, 479 m, 7 ♀♀. Tanna, Lenakel, iii.1980, 0–200 m, 2 ♂♂, 3 ♀♀. Ermae, Mt. Tavani, Talimasa, 30.viii.1979, 0–434 m, 1 ♀; Mt. Tavani, Talimasa, 31.viii.1979, 100–400 m, 1 ♂. Santo, 5 km N Luganville, 11.ix.1979, 50 m, 1 ♀. Maewo, Sourwari, 15°23'S 168°07'E, 4–5.ix.1979, 0–380 m, Albizzia, 1 ♂. (BPBM, CNCI, OSUC).

Etymology. The name *matinalis* refers to the eastern distribution of this species in relation to the others in the genus.

Distribution. Islands of Vanuatu (formerly New Hebrides).

Diagnosis. This species, beautiful for its crisply defined sculpture and color pattern, shares with *P. angor* and *P. striativentris* the presence of a mesopleural carina. From those two it may be distinguished by the lack of mesoscutal microsculpture laterad of the notauli. The contrast in color between the first metasomatic segment and the rest of the body is particularly striking.

5. *Paratelenomus ophiusa* (Dodd)

(Fig. 6)

Telenomus ophiusa Dodd, 1914a: 84. Holotype (examined) in South Australian Museum (Adelaide).

Microphanurus ophiusa: Kieffer, 1926: 94, 112.

Paratelenomus ophiusa: Johnson, 1988a: 231.

Paratelenomus ophiusa: Johnson, 1992: 564.

Description. ♀. Length: 0.77–1.10 mm (\bar{x} = 0.89 mm, N = 12). *Head* (Fig. 6): Central keel complete; submedian carinae generally well developed, extending dorsad to about midpoint of height of eye, usually not reaching vertexial sculpture; frons between submedian carinae finely coriaceous, glabrous; orbital carinae extending from anterior mandibular articulation dorsad along inner orbits to mesal margins of lateral ocelli; area below eye between orbital carina and malar sulcus with two deep grooves defining three to four raised fanlike ridges radiating from mandibular articulation; one deep groove posterior to malar sulcus, genal sulcus flanked anteriorly by deep groove, the combination defining two ridges between malar sulcus and genal carina; clypeus/labrum elongate, rounded or acute apically, far surpassing closed mandibles; crenulae arising from occipital carina short; gena coriaceous posterior to genal carina. *Mesosoma*: Notauli completely absent, disk of mesoscutum varying from areolate-rugose to pustulate (i.e. with raised areas not interconnected), with superimposed fine coriaceous microsculpture; transscutal articulation wide, but somewhat narrowed medially (in comparison with *P. indivisus*), crenulae along posterior margin of scutellum wide, but not covering most of scutellum as in *P. indivisus*, disk of scutellum fusiform, with coriaceous microsculpture, setose, setal bases pustulate, sometimes only weakly so; mesopleural carina absent; space between fore and mid coxae bridged by crenulae flanking coxal cavities; anteroventral portion of mesepisternum occupied by expanded crenulae from coxal cavities and acetabular carina; acetabular field elongate, finely coriaceous; episternal foveae crossing mesopleuron from apex of acetabular carina to mesopleural pit; mesopleural

scrobe longitudinally sulcate; mesepimeron well developed, fusiform; metapleural triangle well developed; metapleuron without crenulae flanking meso-metapleural suture. *Metasoma*: First segment usually xanthic, strongly contrasting with remainder of metasoma, in two specimens darker, more nearly concolorous with remaining segments; T1 with four to seven lateral setae; apex of T2 with fine micropunctures.

♂. Length: 0.66–0.76 mm (\bar{x} = 0.72 mm, N = 3). Similar to female; scape with apex expanded into narrow lamellate blade; crenulae on body generally not as exaggerated, leaving larger coriaceous areas on mesopleuron, gena, mesoscutum, and scutellum; surface sculpture finer, less deeply impressed.

Material Examined. AUSTRALIA: Queensland, 2 km W Gordonvale, 1.iii.1992, screen swept, 1 ♀; Queensland, Gordonvale near Mulgrave River, 30.iii.1991, river forest, screen swept, 5 ♀♀; Queensland, 8 km W Gordonvale, 1.iv.1991, 3 ♀♀. PAPUA NEW GUINEA: Laing, v–vi.1982, 2.v.1982, 10.vi.1982, 16.vii.1982, 24.vii.1982, 11 ♀♀, 4 ♂♂. (ANIC, CNCI, OSUC).

Distribution. Northern Australia and Papua New Guinea.

Diagnosis. Only two species of *Paratelenomus* lack notauli in some form, *P. indivisus* and *P. ophiusa*. This species is distinguished from *P. indivisus* by the xanthic base of the metasoma, the shorter submedian carinae on the frons, a slightly more gracile habitus, and the exaggerated shape of the clypeus/labrum.

6. *Paratelenomus saccharalis* (Dodd)

(Figs. 5, 12)

Telenomus saccharalis Dodd, 1914c: 293. Lectotype (designated below) in Queensland Museum (Brisbane).

Aphanurus graeffei Kieffer, 1917: 343. **New synonymy.** See discussion of type below (not examined).

Liophanurus saccharalis: Kieffer, 1926: 64, 71.

Microphanurus graeffei: Kieffer, 1926: 91, 100.

Asolcus minor Watanabe, 1954: 20, 21. **New synonymy.** Holotype (not examined) in Hokkaido University (Sapporo).

Aporophlebus graeffei: Kozlov, 1970: 216.

Aporophlebus graeffei: Kononova, 1973: 439.

Archiphanurus graeffei: Szabó, 1975: 269.

Aporophlebus graeffei: Kozlov and Lê, 1976a: 348.

Archiphanurus graeffei: Kozlov, 1978: 646.

Aporophlebus graeffei: Mineo, 1979: 234.

Archiphanurus graeffei: Kozlov and Kononova, 1983: 136.

Paratelenomus saccharalis: Johnson, 1988a: 231.

Archiphanurus minor: Bin and Colazza, 1988: 33.

Aporophlebus minor: Ryu and Hirashima, 1989: 50.

Archiphanurus minor: Yamagishi, 1990: 193.

Paratelenomus graeffei: Johnson, 1992: 564.

Paratelenomus minor: Johnson, 1992: 564.

Paratelenomus saccharalis: Johnson, 1992: 564.

Archiphanurus graeffei: Kononova, 1995: 98.

Description. ♀. Length 0.58–0.83 mm (\bar{x} = 0.71 mm, N = 50). *Head* (Fig. 5): Central keel complete; submedian carinae abbreviated, usually not extending dorsad of midpoint of height of eye, in a few specimens continued above as a weak crease reaching vertexial sculpture; lower half of frons between submedian carinae smooth, glabrous, upper half with fine longitudinal wrinkles; orbital carinae extending from anterior mandibular insertion to inner orbits of eyes, continued as a very weak carina around lateral ocelli, sometimes barely

visible; area below eye between orbital carina and malar sulcus with four to five weak carinae extending fanlike from mandibular articulation; three to four weak carinae present between malar sulcus and genal carina; gena coriaceous dorsally, smooth in lower third near mandibular articulation; clypeus/labrum usually pentagonal, apex bidentate, sometimes apical teeth fused into single blunt projection; crenulae arising from occipital carinae short. *Mesosoma* (Fig. 12): Notauli present, fine, extending nearly throughout length of mesoscutum; mesoscutum scaly-reticulate throughout; transscutal articulation strongly narrowed medially, crenulae bordering posterior margin also shorter medially than laterally, disk of scutellum more-or-less semicircular, coriaceous throughout, setose, setal bases not strongly pustulate; mesopleural carina absent; space between fore and mid coxae narrow, but not completely occluded by crenulae flanking coxal cavities; anteroventral portion of mesepisternum smooth, nearly glabrous; acetabular field small, finely coriaceous; episternal foveae indicated only by weak transversely diagonal crease at apex of acetabular carina; mesopleural scrobe only with foveae marking pleural sulcus in an arc that begins above mid coxal articulation; metapleural triangle usually well developed, sometimes poorly differentiated anteriorly; metapleuron without crenulae flanking meso-metapleural suture. *Metasoma*: First segment variable in color, usually noticeably xanthic to some extent and contrasting in color with remaining metasomatic segments; T1 with two lateral setae; microsculpture at apex of T2 very narrow, leaving a fairly wide, smooth transverse band.

♂. Length: 0.49–0.90 mm (\bar{x} = 0.61 mm, N = 31). Very similar to female, except that carinae and sculpture are usually more weakly developed.

Known Hosts. *Brachyplatys subaeneus* Westwood (Wall 1928, 1931), *Coptosoma cribrarium* (Fabricius) (in China); *Megacopta punctatissimum* (Montandon) (Japan) (Hemiptera: Plataspididae).

Material Examined. Lectotype ♀ (here designated): “Hy 2059; *Telenomus saccharalis* Dodd ♂ ♀ type, From Pentatomid eggs on sugarcane, Java; TYPE.” Broken specimen mounted on slide (Q MBA). Paralectotype ♂ mounted on same slide as female, but medium has flowed out from beneath the cover slip and carried the specimen with it. Other Material. AUSTRALIA: Northern Territory, 120 km W Timba Creek, 27.iii.1991, 4 ♀ ♀; Northern Territory, 160 km SW Katherine, 27.iii.1991, 4 ♀ ♀. Queensland, Gordonvale, nr. Mulgrave River, 30.iii.1991, screen swept, river forest, 3 ♀ ♀; Queensland, 25 km W Gordonvale, 1.iii.1991, screen swept, 1 ♀; Queensland, Port Douglas, 23.ii.1984, screen swept, coastal thicket, sand dunes, 3 ♀ ♀. AUSTRIA: Gumpoldskirchen, 2 ♀ ♀. BANGLADESH: 1982, No. 36, pan trap, 1 ♀. BENIN: Abomey-Calavi, ~25 km N Cotonou, xii.1988, 5 ♀ ♀. CHINA: Canton, 1928, ex *Coptosoma cribraria* [sic], 7 ♀ ♀, 1 ♂. INDIA: Karnataka, Bangalore, CIBC grounds, 4.xii.1974, 19.ix.1975, pan traps, 3 ♀ ♀; Bangalore, 19–23.x.1979, 5 ♂ ♂, 22 ♀ ♀; Karnataka, Maddur (Mysore Road), 19.xi.1986, river shoreline, 1 ♂. Kerala, Periyar Animal Sanctuary, 5–15.x.1979, 2 ♀ ♀; Kerala, University of Calicut, botanical garden, 6.x.85, 2 ♂ ♂, 16 ♀ ♀; Kerala, 10 km N Walayar R.R. Sta., 500 m el., 8.x.1985, New Delhi, IARI, 300 m el., 8.vi.1990, swept grass, shrubs, 2 ♀ ♀. Tamil Nadu, 3 km E Manjaler Dam, 15–18.x.1979, 2 ♀ ♀; Tamil Nadu, 29 km S Ootacumund, 1100 m el., 7.x.1985, 4 ♂ ♂, 12 ♀ ♀; Tamil Nadu, 26 km N Valparai, Anaimalai Hills, 935 m el., 9.x.1985, 1 ♂. INDONESIA: Sulawesi Utara, Dumoga-Bone Nat. Pk., Toraut, 220 m el., 9–16.v.1985, 2 ♀ ♀. Curug [Java], 5–17.vii.1981, pan trap, 2 ♀ ♀. IVORY COAST: Bouaké, 7.ii.1978, iii.1980, iv.1980, 1.x.1980, pan traps, malaise, 11 ♀ ♀. ITALY: Genova, S. Lorenzo di Cas., viii.1936, viii–ix.1936, 11 ♀ ♀; Genova, Monte Fasee, 2.x.1972, 2 ♀ ♀. Piacenza, Ferriere, 25.vi.1972, 7 ♀ ♀; Piacenza, 25.vi.1972, 3 ♀ ♀; Val Chero i Magnani, 17.vi.1973, 3 ♀ ♀; Velleia, 30.viii.1973, 1.ix.1973, 4.ix.1973, 20.ix.1973, malaise 12 ♀ ♀; Velleia, 18–21.viii.1973, lago, malaise 1 ♀. Terni, Monte Peglia, 8–25.vi.1978, 14–23.vi.1978, 14–28.vi.1978, 23.vi–4.vii.1978, 23.vii–1.viii.1978, 23.vii–9.viii.1979, 1–9.viii.1978, 5.viii.1978, 9–18.viii.1978,

18–25.viii.1978, 24.viii–1.ix.1978, 1–8.ix.1978, 8–15.ix.1978, 15–22.ix.1978, 23–29.ix.1978, 1–17.x.1978, malaise, 96 ♀♀; Monte Peglia, 1–7.viii.1980, 7–20.viii.1980, 21–28.viii.1980, 4–24.ix.1980, yellow pan traps 52 ♀♀, 1 ♂. JAPAN: Aichi Pref., Narai, Toyota, 30.vii–7.viii.1990, pan trap, 2 ♀♀; Yagoto, Nagoya, 20.v.1989, ex *Megacopta punctatissimum*, 1 ♂, 1 ♀; Honshu, Ibaraki Pref., Tsuchiura, 24–31.vii.1989, 19.ix–2.x.1989, pan trap, marsh, 2 ♀♀; Ibaraki, Tsukuba, NIAES, 14–25.vii.1989, 7–11.ix.1989, pan trap, 3 ♀♀; Tsukuba, Expo site, 29.viii–5.ix.1989, 1 ♀; Gumma Pref., Takamine Table Land, 1950 m el., 19.vii.1980, 1 ♀; Fukuoka, Mt. Tachibana-Yama, 12.viii.1980, 2 ♀♀. KENYA: Nairobi, Nairobi Game Park, 28.iii.1980, pan trap, 1 ♂, 1 ♀; Nairobi, ii.1982, 1 ♀; Mbita Point, ICIPE station, ii.1983, 1 ♀. MALAYSIA: Pahang Kuala Tahan, Taman Negara NP, 200 m el., 20–21.vi.1990, rain forest, 2 ♂♂, 2 ♀♀. Sarawak, Sematin, 23.ii.1987, 1 ♀. MOLDOVA: Strasheny, 20.vi.1960, 1 ♀. NIGERIA: Oyo, Ibadan, IITA compound, xi.1987, pan trap, 2 ♀♀; Ibadan, 4.i.1962, 23.i.1963, 1 ♂, 1 ♀; Kwara, 15 km S Jebba, 15.ix.1987, 11 ♂♂, 13 ♀♀. PHILIPPINE IS.: Leyte, Visca, Baybay, 23.ix–20.x.1982, pan trap, 1 ♂. RWANDA: Kigali, 1977, malaise, 1 ♀. SOMALIA: Mogadishu, Afgoi [Afgooye], Shabelli Valley, 1–15.ii.1977, 17–24.ii.1977, 30.v–7.vi.1978, viii.1978, malaise, 3 ♀♀, 1 ♂; Mogadishu, Afgoi [Afgooye], Lower Shabelli Valley, 1–12.v.1977, malaise, 1 ♀. SOUTH AFRICA: Transvaal, 11 km SE Pilgrims Rest, 1400 m el., 11–31.xii.1985, relict nature forest edge, FIT-malaise, 1 ♀; Guernsey Farm, 15 km E. Klaserie, 19–31.xii.1985, malaise, 1 ♀; Kruger Nat. Park, Satara, 16–18.1985, 1 ♀. SOUTH KOREA: Mt. Sudo-San, 400 m, 22.vii.1990, 23.vii.1990, 2 ♀♀; 600 m, 24.viii.1990, 3 ♀♀; 500 m, 25.viii.1990, 1 ♀. TAIWAN: Kenting, 1–5.v.1991, yellow pan trap, 1 ♀; Nantou Hsien, Lushan Hot Spgs, 1100 m el., 29.v.1990, scrub near tea plant, 1 ♀. THAILAND: Nan Prov., Nan, 31.viii.1985, 1 ♀. Uthani, Thani Distr., Khao Nang Rum, 400 m el., v.1985, malaise trap, 1 ♀. Kanchanaburi Prov., Erawan Nat. Pk., 100 m el., 5.vii.1990, mixed bamboo forest, 1 ♂. Chiang Mai, Doi Inthanon Nat. Pk., 1300 m el., 1–12.v.1990, malaise trap, second growth, 1 ♂. UGANDA: Kampala, lakeshore, 3800' el. (1158 m), i.1973, 2 ♀♀. ZAMBIA: Nyika Plateau, 7100' el. (2164 m) 8.xii.192, 3 ♀♀. ZIMBABWE: Chishawasha, nr. Harare, ii, iii, iv, 1980; vii.1979, pan trap, 10 ♀♀. (BMNH, CNCI, OSUC, USNM).

Distribution. Probably widespread in southern Palearctic, Africa, tropical Asia, and northern Australia.

Diagnosis. This is by far the most common and most widespread species of *Paratelenomus*. It is generally characterized by its small size and delicate sculpture. *Paratelenomus bicolor* is very similar, but quite different in coloration. *Paratelenomus tetartus* also has well-developed notauli and lacks the mesopleural carina. *Paratelenomus saccharalis* may be distinguished from *P. tetartus* by the pentagonal, bidentate clypeus/labrum. The short submedian carinae on the frons is fairly characteristic of *P. saccharalis* through much of its range, but in specimens from Japan and Korea the carinae continue dorsally to merge with the vertexial sculpture.

Remarks. Through most of its range *Paratelenomus saccharalis* is bisexual, but in Europe the species is unisexual (Bin and Colazza 1988). Wall (1928) published a brief account of some aspects of the biology of this species, referring to it as a chalcid. Later (Wall 1931) he referred to it as *P. tetartus* (determined by A.B. Gahan). Some of the material from that study is now deposited in OSUC.

The male paralectotype is no longer protected beneath the cover slip with the female. I chose not to try to remount it because it is already broken and because of its age.

In his redescription of *Archiphanurus graeffei* Szabó (1975) designated both a neotype and a neoparatype. The label associated with his "neotype" indicates that the specimen was

collected in Hungary, rather than Kieffer's type locality of Trieste. I believe the validity of this designation to be irrelevant for two reasons. First, I have found only a single species of *Paratelenomus* in Europe. Therefore, I believe that the identity of *Aphanurus graeffei* is unambiguous. Second, when I visited the Hungarian National Museum of Natural History in 1979, the neotype specimen was missing from its pin!

I did not examine the holotype of *P. minor*. Yamagishi (1990) published an excellent illustration of that species. That, combined with the fact that I know of no other species in Japan, leads me to synonymize that name under *saccharalis*.

7. *Paratelenomus striativentris* (Risbec)

(Figs. 7, 8)

Microphanurus striativentris Risbec, 1950: 568, 575. Lectotype (designated below) in Muséum National d'Histoire Naturelle, Paris (MNHN).

Archiphnanurus striativentris: Bin and Colazza, 1988: 33.

Paratelenomus striativentris: Johnson, 1992: 564.

Description. ♀. Length: 0.70–1.06 mm (\bar{x} = 0.84 mm, N = 51). **Head** (Fig. 7): Central keel complete, extending to median ocellus; submedian carina present as two, occasionally three, closely approximated, parallel carinae on each side of frons; orbital carina continuous along inner eye margin past lateral ocellus; frons smooth on either side of the central keel between submedian carinae; area between orbital carina and malar sulcus with three deep grooves; submedian carinae merging dorsally with longitudinal carina on vertex and upper half of frons; gena between malar sulcus and genal carina convex, without grooves; crenulae arising from occipital carina short, gena posterior to genal carina coriaceous; clypeus/labrum pentagonal, apex bidentate. **Mesosoma**: Notauli usually well developed, straight, varying in length, usually long, nearly percurrent, sometimes short, restricted to posterior fourth of mesoscutum; mesoscutal sculpture variable, coriaceous, coarsely scaly-reticulate, or granular, sculpture extending onto surfaces laterad of notauli; transscutal articulation strongly narrowed medially, crenulae on posterior margin also narrowed medially, disk of scutellum with same sculpture as mesoscutum; mesopleural carina defined by distinct arcuate line of foveae along its anterior margin extending from mid coxal cavity to confluence with episternal foveae at anterior margin of episternum (Fig. 8); intercoxal space with between crenulae flanking coxal cavities setose, setal bases pustulate, without microsculpture; anteroventral portion of mesepisternum with small coriaceous acetabular field, otherwise smooth; mesopleural scrobe with narrow, convex, fusiform, smooth area posteriorly, otherwise transversely sulcate; metapleural triangle well defined; meso-metapleural suture without crenulae posteriorly. **Metasoma**: First segment varying in color from golden-yellow to light brown, usually strong contrasting with remaining brown segments; T1 with two to three lateral setae; apex of T2 nearly smooth, with relatively few (compared with T3) shallow micropunctures.

♂. Length: 0.89 mm (N = 1). Except for antennae, very similar to female, differing only in that head and mesosomatic sculpture are generally finer; orbital carina dorsally extends to lateral ocellus.

Material Examined. Lectotype ♀ (here designated): IVORY COAST: Abengourou, 20.xii.1946, ponte Hemiptère sur haricot; *Microphanurus striativentris* Risbec, TYPE, O.R.S.T.O.M. Coll. Risbec (MNHN). Paralectotypes: 4 ♂♂, 13 ♀♀ with same data as lectotype. Other material. BENIN: Abomey-Calavi, ca. 25 km N Cotonou, xii.1988, malaise trap, 10 ♀♀. INDIA: Tamil Nadu, 29 km S Ootacumund, 1100 m, 7.x.1985, 3 ♀♀, 1 ♂. IVORY COAST: Bouaké, ii, iii, iv, 11.x.1980, xii.1981, 51 ♀♀; Lamto, 160 km NW Abidjan, 6°13'N 5°02'E, xi.1988, 1 ♀. KENYA: Nairobi, iii.1982, 1 ♀. NIGERIA: Oyo, Ibadan, IITA compound, x.1987, xi.1987, pan trap, 4 ♀♀. RWANDA:

2°46'10"S 29°21'9"E, Nyungwe For. 22–24.ix.1993, pan, prim. rainfor. 1 ♀. SOMALIA: Mogadishu, Afgoi [Afgooye], Shabelli Valley, 18–25.v.1977, 30.v–7.vi.1978, 14–25.vi.1978, 25.vi–4.vii.1977, malaise, 5 ♀♀; Mogadishu, Afgoi [Afgooye], Lower Shabelli Valley, 1–12.v.1977, malaise, 2 ♂♂, 2 ♀♀. TOGO: 10 km N Kapalimé, 17.xii.1988, 1 ♀. UGANDA: Kampala, lakeshore, 3800 ft (1158 m), i.1973, 3 ♀♀; Kibale Forest near Fort Portal, xii.1972, 1 ♀. ZIMBABWE: Chishawasha, nr. Harare (Salisbury), iii.1980, ii.1981, iv.1980, iv.1983, x.1979, x–xii.1974, xii.1979, xii.1982, 11 ♀♀. (BMNH, CNCI, MNHN, OSUC).

Distribution. Sub-Saharan Africa and southern India.

Diagnosis. Other species in this genus with notauli present and the foveae marking the edge of the mesopleural carina are *P. matinalis* and *P. angor*. *Paratelenomus striativentris* is distinguished from them by the completely sculptured mesoscutum and scutellum, the multiple carinae in the position of the submedian carinae, and the light base of the metasoma.

8. *Paratelenomus tetartus* (Crawford)

Dissolcus tetartus Crawford, 1911: 270. Holotype (examined) in National Museum of Natural History (Washington).

Dissolcus tetartus: Kieffer, 1926: 124, 125.

Dissolcus tetartus: Wall, 1931: 381. Misidentification (see below).

Trissolcus tetartus: Masner and Muesebeck, 1968: 73.

Archiphanurus tetartus: Johnson, 1981: 73.

Paratelenomus tetartus: Johnson, 1992: 564.

Description. ♀. Length: 0.79–1.01 mm (\bar{x} = 0.87 mm, N = 10). *Head*: Central keel complete; submedian carinae present, sometimes doubled, extending dorsad to midpoint of height of eye, merging there with longitudinal rugae and raised setal bases extending down from vertex; lower half of frons between submedian carinae smooth, glabrous; upper half with two to three longitudinal rugulae, pustulate setal bases, fine coriaceous microsculpture; orbital carina complete, extending to lateral ocellus; area below eye between orbital carina and malar sulcus with four longitudinal ridges radiating from anterior mandibular articulation; gena with single ridge between malar sulcus and genal carina; crenulae arising from occipital carina short; gena almost completely coriaceous behind genal carina, smooth only near mandibular articulation; clypeus/labrum ligulate, apex rounded. *Mesosoma*: Notauli present, extending from transscutal articulation over half length of mesoscutum, noticeably narrowed and shallow apically; mesoscutum with scaly-reticulate microsculpture throughout; scutellum with transscutal articulation wide laterally, crenulate, medially scutellum closely abutting mesoscutum; crenulae along posterior margin only slightly narrower medially than laterally; disk of scutellum coriaceous, with setal bases raised; mesopleural carina visible as a poorly differentiated ridge, best developed dorsally, without foveae marking anterior margin; crenulae flanking pro- and mesocoxal cavities confluent medially; anteroventral portion of mesepisternum with effaced coriaceous microsculpture; acetabular field large, coriaceous, setose; episternal foveae reduced to single large pit, anterior edge confluent with anterior margin of mesepisternum, posterior margin with weak spur of mesopleural carina; metapleural triangle well developed; metapleuron without crenulae flanking meso-metapleural carina. *Metasoma*: First segment golden brown, noticeably contrasting with remaining dark brown segments; T1 with two lateral setae; apex of T2 with band of fine microsculpture.

♂. Length 0.90 mm (N = 1). Similar to ♀, with less contrast in color between first metasomatic segment and remainder of body; tarsal segments expanded, especially basitarsi.

Material Examined. Holotype ♀: "Deli, Sumatra, LP du Bussy collector; ♀; Type No. 13880 U.S.N.M.; *Dissolcus tetartus* Cwfd Type" (USNM). MALAYSIA: Sabah, Mt. Kinabalu Nat. Pk., Poring Hot Spgs, 490 m, 3–16.viii.1988, 1 ♀; 19.viii.1988, 500 m, 1 ♀; 24.viii.1988, 500 m, 1 ♀; 9.v.1987, 510 m, 2 ♀♀, 1 ♂; 12.v.1987, 500 m, 1 ♀. Sarawak, Sematin, 23.ii.1987, 2 ♀♀. INDONESIA: Sulawesi Utara, Dumoga-Bone Nat. Pk., Toraut, 9–16.v.1985, malaise trap, forest, 1 ♀. PHILIPPINES: Manila, 1913, ex eggs Hemiptera, 1 ♀. (CNCI, OSUC, USNM).

Distribution. Indonesia, Malaysia, Philippines.

Diagnosis. The shape of the clypeus/labrum is very similar in both this species and *P. ophiusa*. *Paratelenomus tetartus* may be distinguished by the well-developed notauli and the closure of the transscutal articulation such that the disc of the scutellum abuts the mesoscutum. *Paratelenomus saccharalis* is also very similar, but *P. tetartus* may be separated by the possession of long submedian carinae on the frons and the elongate clypeus/labrum.

M.A. Ivie (Montana State University) recently discovered voucher specimens from Wall (1931) referred to this species. However, these specimens belong to the widespread species *P. saccharalis*. This material is now deposited in OSUC.

ACKNOWLEDGMENTS

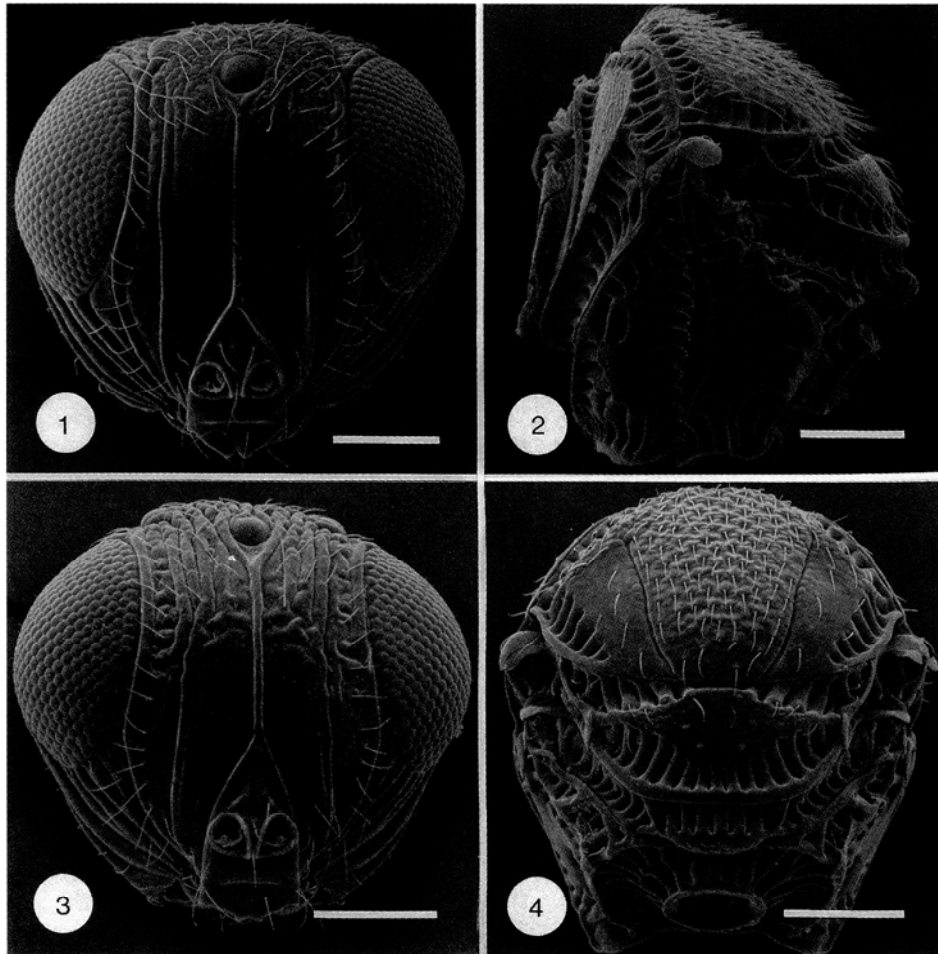
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REFERENCES

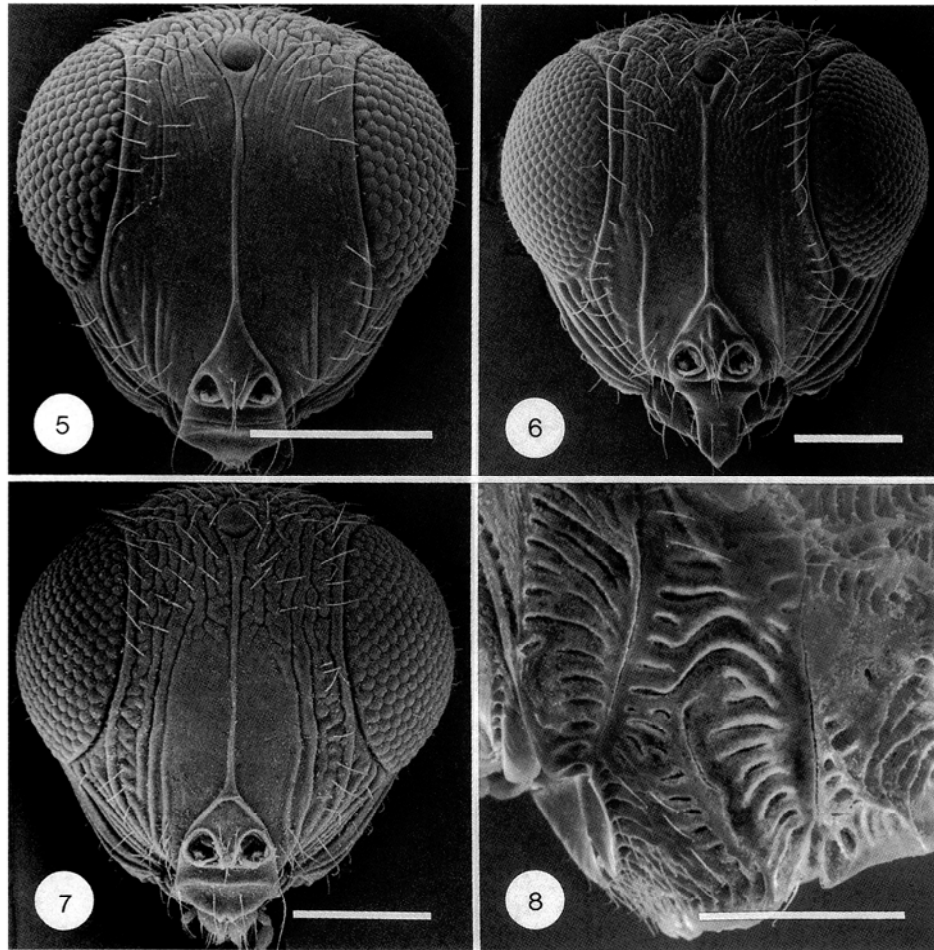
- Arnett, R.H., Jr., and G.A. Samuelson. 1986. The Insect and Spider Collections of the World. E.J. Brill/Flora & Fauna Publications, Gainesville, FL. 220 pp.
- Bin, F., and S. Colazza. 1988. Egg parasitoids, Hym. Scelionidae and Encyrtidae, associated with Hemiptera Plataspidae. *Colloques de l'INRA* 43: 33–34.
- Crawford, J.C. 1911. Descriptions of new Hymenoptera. No. 3. *Proceedings of the U.S. National Museum* 41: 267–282.
- Dodd, A.P. 1914a. Further additions to the Australian Proctotrypoidea. *Archiv für Naturgeschichte* 79(8): 77–91.
- 1914b. New Proctotrypoidea from Australia (Hym.). *Entomological News* 25: 251–257.
- 1914c. Some proctotrypoid egg-parasites of sugar cane insects in Java. *The Canadian Entomologist* 46: 293–294.
- 1914d. Australian Hymenoptera Proctotrypoidea. No. 2. *Transactions of the Royal Society of South Australia* 38: 58–131.
- Johnson, N.F. 1981. The New World species of the *Telenomus nigricornis* group (Hymenoptera: Scelionidae). *Annals of the Entomological Society of America* 74: 73–78.
- 1984a. Systematics of Nearctic *Telenomus*: Classification and Revisions of the *podisi* and *phymatae* Species Groups (Hymenoptera: Scelionidae). *Bulletin of the Ohio Biological Survey* 6(3): 113 pp.
- 1984b. Revision of the Nearctic species of the *Trissolcus flavipes* group (Hymenoptera: Scelionidae). *Proceedings of the Entomological Society of Washington* 86: 797–807.
- 1985. Phylogenetic relationships of the telenomine genus *Nirupama* (Hymenoptera: Scelionidae). *International Journal of Entomology* 27: 369–374.
- 1988a. Species of Australian Telenominae (Hymenoptera: Scelionidae) of A.P. Dodd and A.A. Girault. *Proceedings of the Entomological Society of Washington* 90: 229–243.
- 1988b. *Mudigere*, a new genus of Telenominae (Hymenoptera: Scelionidae), related to the *Psix*-group of genera. *Colemania* 5: 25–28.
- 1992. Catalog of World Proctotrypoidea Excluding Platygastriidae. *Memoirs of the American Entomological Institute* 51: 825 pp.
- Johnson, N.F., and L. Masner. 1985. Revision of the genus *Psix* Kozlov & Lê (Hymenoptera: Scelionidae). *Systematic Entomology* 10: 33–58.
- Kieffer, J.J. 1917. Über neue und bekannte Microhymenopteren. *Entomologische Meddelelser* 11: 341–355.
- 1926. Scelionidae. *Das Tierreich* 48. Walter de Gruyter & Co., Berlin. 885 pp.

- Kononova, S.V. 1973. [Egg parasites of the genera *Aporophlebus* Kozlov, 1970 and *Platytenomus* Dodd, 1914 (Hymenoptera, Scelionidae) in the fauna of the Ukraine.] *Entomologicheskoye Obozreniye* **52**: 658–664.
- 1995. [Fam. Scelionidae.] pp. 57–121 in Lehr, P.A. (Ed.), [Key to Insects of Russian Far East in Six Volumes. Vol. 4. Neopteroidea, Mecoptera, Hymenoptera. Part 2. Hymenoptera.] Dal'nauka, Vladivostok. 600 pp.
- Kozlov, M.A. 1970. [Supergeneric groupings of Proctotrupeoidea (Hymenoptera).] *Entomologicheskoye Obozreniye* **49**: 203–226.
- 1978. [Superfamily Proctotrupeoidea]. pp. 538–664 in Medvedev, G.S. (Ed.), [Determination of Insects of the European portion of the USSR], vol. 3, part 2. 758 pp.
- Kozlov, M.A., and S.V. Kononova. 1983. [Telenominae of the Fauna of the USSR.] *Zoologicheskii Institut Akademiya Nauk SSSR* **136**: 336 pp.
- Kozlov, M.A., and Lê Xuân Huê. 1976a. [Palearctic species of egg parasites of the genus *Aporophlebus* Kozlov (Hymenoptera, Scelionidae).] *Insects of Mongolia* **4**: 348–369.
- 1976b. [A new Palearctic genus of the family Scelionidae (Hymenoptera, Proctotrupeoidea) from Afghanistan.] *Zoologicheskii Zhurnal* **55**: 143–145.
- 1977. [Palearctic species of egg parasites of the genus *Trissolcus* Ashmead, 1893 (Hymenoptera, Scelionidae, Telenominae).] *Insects of Mongolia* **5**: 500–525.
- Lê Xuân Huê. 1979. Ong ky sinh trung thuoc ho phu Telenominae (Hymenoptera, Scelionidae) o Viêt Nam. *Tap Chi Sinh Vat Hoc* **1**(3): 25–27.
- 1980. Ba loai ong ki sinh moi thuoc cac giong *Archiphanurus* Szabó va *Platytenomus* Dodd (Hymenoptera, Scelionidae, Telenominae) o Viet Nam. *Tap Chi Sinh Vat Hoc* **2**(2): 17–19.
- 1982. [Two new species of the subfamily Telenominae (Hymenoptera, Scelionidae) from Viet Nam.] pp. 144–146 in Medvedev, L.N. (Ed.), *Zhivotnii Mir Vietnam* [The Animal World of Viet Nam]. Nauka, Moscow. 168 pp.
- Mani, M.S., and S.K. Shama. 1982. Proctotrupeoidea (Hymenoptera) from India. A review. *Oriental Insects* **16**: 135–258.
- Masner, L. 1976. Revisionary notes and keys to world genera of Scelionidae (Hymenoptera: Proctotrupeoidea). *Memoirs of the Entomological Society of Canada* **97**: 1–87.
- 1979. Pleural morphology in scelionid wasps (Hymenoptera: Scelionidae)—an aid to higher classification. *The Canadian Entomologist* **111**: 1079–1087.
- 1980. Key to Genera of Scelionidae of the Holarctic Region, with Descriptions of New Genera and Species (Hymenoptera: Proctotrupeoidea). *Memoirs of the Entomological Society of Canada* **113**: 54 pp.
- Masner, L., and C.F.W. Muesebeck. 1968. The Types of Proctotrupeoidea (Hymenoptera) in the United States National Museum. *Bulletin of the U.S. National Museum* **270**: 143 pp.
- Mineo, G. 1979. Studies of the Scelionidae (Hym. Proctotrupeoidea). IX. Material for a revision of the genus *Gryon* Hal., with description of 4 new species (*G. austraficanum*, *G. eremiogryon*, *G. larachii*, *G. nicolai*) and notes on other scelionids. *Bollettino del Laboratorio di Entomologia Agraria "Filippo Silvestri" di Portici* **36**: 234–265.
- Muesebeck, C.F.W., and L.M. Walkley. 1956. Type species of the genera and subgenera of parasitic wasps comprising the superfamily Proctotrupeoidea (Order Hymenoptera). *Proceedings of the U.S. National Museum* **105**: 319–419.
- Nixon, G.E.J. 1935. A revision of the African Telenominae (Proctotrupeoidea, fam. Scelionidae). *Transactions of the Royal Entomological Society of London* **83**: 73–103.
- Risbec, J. 1950. Contribution à l'étude des Proctotrupidae (Serphiidae). Proctotrupidés de la Section technique d'Agriculture tropicale (A.O.F.) et Proctotrupidés du Muséum national d'Histoire naturelle (Afrique et Colonies françaises). Travaux du Laboratoire d'Entomologie du Secteur Soudanais de Recherches Agronomiques, Gouvernement Générale de l'Afrique Occidentale Française. 639 pp.
- Ryu, J., and Y. Hirashima. 1989. Taxonomic studies on the genera *Aporophlebus*, *Eumicrosoma*, and *Platytenomus* of Japan and Korea (Hymenoptera, Scelionidae, Telenominae). *Esakia* **28**: 49–62.
- Szabó, J.B. 1975. Neue Gattungen und Arten der paläarktischen Telenominae (Hymenoptera, Scelionidae). *Annales Historico-Naturales Musei Nationalis Hungarici* **67**: 265–278.
- Wall, R.E. 1928. A comparative study of a chalcid egg parasite in three species of Plataspidae. *Lingnan Science Journal* **6**: 231–239.
- 1931. *Dissolcus tetartus* Crawford, a scelionid egg parasite of Plataspidae in China. *Lingnan Science Journal* **9**: 381–382.
- Watanabe, C. 1954. Discovery of four new species of Telenominae, egg parasites of pentatomid and plataspid bugs, in Shikoku, Japan. *Transactions of the Shikoku Entomological Society* **4**: 17–22.
- Yamagishi, K. 1990. Notes on *Archiphanurus minor* (Watanabe) (Hymenoptera, Scelionidae). *Esakia, Special Issue* **1**: 193–196.

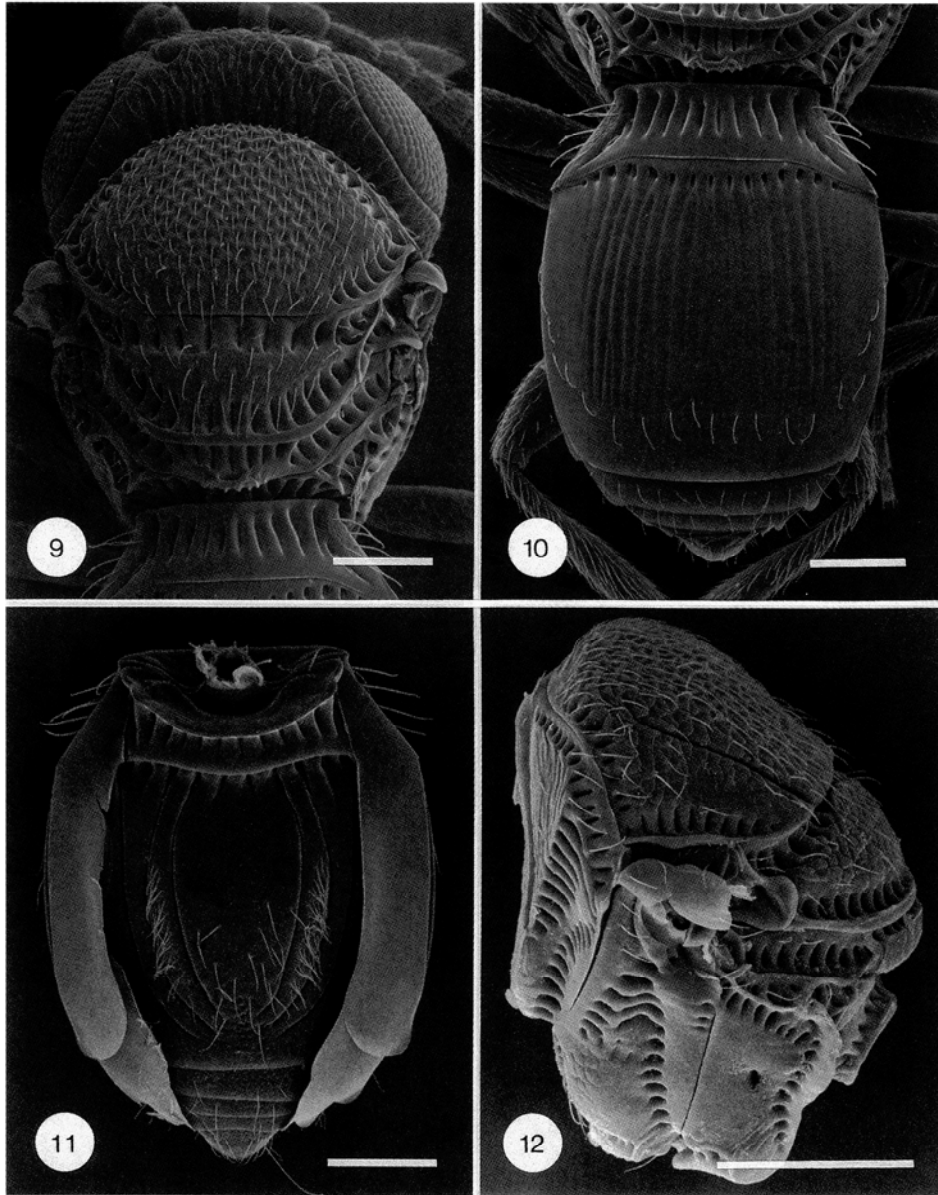
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FIGS. 1–4. 1 and 2, *Paratelenomus indivisus* sp.nov.: 1, head, frontal view; 2, mesosoma, lateral view. 3 and 4, *P. matinalis* sp.nov.: 3, head, frontal view; 4, mesosoma, dorsal view. Scale lines = 0.1 mm.



FIGS. 5–8. 5, *Paratelenomus saccharalis* (Dodd), head, frontal view; 6, *P. ophiusa* (Dodd), head, frontal view; 6 and 7, *P. striativentris* (Risbec): 6, head, frontal view; 7, mesosoma, oblique lateral view. Scale lines = 0.1 mm.



FIGS. 9–12. 9–11, *Paratelenomus indivisus* sp. nov.: 9, head and mesosoma, dorsal view; 10, metasoma, dorsal view; 11, metasoma, ventral view. 12, *P. saccharalis* (Dodd), mesosoma, oblique lateral view. Scale lines = 0.1 mm.