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PHYLOGENETICS AND CLASSIFICATION OF CLEONYMINAE (HYMENOPTERA: CHALCIDOIDEA: PTEROMALIDAE)

by

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ABSTRACT

The tribes and genera of Cleonyminae (Pteromalidae) *sensu* Bouček (1988*a*) are revised for the world. Thirty-nine genera are classified in six tribes: Boucekiini **new tribe**, Chalcedectini, Cleonymini, Heydeniini, Lyciscini and Ooderini. Boucekiini is established for *Boucekius* **new genus** and for *Chalcidiscelis* Ashmead, newly transferred from Lyciscini. *Agrilocida* Steffan and *Chalcedectus* Walker are recognized in Chalcedectini; synonymized under *Chalcedectus* are *Polychroma* Westwood, *Amotura* Cameron, *Polychromatium* Dalla Torre, *Episystole* Girault, *Neochalcodectus* Masi and *Dryadochalcis* De Santis. *Callocleonymus* Masi, *Cleonymus* Latreille, *Dasycleonymus* **new genus**, *Notanisus* Walker and *Zolotarewskya* Risbec are recognized in Cleonymini; newly synonymized under *Notanisus* is *Anacallocleonymus* Yang. *Heydenia* Förster and the fossil genus *Heydeniopsis* Hedqvist comprise Heydeniini. Twenty-eight genera are recognized in Lyciscini, including *Hadroepistenia*, *Hedqvistia*, *Protoepistenia*, *Scaphepistenia*, *Shedoepistenia* and *Striatacanthus* **new genera**, and *Epistenia* (*Punctepistenia*) **new subgenus**. *Proshizonotus* Girault is reestablished from synonymy under *Parepistenia* Dodd; synonymized under *Proshizonotus* are *Austrogerrhus* Bouček, *Excisoclea* Bouček, *Kraska* Bouček and *Oxyepistenia* Bouček. *Anepistenia* Bouček is newly synonymized under and treated as a subgenus of *Nepistenia* Bouček, *Primasura* Bouček is newly synonymized under *Thaumasura* Westwood, and *Neolycisca* Hedqvist is newly synonymized under *Proglochin* Philippi. *Oodera* Westwood comprises Ooderini. Nine species are newly described: *Boucekius primevus*, *Dasycleonymus bakeri*, *Hadroepistenia erwini* and *H. glabra*, *Hedqvistia reticulata*, *Protoepistenia melanocara*, *Shedoepistenia noyesi*, and *Striatacanthus abruptus* and *S. arcuatus* **new species**. Separate keys are provided to distinguish the tribes, the genera of each tribe consisting of more than one genus, and either the described species or recognized morphospecies for most genera of Lyciscini. All extant genera except *Westwoodiana* are illustrated by 490 scanning electron micrographs. A checklist of described species is included for all genera, comprising 260 valid species and including 51 new or reestablished combinations, 1 resurrected name and 4 new synonyms. Maximum parsimony and intuitive hypotheses of monophyly and relationships are postulated based on analyses of homology and distribution of 61 characters among the 39 recognized cleonymine genera and 15 genera representing 6 pteromalid subfamilies treated as outgroups. Eupelmidae is not included as an outgroup, but character-state distribution among the three component subfamilies is discussed within the treatment of characters.

INTRODUCTION

The Cleonyminae were first treated as the family Cleonymidae by Walker (1837). Walker included 10 genera in the family, but did not otherwise define or differentiate the taxon. Only two of the original genera, *Cleonymus* and *Notanisus*, remain in Cleonyminae; five others are now classified in Eupelmidae, one in Encyrtidae, and two in other subfamilies of Pteromalidae. Förster (1856) defined the group as 'pteromaloid' chalcids with a large conical pronotum. Ever since, concepts of Cleonyminae and whether the group should be treated as its own family or as a subfamily of Pteromalidae have varied substantially. This is because subsequent authors characterized the group differently and therefore differed in the genera they included or excluded. Schmiedeknecht (1909) was the first to classify Cleonyminae as a subfamily of Pteromalidae, but current concepts are derived principally from Bouček (1958), who both characterized the group and provided a key to the world genera. Bouček (1958) characterized Cleonyminae as having a single ring segment (anellus) and seven or more filiform flagellar segments, the inner margins of the eyes strongly divergent ventrally, a large pronotum, two tibial spurs on the hind leg, the femora (especially the profemur and metafemur) more or less thickened, and often a large body. He also divided the subfamily into five tribes: Cleonymini, Leptofoenini, Lyciscini, Ooderini and Thaumasurini. Hedqvist (1961) recognized two subfamilies, Cleonyminae and Chalcedectinae, within the family Cleonymidae. He did not characterize the family but classified seven tribes in Cleonyminae: Cleonymini, Heydeniini, Leptofoenini, Louriciini, Lyciscini, Ooderini and Thaumasurini. Subsequently, Bouček (1988*a*) excluded Leptofoenini and Louriciini as their own subfamilies in Pteromalidae, synonymized Thaumasurini under Lyciscini, accepted Heydeniini as a tribe, and reduced Chalcedectinae to a tribe, for a total of five tribes in Cleonyminae. The subfamily was differentiated only in the key to genera of Australasian Pteromalidae and thus was defined as much through exclusion as by shared features.

The primary purpose of the present study was to revise the world genera of Cleonyminae. The initial problem, and one still remaining, is what constitutes a monophyletic Cleonyminae, i.e., which taxa should be included in or excluded from the study? No morphological features are known to uniquely define Cleonyminae and the features used to distinguish the group by Bouček (1958, 1988*a*), Graham (1969) or earlier authors either are not possessed by all members and/or are possessed by some other pteromalids and even members of some other chalcid families. Resolution of the monophyly of Cleonyminae requires a comprehensive analysis of character-state distribution, homology and transformation among the 31 recognized subfamilies of Pteromalidae (Noyes 1998) and other Chalcidoidea. This was largely beyond the scope of the study. For strictly practical reasons I included in the revision those tribes Bouček (1988*a*) classified in Cleonyminae, though I also recognize one new tribe, Boucekiini.

Under the generic concepts proposed, Lyciscini comprises 28 of the 39 extant cleonymine genera (72%). Bouček (1988*a*) revised the Australasian genera of Lyciscini and Hedqvist (1959, 1961) studied some New World members of the tribe. However, New World diversity of Lyciscini or Lyciscini from the Old World other than the Australasian region has never previously been comprehensively studied or compared. For most genera of the Lyciscini I provide keys, sometimes only to females, to either the described species of the genus (mostly for Australian genera) or to the morphospecies I recognize based on available material (mostly for New World genera). These keys are included to better document known character-state distribution within each genus and the location of specimens in world museums as an impetus for future research. The keys should be used with caution, particularly those to the morphospecies of New World genera. Only a very small percentage of New World Lyciscini species has been described. Furthermore, my species concepts are based primarily on females and on relatively few specimens. For example, I differentiate 21 morphospecies of *Proshizonotus* in the New World, all of which are undescribed and based on only 40 females. For most New World genera of Lyciscini species recognition is based largely on differences in color pattern.

Too few specimens, often from widely separated sites, are currently available to accurately assess infraspecific variability or to confidently associate sexes if these were not collected together.

Although secondary, another purpose of this study was to develop a comprehensive character-state matrix and testable hypotheses of the evolutionary relationships of Cleonyminae *sensu* Bouček (1988*a*). For the phylogenetic analysis I included members of six other pteromalid subfamilies. The putative outgroup taxa were selected because they share some of the diagnostic features of Cleonyminae or they are parasitoids of wood-boring insects. Most cleonymines are parasitoids or presumed parasitoids of wood-boring beetles or other insects nesting or occurring in wood or under bark and Bouček (1988*a*: 243) used this association to support his assertion that Cleonyminae is one of the oldest evolutionary branches in Pteromalidae. Various authors have also long proposed a close evolutionary relationship between Cleonyminae and Eupelmidae (e.g., Walker 1846; Ashmead 1890, 1904; Bouček 1958, 1988*a*, *b*; Graham 1969; Gibson 1989). I do not formally include Eupelmidae in the phylogenetic analysis because inclusion of sufficient representatives to encompass variation would have expanded the study far beyond its intended scope, though for most characters I do discuss known character-state distribution in Eupelmidae. I do this because my initial interest in Cleonyminae was instigated partly from unanswered questions concerning evolutionary history and relationships of Eupelmidae.

MATERIALS AND METHODS

TAXON TREATMENTS. The tribes and genera are treated in alphabetical order except within Lyciscini. Within Lyciscini, those genera known from the Old World and those known from the New World are grouped separately to *Proshizonotus*, the only genus known to occur in both regions. Generic descriptions are not strictly comparable among the tribes because the features that are important for generic recognition differ among tribes. Tribal descriptions are also not rigorously comparable because unique features or features that in combination differentiate the respective tribe are emphasized. Descriptions are more comparable for genera within tribes; however, within "Lyciscini: Genera Restricted to the New World" I provide an initial short description listing those features common to all New World Clade genera. This was done to reduce excessive repetition and the features are not repeated in the subsequent generic descriptions. Additional color and structural features important for differentiating only New World Clade genera are also described only for these genera. All generic and tribal descriptions follow the same format. Each taxon is described under the headings *head*, *antenna*, *mesosoma*, *wings* or *forewing*, *legs*, and *metasoma*, if applicable. Because Heydeniini and Ooderini are both composed of only one extant genus, the respective generic description serves as the tribal description.

For each genus I provide a checklist of described species classified in the genus; a check mark (✓) before a species name indicates I have seen type material and concur with the generic placement. Information on the putative location and sex of type material is provided for all species except those described from Australia by Girault because these types were exhaustively catalogued by Dahms (1978, 1983, 1984, 1986). Listed distributions for species are based on identified material examined plus published records given in Bouček (1988*a*) and Noyes (1998). An asterisk (*) before the name of a country or state indicates a previously unpublished record for the species or genus. For new records, the acronym of the collection containing the specimen is given to validate the record. Noyes (1998) is the reference for any listed biogeographic region larger than a country. Host information is not provided for individuals species and Noyes (1998) should be referred to for more complete information. Following the checklist of described species classified in the genus I provide a list of species I newly transfer from the genus.

I describe new species primarily to validate new genera. My species concepts are often based on only one or two specimens and larger type series should be accumulated to better analyze infra- and interspecific variation prior to formalizing many new names. For this reason I only describe the type species of new genera in which I recognize three or more species. Because I provide differential keys to both sexes of all morphospecies I recognize in new genera, species descriptions are brief, citing only those features that appear to differentiate the species based on available material. In citing type information for newly described species a " / " separates data printed on separate labels.

KEYS. For correct observation of sculpture and structure it is essential that glare from incandescent light sources be reduced by inserting some light-diffusing material, such as a piece of translucent tracing acetate (e.g., Mylar 4-ply drawing film), between the light source and specimen, close to the specimen (see Goulet and Mason 1993). I include a key to distinguish the tribes and separate keys to genera for tribes consisting of more than one genus. Most of the tribes cannot be differentiated by one or two absolute and easily visible features applicable to both sexes. For this reason some couplets in the key are more of a diagnosis of the tribe than truly differential. The key to tribes is provided so that separate keys to the genera of each tribe, rather than one large key, could be given. The key to the genera of Lyciscini is constructed so that New World genera with species having limited punctate or reticulate sculpture on Gt_1 will key through either option. I provide keys only to the described species for some genera of Lyciscini restricted to the Old World. Because species descriptions are not included, whenever possible I employ several features per couplet to assist recognition of described *versus* undescribed species; information provided between square brackets at the end of a couplet leading to a described species provides additional features useful to differentiate undescribed species known to me. The keys to species should be used with extreme caution because even those constructed to include all known morphospecies typically are based on very few individuals per morphospecies. It is inevitable that subsequent collecting will result in the discovery of additional unkeyed species as well as specimens intermediate between described states of keyed morphospecies. Species concepts are based primarily on females. When I am relatively confident males represent the opposite sex of keyed females, I key the males to the same species number as the female, but when I am unsure of their status I key them as "sp. M#1", etc., to avoid over estimating probable species diversity.

STRUCTURE. Terms and abbreviations used for structures follow Gibson (1997, see figs 1–6) except as noted below. Abbreviations used on the illustrations for structures are included between parentheses after the relevant term and are listed in Appendix I. Features of particular importance for identifying cleonymine genera or species are as follows.

Head. Width of the **interantennal region** is measured between the toruli. The **scrobal depression** usually consists of a separate depression or **scrobe** above each torulus. These depression often merge above the interantennal region to form a common **scrobal channel** (i.e., scrobes + scrobal channel = scrobal depression). The shape of the depression and dorsal limit of the channel is important for distinguishing some genera, as are sometimes differences in sculpture between the scrobal channel and scrobes. In some New World Lyciscini the bottom of the scrobal depression is not flat, but undulates because the upper portion of the channel is depressed or concave relative to the scrobes, which are on a slightly higher plane. This type of scrobal depression is termed **undulating**. If the scrobal depression is well separated from the anterior ocellus then the region between the depression and anterior ocellus, plus the dorsal surface of the head around and behind the ocelli, may form a more or less horizontal surface, the **frontovertex**, compared to the more vertical frontal surface of the head, the **face**. The eye has an upper (dorsal), lower (ventral), inner (anterior) and outer (posterior) **orbit** or margin. The frontovertex is sometimes delimited from the face by a transverse **frontovertexal carina** between the inner orbits (Fig. 303). The part of the face between the outer margin of the scrobal depression and the inner orbit is the **parascrobal region**; the region below the toruli between the malar sulci is the **lower face**. The posterior surface of the head above and beside the occipital foramen is the **occiput**, whereas the posterior portion below the occipital foramen is the **postocciput** and the more lateral surface near the eye is the **gena**. The posterior surface may have a ∩-like **occipital carina** (Fig. 282: **occ**) around the occipital foramen or, more commonly, only lateral portions of the occipital carina on either side of the occipital foramen, mostly on the postocciput (Fig. 304). The gena may also have a **genal carina** (Fig. 346: **gc**) or more distinct flange, which may or may not merge with the putative occipital carina (Fig. 357) and which may or may not be evident when the head is appressed to the prothorax.

Antenna. In this study I use the term **funicle** for all segments of the **flagellum** excluding the terminal **clava**, i.e., including the **anellus** or anelli (ring segments). **Multiporous plate sensilla** are longitudinal, ridgelike structures on all flagellar segments excluding the anelli (Figs 24, 58), whereas a **micropilose sensory region** is a differentiated sensory region on the clava (Fig. 231) and sometimes on one or more apical funicular segments (Fig. 164). The clava of females sometimes has an apical or subapical spinelike process, which may arise from a pore and thus be articulated (Fig. 57) or simply be a narrowed prolongation of the cuticle (Figs 86, 246). The apical funicular segment, or **preclaval segment**, of females sometimes has a similar spinelike process (Figs 94, 246) or attenuated, fingerlike process (Fig. 92) extending anteriorly along side of the clava (Figs 91, 92).

Mesosoma. Most Lyciscini and some *Chalcedectus* have a smooth and shiny, sometimes raised **median line** (Fig. 197: **pml**) on the pronotum; the line extends from the anterior pronotal margin and may be concealed by the head. The margins of the **mesoscutal lateral lobe** are subdivided as follows: the inner or mesal margin of the lateral lobe is delineated by the **notaulus** (Fig. 13: **not**); the outer or lateral margin consists of a more or less longitudinal **mesoscutal margin** (Fig. 67: **msm**) from the pronotum to the anterior angle of the tegula, plus an obliquely angled **parascutal margin** (Fig. 67: **psm**) that parallels the inner margin of the tegula; the posterolateral margin of the lateral lobe from the parascutal margin to the anteromedial angle of the axilla is the **paraaxillar margin** (Fig. 59: **pam**), whereas the posteromedial margin from the anteromedial angle of the axilla to the notaulus is the **preaxillar margin** (Fig. 59: **prm**). The **anteromedial angle** of the **axilla** occurs because the axilla normally projects slightly into the mesoscutal lateral lobe (Figs 59, 60). In some taxa the posterior (Fig. 450) or inner portion of the axilla (Figs 60–64) has a differentiated, often smoother sculpture. Some taxa also have the extreme posteromedial angle of the **mesoscutal medial lobe** between the preaxillar margin and notaulus differentiated by sculpture, the angulate region sometimes being smooth but often strigose (Figs 60, 62: **sr**). The scutellum usually has at least a slight indication of a smooth and shiny **frenal arm** (Figs 11, 12: **fra**) posterolaterally, which is directed dorsally from the base of the posterior notal wing process or ventral angle of the axilla. Sometimes a furrow or punctate **frenal line** (Fig. 11: **frl**) extends across the dorsal surface of the scutellum between the two frenal arms and in such instances the differentiated posterior portion is termed the **frenum** (Fig. 11: **fre**). Dorsally, the apical portion of the frenal arm is often recurved and sometimes unites with a longitudinal **axillular sulcus** (Fig. 12: **axs**), which in some taxa is represented by an **axillular carina** (Fig. 62: **axc**) laterally on the scutellum. In such instances the frenal arm and axillular sulcus or carina differentiate a triangular, more or less vertical region, the **axillula** (Fig. 12: **axl**), on the side of the scutellum posterior to the axilla. The extreme posterolateral (Fig. 10) or posterior margin of the scutellum is often differentiated by a slightly reflexed margin (Fig. 15) or a variably distinct band of aligned crenulae (Figs 11, 14) that differentiate a **marginal rim** (Figs 10, 11, 15: **mrs**), which originates from the angle formed between the frenal arm and the posterior margin of the scutellum. The marginal rim often has a smoother posterior surface, the **scutellar lip** (Fig. 285: **lsc**), which projects vertically or even obliquely under the apex of the scutellum toward the dorsellum. The **dorsellum** (Fig. 14: **dor**) is the median, convex portion of the metanotum, which may be bare or setose. The **prepectus** (Fig. 452: **pre**) consists of a ventral portion across the body, which normally is concealed beneath the procoxae, plus a lateral **panel** (Fig. 451: **prp**) on each side between the pronotum and mesopleuron. For simplicity, the panel usually is referred to as the prepectus because it typically is the only visible portion. The panel is often triangular or has a somewhat lunate posterodorsal angle if the posteroventral margin is incurved; it is termed **pedunculate** if the posterodorsal angle narrows prior to expanding subapically into a rounded lobe (Figs 316, 416, 417). The mesopleuron consists of a small convex region below the tegula and forewing base, the **acropleuron** (Fig. 68: **acr**) (= subalar area) and, largely ventral to the acropleuron, the **mesepisternum**, which is formed in part by a variably concave **femoral depression**. The **mesepimeron** is the obliquely angled, more or less quadrangular region posterior to the mesepisternum. The dorsal margin of the mesepimeron is formed partly by a depression posterior to the subalar region, the **subalar pit** (Fig. 68: **sap**), and usually it is subdivided into an **upper mesepimeron** and **lower mesepimeron** by a pit, sulcus or some other mark. The propodeum is highly variable, but usually has a median **plical region** (Fig. 12: **plr**) differentiated from a lateral **callus** (Fig. 12: **cal**) by a **paraspiracular carina** (Figs 12, 66: **psc**) or **furrow**

(Fig. 387: **psf**) or some other landmark mesal to the spiracle. Instead of or in addition to a paraspiracular furrow there is sometimes a **postspiracular furrow** (Fig. 47, **ptf**) posterior to the spiracle. An **anterior crenulate furrow** (Fig. 11, **acf**) usually extends along the anterior margin of the callus at least to about the lateral limit of the dorsellum and often also along the plical region. The normally bare part of the plical region on either side of a median carina is the **panel**.

Wings. Cleonyminae possess the typical chalcid pattern of forewing venation, consisting of **submarginal**, **marginal**, **postmarginal** and **stigmal** veins. The stigmal vein is often bifurcate apically; a short vein stub, the **uncus**, projects anteroapically from the stigmal vein and is sometimes continued as a convex fold, termed the **Rs** (radial sector) fold or setal line. The apex of the stigmal vein sometimes also extends into a convex fold or setal line, termed the **r-m** fold or line, which curves toward the apical wing margin (see Burks 1938 for vein terms). There is sometimes also a longitudinal convex fold near the middle of the wing, termed the **median fold**. The apical portion of the submarginal vein is the **parastigma** (Fig. 150: **pst**). When present, the origin of the **basal setal line** or fold (Fig. 149: **bsl**) delimits both the origin of the parastigma and the apical margin of the **basal cell** (Fig. 149: **bc**). The posterior limit of the basal cell may be delimited by the **cubital setal line** or fold (Fig. 149: **csl**), which often continues beyond the basal fold near the posterior margin of the wing. Some taxa have an oblique bare region immediately beyond the basal setal line behind the parastigma, which is termed the **speculum** (Fig. 149: **spc**). The **humeral plate** (Fig. 17: **hpl**) is a sclerite that comprises the basalmost portion of the forewing, immediately beyond the **tegula** (Fig. 17: **tgl**).

Legs. The protibia often has short, stout, articulated spines along its dorsoapical margin, the **dorsoapical spicules** (Figs 23, 146: **das**), and rarely has similar **dorsal spicules** (Fig. 146: **dos**) in a row along the dorsal length of the tibia. The ventral margin of the profemur sometimes also has spicules or, more commonly, the profemur (Fig. 236) and especially the metafemur (Figs 102–106) has cuticular protrusions or **teeth**. The profemur is sometimes enlarged (Figs 145, 457) or is expanded ventroapically so as to have a **preapical angulation** (Fig. 375: **paa**); in such instances, at least the basal half of the ventral surface of the protibia can have a carinate margin (Figs 146, 375: **car**). The apex of the femur and base of the tibia, i.e., the region around the articulation of the two leg parts comprise the **knee**. The metacoxa can be carinate along its dorsal length (Fig. 30), though the carina is sometimes obscure because the metacoxa usually is also setose along its dorsal length (Fig. 341). When present, the dorsal carina delimits the dorsal surface of the metacoxa and presence or absence of dorsal setae *exterior* to the carina is important for identifying New World genera. Careful observation is required because the interior surface of the metacoxa is often also setose dorsally along its length, but these setae are not considered as dorsal setae. Some Old World genera also have the exterior surface of the metacoxa variably setose. Limits of the dorsal, outer and ventral surfaces of the metacoxa are not distinct, but the outer surface generally is the flat to slightly concave surface relative to the convex dorsal and ventral surfaces.

Metasoma. The metasoma consists of the **petiole** and **gaster**. The petiole sometimes forms an entirely sclerotized tube (Fig. 7), but usually consists of just a lunate dorsal strip (Fig. 10: **ptl**) or at least ventrally is membranous along its midline. The gastral **terga** are designated as “$\mathbf{Gt}_x$”(Fig. 353) and sometimes are abruptly angled or even carinately margined laterally; the vertical surface of the tergum lateral to the angle or carina is the **laterotergite** (Fig. 353: **ltg**). In some cleonymines, Gt_2 is almost or entirely concealed under Gt_1 in dorsal view, in which instances it is visible in lateral view as a triangular sclerite (Fig. 352). Extreme caution should be used when interpreting whether, and to what extent, Gt_2 is concealed under Gt_1 because the gastral terga telescope to some degree. Consequently, the extent Gt_2 is exposed in any specimen depends partly on how the specimen was preserved and whether the terga are abnormally distended. A secondarily exposed portion of Gt_2 is always quite smooth, at most transversely aciculate or finely coriaceous rather than punctate or reticulate; furthermore, the setose/sculptured region of the laterotergite tapers to an angle at the posterodorsal margin of the laterotergite in specimens normally having Gt_2 concealed (*cf*. Figs 352, 353). In specimens that normally have Gt_2 distinctly exposed, the dorsally attenuated lateral setose/sculptured region has a variably broadly truncate dorsal margin. Most female and all male cleonymines have seven gastral terga, with the spiracles always on Gt_6 and the **cerci** (Fig. 26: **cer**) on the apical tergum. In such instances the apical tergum, the **syntergum** (Figs 49, 122, 238: **syn**), is a fused composite of Gt_7 (Mt_8) and Gt_8 (Mt_9). A transverse suture or ridge across the tergum anterior to the cerci sometimes indicates the presumptive line of fusion (Figs 49, 238). Females of very few taxa have Gt_7 and Gt_8 as two independent sclerites separated by membrane (Fig. 34). The cerci subdivide the syntergum into a precercal and a postcercal portion, the relative lengths of which can be important for distinguishing species. Normally, the posterior margin of Gt_6 extends to the anterior margin of the syntergum, but because the terga can move relative to each other the posterior margin of Gt_6 is sometimes advanced anteriorly, in which case a normally concealed bare region is exposed anterior to the setose dorsal surface of the syntergum (Fig. 355). Depending on whether or not Gt_6 is distended, the **precercal length** (Fig. 355: **prec**) is measured either from the basal-most setae on the syntergum or the posterior margin of Gt_6 to the midpoint of the cercus; the **postcercal length** (Fig. 355: **post**) is measured from the midpoint of the cercus to the posterior margin of the tergum. A membranous **anal filament** (Figs 25, 147: **anf**) sometimes projects over the ovipositor from the apex of Gt_8 or the syntergum, though this can be concealed between the **ovipositor sheaths** (Fig. 463: **osh**). Unlike Gt_8 (Fig. 25) or the epipygium of Torymidae (Fig. 26), the anal filament lacks setae (Figs 25, 147, 463) and thus likely is homologous with the anal sclerite of some Eupelminae (Gibson 1995, fig. 323: **asc**).

SCULPTURE. Terms used for sculpture are defined as follows:

aciculate – a series of fine, mostly subparallel impressed lines, some of which interconnect (as if surface was scratched by a needle) (Fig. 428, Gt_2);

alveolate – relatively large and deep multisided depressions (Figs 51, 55, face);

carinate – having one or more carina or ridges (Fig. 71, plical region);

coriaceous – a meshlike or multisided pattern of flat cells formed by impressed lines (Fig. 15, center of scutellum);

crenulate – a series of regular, short ridges delineating a transverse row of depressions (Fig. 9, metanotum; Fig. 359, propodeum);

cristate – a series of raised transverse ridges similar to that of a ‘rasp’ (Figs 389, 449, upper parascrobal region);

granular – similar to coriaceous except the surface of the cells are convex (Fig. 112, metapleuron; Fig. 220, region surrounding ocelli);

punctate/punctulate – more or less circular depressions (Fig. 360, scutellum), with punctulate being smaller punctures more like pin pricks (Fig. 399, mesonotum);

reticulate – a meshlike or multisided pattern of concave cells formed by raised ridges (Fig. 16, scutellum);

rosetteform – pattern of coriaceous subsculpture on the interstices of punctures or reticulations that resembles petals of a composite flower (Fig. 161);

rugose/rugulose – a series of strong, irregular and at least partly connected ridges (= rugae) (Fig. 7, propodeum; Fig. 275, plical region), with rugulose being composed of finer rugae (Fig. 418, largest tergum);

scabrous – irregularly, transversely wrinkled without distinct punctures or cells (Fig. 84, upper face; Fig. 127);

strigose – transverse, closely set, mostly parallel striae or fine ridges, some of which interconnect (Fig. 9, propodeum; Fig. 152, scrobal depression).

Sculpture that intergrades between any two types is described by hyphenating the respective terms, e.g., reticulate-coriaceous.

COLOR. Color pattern is particularly important for distinguishing species of New World Lyciscini. Some species have cupreous (more or less red with yellowish luster under some angles of light) or dark regions that are abruptly delineated from metallic blue, violaceous or green regions on the head, pronotum and mesonotum. This color pattern is termed **bicolored**. Whether a region is dark or cupreous may in some instances depend at least partly on preservation of the specimen, and for this reason the color is sometimes stated as “cupreous/dark” or “dark/cupreous” in keys. This indicates both states are known to occur or that known specimens have the first state but both states likely are possible. A forewing is termed **bimaculate** if there is a brownish region extending behind the parastigma and either a brown region behind the stigma or at least with the r-m fold dark brown. The two brownish regions often form a single ∪-like infuscate region between the parastigma and stigma.

SPECIMENS. This study was based on specimens from collections and/or individuals included in the list below, some of which were on loan to Ian Naumann (CSIRO). The collections examined are those that include the name of the curator. Collections that do not include the name of a curator were not examined but contain type material cited in the text; the respective acronyms are used in the text to denote depositories.

AEIC	American Entomological Institute Collection, Gainesville, FL, USA (D. Wahl).
AMSA	The Australian Museum, Sydney, NSW, Australia (G.A. Holloway).
ANIC	Australian National Insect Collection, Canberra, ACT, Australia (I.D. Naumann).
AUWN	Agricultural University, Department of Entomology, Wageningen, The Netherlands (Y. Jongema).
BCRI	Biological and Chemical Research Institute, Rydalmere, NSW, Australia.
BMNH	The Natural History Museum, London, England [British Museum of Natural History] (J. Noyes).
BPBM	Bernice P. Bishop Museum, Honolulu, HI, USA (G. Nishida).

CASB	Institute of Zoology, Chinese Academy of Sciences, Beijing, China (Huang Da-Wei and Zhu Chao-dong).
CASC	California Academy of Sciences, San Francisco, CA, USA (R. Zuparko, W. Pulawski).
CDFA	California State Collection of Arthropods, California Department of Food & Agriculture, Sacramento, CA, USA.
CNCI	Canadian National Collection of Insects and Arachnids, Ottawa, ON, Canada.
CUIC	Cornell University Insect Collection, Cornell, NY, USA.
DEIC	Deutsches Entomologisches Institut, Eberswalde, Germany (A. Taeger).
DEZA	Dipartimento di Entomologia e Zoologia Agraria dell'Università, Portici, Italy.
DPIQ	Queensland Department of Primary Industries, Indooroopilly, QLD, Australia (J. F. Donaldson).
DZUC	Department of Zoology, University of Calicut, Calicut, India.
EIHU	Laboratory of Systematic Entomology, Hokkaido University, Sapporo, Japan.
EMEC	Essig Museum of Entomology, University of California, Berkeley, CA, USA (R. Zuparko).
HNHM	Hungarian Natural History Museum, Budapest, Hungary.
INBIO	Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica (P. Hanson).
KHPC	Karl Hedqvist personal collection, Vallentuna, Sweden.
MACN	Museo Argentina de Ciencias Naturales “Bernardino Rivadavia” e Instituto Nacional de Investigación de las Ciencias Naturales, Buenos Aires, Argentina.
MCPM	Milwaukee City Public Museum, Section of Invertebrate Zoology, Milwaukee, WI, USA.
MCSN	Museo Civico di Storia Naturale “Giacomo Doria”, Genoa, Italy.
MCZC	Museum of Comparative Zoology, Cambridge, MA, USA.
MHNG	Muséum d’Histoire Naturelle, Geneva, Switzerland (B. Merz).
MLPA	Museo de la Plata, Universidad Nacional de La Plata, División Entomología, La Plata, Argentina.
MNHN	Muséum National d'Histoire Naturelle, Paris, France.
MONZ	Museum of New Zealand, Wellington, New Zealand.
MRSN	Museo Regionale di Scienze Naturali, Torino, Italy.
MUCR	Museo de Insectos, Universidad de Costa Rica, San José, Costa Rica (P. Hanson).
MZLU	Zoological Institute, Lund University, Lund, Sweden.
NHRS	Naturhistoriska Riksmuseet, Stockholm, Sweden (B. Viklund).
NMID	National Museum of Ireland, Dublin, Ireland.
NMPC	National Museum (Natural History), Prague, Czech Republic.
NMWA	Naturhistorisches Museum, Vienna, Austria.
NWCF	Northwestern College of Forestry Insect Collection, Yangling, China.
NZAC	New Zealand Arthropod Collection, Entomology Division, DSIR, Auckland, New Zealand (J. Berry).

OXUM	Hope Entomological Collections, Oxford University Museum, Oxford, England (C. O'Toole).
QFIC	Queensland Forest Insect Collection, Indooroopilly, QLD, Australia (M. DeBaar).
QMBA	Queensland Museum, Queensland Cultural Centre, Brisbane, QLD, Australia (C. Burwell).
RMNH	Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands (C. van Achterberg).
ROMT	Royal Ontario Museum, Centre for Biodiversity and Conservation Biology, Toronto, ON, Canada (D.C. Darling, S. Liebenson).
SAMA	South Australia Museum, Adelaide, SA, Australia (J. Forrest).
TAMU	Texas A&M University Insect Collection, College Station, TX, USA (R. Wharton).
UCDC	Bohart Museum, University of California, Davis, CA, USA (S. Heydon).
UCRC	University of California, Riverside, CA, USA (S. Triapitsyn).
UQIC	University of Queensland Insect Collection, Department of Entomology, Brisbane, QLD, Australia (G. Daniels).
USNM	United States National Museum of Natural History, Smithsonian Institution, Washington, DC, USA (E.E. Grissell).
VMNH	Museum of Victoria, Natural History, Abbotsford, VIC, Australia (C. McPhee).
WAMP	Western Australian Museum, Perth, WA, Australia (T. Houston).
WARI	Waite Agricultural Research Institute, The University of Adelaide, Glen Osmond, SA, Australia (A. Austin).
ZIKU	Zoological Institute, Academy of Sciences, Kiev, Ukraine.
ZMAS	Zoological Museum, Academy of Science, St. Petersburg, Russia.
ZMHB	Museum für Naturkunde der Humboldt-Universität, Berlin, Germany (F. Koch).
ZMUC	Zoological Museum, University of Copenhagen, Copenhagen, Denmark.
ZSIK	Zoological Survey of India, Western Ghats Field Research Station, Kerala, India.

SPATIAL AND TEMPORAL PATTERNS

Pteromalids are not known from Cretaceous amber (Yoshimoto 1975) and only three fossil taxa have been described as putative cleonymines from more recent strata. Brues (1910) described *Cleonymus submersus* and *Ormyrodes petrefactus* from impression fossils in Florissant shale and Hedqvist (1961) described *Heydeniopsis cleonymoides* from Baltic amber. Florissant shale is purported to be Oligocene in origin or about 35 million years old, whereas Baltic amber is thought be about 40–50 million years old. Hedqvist (1961) questioned Brues's classification of *C. submersus*, stating that it differed from extant *Cleonymus* in shape of the head and venation of the forewings, and proposed the new genus *Bruesisca* for it. The illustration and description given by Brues (1910) did not include such important features as antennal or hind leg structure and are insufficient to classify *B. submersus* confidently to tribe or subfamily within

Pteromalidae. The illustration and description of *O. petrefactus* are also insufficient to confidently classify this species. The types species of *Ormyrodes* was transferred to *Solenura* by Gahan (1951), but *O. petrefactus* likely is incorrectly classified in *Solenura* and Cleonyminae (see discussion under Remarks for *Solenura*). I did not examine the type specimens of *B. submersus* or *O. petrefactus* and these two taxa are not included in my phylogenetic analyses. I did examine the amber inclusion of *Heydeniopsis cleonymoides* and concur with Hedqvist's (1961) placement of this taxon in Heydeniini. Consequently, Heydeniini is indicated to be minimally 40 million years old. The extant genus *Heydenia* is currently known from all biogeographic regions except the Neotropical region.

No fossil taxa definitely belonging to Lyciscini have been described; however, present distribution of this mainly southern hemisphere group and my analyses indicate the tribe could be between 90 and 140 million years old. Under generic concepts proposed within this work, 28 world genera of Lyciscini are recognized, of which only *Proshizonotus* is known from both the Old World (Australasian region including New Zealand) and New World. Present distribution of *Proshizonotus* suggests it might have had a Gondwanan origin and therefore it and Lyciscini be at least 90–110 million years old. My intuitive character-state analysis also suggests *Proshizonotus* may well be paraphyletic relative to other New World Lyciscini, which in turn probably form a monophyletic clade that I treat as the "New World Clade" of Lyciscini. All but 1 of the 13 New World Clade genera are restricted to the Neotropical region; only *Epistenia* extends north of Mexico as far as southeastern Canada. Twelve genera of Lyciscini are restricted to the Australasian region and two genera, *Solenura* and *Grooca*, occur in the Afrotropical and Oriental regions. Lyciscini is absent from the Palearctic region except for two species of *Solenura*, which occur also in either the Afrotropical or Oriental regions. This suggests the two species originated in the former two regions and subsequently dispersed north into the Palearctic region. The presence of two genera essentially restricted to the Afrotropical and Oriental regions indicates the common ancestor of Lyciscini could have been present in Gondwana prior to Africa being isolated from the combined supercontinent of South America, Antarctica, Australia and New Zealand, i.e., prior to the origin of the Atlantic ocean about 110 million years ago. Their restricted distribution might even indicate the common ancestor was present in Gondwana as early as 140 million years ago, prior to separation of Africa + South America from the rest of the southern land mass upon formation of the Mozambique channel.

The other four recognized tribes of Cleonyminae are much less diverse than Lyciscini and lack fossil records for inferring geologic origins. Of the five genera I recognize in Cleonymini, only *Cleonymus* occurs in all six biogeographic regions and my character-state analyses suggest this genus may be paraphyletic to most of the other genera. What may represent the most basal lineage of Cleonymini, *Dasycleonymus*, is known only from the Oriental region. The other three genera, *Callocleonymus*, *Notanisus* and *Zolotarewskya* occur throughout the Old World. *Callocleonymus* also occurs in the Nearctic region, but no cleonyminine genus other than *Cleonymus* is known from the Neotropical region. I recognize only two morphologically disparate genera in Chalcedectini, *Agrilocida* and *Chalcidiscelis*. *Agrilocida* is restricted to the Palearctic region whereas *Chalcedectus* is known from all six biogeographic regions. Of the two genera I classify in Boucekiini, *Chalcidiscelis* is known only from Australia and *Boucekius* only from Guyana. Finally, the monotypic tribe Ooderini is primarily Old World in distribution. One species of *Oodera* is known from eastern United States, but this very likely results from a recent accidental introduction. Species of *Oodera* are otherwise known only from the Afrotropical, Oriental and Palearctic regions.

PHYLOGENETIC ANALYSIS

SCOPE. Very few morphologically-based phylogenetic analyses have been published for Pteromalidae or for other families of Chalcidoidea. Grissell (1995) was the first to attempt a comprehensive, familial-level, parsimony-based analysis of generic and higher-level relationships for the family Torymidae. Within Pteromalidae, Heydon (1989) analyzed relationships among 4 genera he termed the *Cyrtogaster*-group, Huang (1993) among 11 genera of Sphegigasterini and 8 genera of Miscogasterini (Pteromalinae), Heydon (1997) among the 8 recognized world genera of Trigonoderini (Pteromalinae), and Baur (2000) among several genera of Pteromalini putatively related to *Coelopisthia* Förster. None of these analyses included a cleonymine representative as an outgroup. Wijesekara (1997) used representatives of *Chalcedectus* (as *Amotura*) and *Epistenia* as two outgroup taxa in a morphological-based parsimony analysis of relationships of Chalcididae. Campbell *et al.* (2000) also used representatives of *Cleonymus* and *Epistenia* in a molecular analysis of familial-level relationships of Chalcidoidea. The latter analysis included representatives of seven pteromalid subfamilies, but did not recover Pteromalidae as a monophyletic taxon or Cleonyminae as the sister group of any other pteromalid subfamily. Furthermore, the clade including *Cleonymus* + *Epistenia* shifted between two major clades recovered in the single most parsimonious tree and after successive weighting. Results suggesting relationships of Cleonyminae within Pteromalidae were, at best, inconclusive.

Although monophyly and relationships of Cleonyminae are uncertain, historically the group has been considered as an ancient or basal group within Pteromalidae. Bouček (1988*b*: 19) stated “it is generally accepted that Cleonyminae show most plesiomorphic features” and (1988*a*: 243) that they are “certainly one of the oldest [clades] in Pteromalidae.” Bouček and Heydon (1997: 541) also stated “the various subfamilies [of Pteromalidae] all appear to be derived from either Cleonyminae or Ormocerinae.” Furthermore, Pteromalidae has long been regarded as a ‘dumping ground’ of the superfamily (Gibson *et al.* 1999) and may be paraphyletic relative to some other families such as Eupelmidae (Gibson 1989). Cleonyminae share their two most ‘diagnostic’ features with Eupelmidae, a single antennal anellus and eyes that typically are conspicuously divergent ventrally. All Eupelmidae also share robust protibial dorsoapical spicules with all Cleonyminae excluding Cleonymini and Chalcedectini. Gibson (1989) hypothesized the presence of protibial dorsoapical spicules in eupelmids, regardless of whether they are parasitoids of wood-boring beetles or of other hosts in different niches, represent a relict feature of a common ancestor that was a parasitoid of some wood-inhabiting insect. Some genera of Calosotinae, particularly *Archaeopelma* Gibson and *Licrooides* Gibson, also have mesosomal structures intermediate between those typical of most eupelmids and those characteristic of cleonymines and other pteromalids.

Furthermore, male Eupelminae are morphologically much more similar to Cleonyminae than they are to females of their own species or to either sex of other eupelmid subfamilies. Confident identification of male eupelmines to family sometimes requires removal of a mesocoxa to determine structure of the mesotrochantinal plate. Male eupelmines have a large membranous region separating the mesotrochantinal plate from the metasternum (Gibson 1989, fig. 110; 1995, fig. 447), whereas cleonymines excluding *Oodera* have the mesotrochantinal plate and metasternum broadly abutting (Gibson 1989, fig. 109) or closely approximated (Gibson 1995, fig. 449). *Oodera* has sometimes been specifically proposed as forming a link between Cleonyminae and Eupelmidae (Bouček 1958; Graham 1969). Some workers, such as Ashmead (1904), Nikol'skaya (1952) and Graham (1969), even classified *Oodera* in Eupelmidae rather than Cleonyminae. Gibson (1989) analyzed several morphological features for a phylogenetic analysis of familial and subfamilial relationships of Eupelmidae and included Cleonyminae as an outgroup to help polarize features. A thickened mesotibial spur (character 4, state 3), presence of mesotarsal pegs (character 5, state 5) and a modified mesocoxal articulation with a membranous area anterior to each mesocoxa (character 6, state 4) were found to be shared among *Oodera* and one or more subfamilies of Eupelmidae, Tanaostigmatidae and Encyrtidae. However, analysis of character-state distribution within Cleonyminae and other Pteromalidae was too superficial to confidently polarize some features and thereby postulate synapomorphies for Cleonyminae plus Eupelmidae or some part of Eupelmidae. Gibson (1989: 35) found no evidence for the monophyly of Eupelmidae and suggested the family "represents a grade-level taxon that probably is paraphyletic if not polyphyletic." In other words, the three component eupelmid subfamilies may be more closely related to different lineages of Cleonyminae, or to some other Pteromalidae, than they are to each other.

Because monophyly of Cleonyminae *sensu* Bouček (1988*a*) is unsupported, a well substantiated rationale cannot be provided for what taxa should be included in the ingroup 'Cleonyminae', and what taxon or taxa are appropriate outgroups for phylogenetic analyses. For the present analysis, members of 15 genera representing 6 other currently recognized pteromalid subfamilies were used as putative outgroups: Colotrechinae: Hetreulophini (*Hetreulophus* Girault and *Zeala* Bouček), Leptofoeninae (*Doddifoenus* Bouček and *Leptofoenus* F. Smith), Louriciinae (*Callimomoides* Girault), Macromesinae (*Macromesus* Walker), Nefoeninae (*Nefoenus* Bouček) and Pteromalinae: Pteromalini (*Dinotiscus* Ghesquière, *Rhaphitelus* Walker, *Rhopalicus* Förster and *Roptrocerus* Ratzeburg) and Trigonoderini: (*Gastracanthus* Westwood, *Ogloblinisca* Hedqvist, *Platygerrhus* Thomson and *Plutothrix* Förster). Leptofoeninae, Louriciinae, Macromesinae, Nefoeninae and Hetreulophini are composed only of the genera listed above. Hetreulophini should not be considered as representative of the morphological diversity within Colotrechinae, which is comprised of 19 genera classified in 5 tribes (Bouček 1988*a*; Noyes 1998). Hetreulophini were the only Colotrechinae included in the analysis because they uniquely possess a single anellus within the subfamily. *Gastracanthus* and *Platygerrhus* are two of four genera that Heydon (1997) classified in the *Gastracanthus*-group of Trigonoderini and *Ogloblinisca* and *Plutothrix* are two of four genera he classified in the *Trigonoderus*-group of genera. The actual number of genera comprising Pteromalini is unknown, but it is by far the largest and biologically most diverse tribe of Pteromalidae.

The taxa listed above were selected as putative outgroups for the analysis because members are all known or suspected egg or larval-pupal parasitoids of wood-boring beetles. Except for the Pteromalinae, they were also known to possess protibial dorsoapical spicules and/or have only a single anellus. The pteromaline taxa were included because they are parasitoids of wood-boring beetles, but lack both primary diagnostic features of Cleonyminae *sensu* Bouček 1988*a* (single anellus and distinctly divergent eyes). Several groups of pteromalid parasitoids of wood-boring beetles were included in the analysis to better analyze which features shared by Cleonyminae might be synapomorphies inherited from a common ancestor and which might have been derived independently in response to similar selection pressures correlated with being a parasitoid of a wood-boring host. Eupelmidae was not included in the formal analysis because this would have expanded the study far beyond its intended scope, but character states possessed by its three recognized subfamilies (Calosotinae, Eupelminae and Neanastatinae) are discussed under relevant characters.

CHARACTER-STATE ANALYSIS. The phylogenetic hypotheses derived herein for Cleonyminae using parsimony analysis are based on the 61 characters of adults described below; order of character presentation is based on body region. Almost all of the characters involve qualitative features that are difficult to segregate into discrete states or to assign unambiguously to all taxa included in the analysis. For this reason, under each character I discuss any realized weaknesses in defining the character or character states and often provide my rationale for assigning a particular state to a particular taxon. I also give rationale for any proposed 'intuitive' polarity of character states based on outgroup or commonality. Possible transformation series are also discussed for multistate characters. States of multistate characters are separated by a comma in the published matrix (Appendix III) in order to conserve space, but the matrix for PAUP analyses utilized an ampersand (&) to designate multistate features. Males of *Nefoenus* and *Doddifoenus* are unknown (Bouček 1988*a*) within the outgroup taxa, and for *Boucekius*, *Chalcidiscelis* and *Westwoodiana* within the ingroup; respective states for these males were coded as missing (?) for all parsimony analyses. The species examined for character-state coding of the outgroups are listed in Appendix II.

Cleonymine taxa are listed in the same order in the character-state matrix (Appendix III) as presented in the section on cleonymine systematics, except *Proshizonotus* is additionally divided into two groups. Character states possessed by Old World species of *Proshizonotus* are recorded separately from those possessed by New World species. This was done to examine the hypothesis that New World *Proshizonotus* is more closely related to the New World Clade of genera than to other *Proshizonotus*. Character states possessed by *Proshizonotus* n. sp. #1 are excluded from the treatment of New World *Proshizonotus* for the reasons discussed under 'Remarks' for the genus.

1. **Separation of toruli for female**: **0** = toruli 'narrowly' separated, by distance at most equal to 1.5 times width of a torulus (Figs 2, 3, 27, 35); **1** = toruli 'widely' separated, by distance greater than 1.6 times width of a torulus (Figs 5, 6, 51, 90, 131, 448).

Degree of separation of the toruli likely forms a continuum within Pteromalidae and Chalcidoidea and is not readily divisible into discrete states. Wijesekara (1997) (character 2) hypothesized that toruli separated by a distance more than two times the diameter of a torulus was an autapomorphy of Cleonyminae relative to Chalcididae, Leucospidae and Eurytomidae, which have toruli "separated by not more than two times the diameter of a torulus" (Wijesekara 1997, p. 12). Though toruli separated by at least twice the minimum diameter of a torulus is characteristic of most Cleonyminae *sensu* Bouček (1988*a*) (Figs 51, 84, 131, 151, 448), female *Dasycleonymus bakeri* (Fig. 90) and a few *Cleonymus* (Fig. 88) have the toruli separated by only about 1.7 torular diameters. Males identified as *D. bakeri* have more distinctly separated toruli, by about twice the width of a torulus, more similar to other Cleonymini and most Cleonyminae. Female *Boucekius* (Fig. 27) and *Chalcidiscelis* (Fig. 35) have what may be the groundplan state for Pteromalidae, the toruli separated by a distance only about equal to the width of a torulus (Figs 27, 35). Among the outgroup taxa examined, both sexes of *Callimomoides* (Fig. 5) and *Zeala* (Fig. 6) have widely separated toruli. Males of at least *Macromesus americanus* also have toruli that are separated by a distance approximately equal to twice the width of a torulus, but females of *M. americanus* have the toruli separated by at most 1.5 times the width of a torulus (Fig. 4). For the purpose of the analysis I assigned state 0 for *Macromesus* based on the structure of female *M. americanus*, but examination of additional species is required to determine the validity of my character-state assignment. In the future, more comprehensive analyses may also require degree of torular separation to be divided more finely into more than two states and/or the character treated separately for males and females. Regardless, widely separated toruli are not an autapomorphy of Cleonyminae *sensu* Bouček (1988*a*) as hypothesized by (Wijesekara 1997). Narrowly separated toruli likely supports a basal position for *Boucekius* and *Chalcidiscelis* relative to other taxa currently classified in Cleonyminae. The comparatively narrowly separated toruli of *D. bakeri* females and rare *Cleonymus* may also indicate this as the groundplan structure for Cleonymini. Within Eupelmidae, the putatively most basal genus of Calosotinae, *Archaeopelma*, has narrowly separated toruli, as do most other Calosotinae (Gibson 1989, figs 1–10) excluding *Calosota*. In contrast, individuals of Eupelminae have widely separated toruli (Gibson 1995, figs 1–90) similar to most Cleonyminae.

2. **Location of antennal toruli for female**: **0** = lower margin of torulus at least slightly above level of line drawn between lower orbits (Figs 2, 3, 90); **1** = lower margin of torulus obviously below level of lower orbits (Figs 5, 6, 35, 51).

Relative position of the antennal toruli on the face has been interpreted differently by different authors. Some authors characterized torular position relative to the lower margin of the eyes (Wijesekara 1997, character 5), whereas others characterized their position relative to placement between the apical margin of the clypeus and the top of the head (e.g., Graham 1969, Grissell 1995). Both methods have disadvantages for inferring character transformation. Using the latter method, Grissell (1995) was unable to recognize discontinuities and therefore excluded the character from his analysis. The former method enforces one of two states, but is influenced by two factors: relative height of the toruli on the head, and the size of the eyes. For example, state 0 is assigned to both *Leptofoenus* and *Doddifoenus*. In *Leptofoenus* the toruli are often only slightly below the middle of the head (Fig. 3), whereas in *Doddifoenus* they are near the ventral quarter (Fig. 3), in a similar or even lower position than for many Cleonyminae assigned state 1. However, the toruli are always above the lower orbits (Figs 2, 3) because the eyes are large in both genera. Even with this acknowledged weakness, I used this method for the analysis because it is unambiguous unless the ventral margin of the torulus is very near the level of the lower orbit. Correct character-state assignment for *Nefoenus*, *Boucekius* and *Macromesus* is ambiguous because of this latter problem. I assigned state 0 for all three genera because the lower margin of the torulus appears to be slightly above the lower orbit in at least females. Knowledge of the structure for *Nefoenus* and *Boucekius* males would be helpful. Males of *M. americanus* have the lower margin of the torulus obviously below the lower orbit, whereas males of *Agrilocida* have the toruli more distinctly above the lower orbit (Fig. 50; Steffan 1964, fig. 4) than do females. Either condition might be true for *Nefoenus* and *Boucekius* males. The sexual dimorphism evident in this and the preceding character for *Macromesus* might also indicate some functional correlation between degree of separation of the toruli and relative height of the toruli. The present analysis, of females only, also excludes sexual dimorphism known for Cleonymini. Both sexes of *Dasycleonymus* have the toruli slightly above the level of the lower orbit (Fig. 90). Females of other cleonyminine genera have the ventral margin of the torulus at least slightly below the lower orbit (Fig. 84), except for very rare *Zolotarewskya*. Male Cleonymini are much more variable. At least some males of all genera have the toruli at or above the lower orbit (Fig. 88). Furthermore, position of the toruli in males appears to be at least partly correlated with flagellar structure. Males with a ramose flagellum (Fig. 98) always have the toruli high on the head, conspicuously above the lower orbit, whereas those with a lobate flagellum (Fig. 97) tend to have the toruli about in line with or slightly above the lower orbit, and those with a clavate or filiform flagellum (Figs 95, 96) often have the toruli slightly below the lower orbit. Within Eupelmidae, females of Eupelminae typically have at least the ventral margin of the torulus obviously below the lower orbit except for some taxa with unusually large eyes (see character 8 and figures in Gibson 1995). The feature appears to be more variable in males (Gibson 1995, character 48) and in some genera is sexually dimorphic (Gibson 1995, *cf*. figs 81 and 82 with 409; fig. 75 with 405). The toruli are at least relatively ‘low’ on the head in Neanastatinae, though position relative to the eyes is variable. Relative position of the toruli in Calosotinae is much more variable, whether characterized by height on the face or position relative to the lower orbits (Gibson 1989, *cf*. figs 3, 5). The toruli are positioned slightly above the lower orbits in female *Boucekius*, which is not evident in Fig. 27 because the micrograph was taken from a somewhat dorsal angle to include the ocelli, but is evident in Fig. 28. This torular position is similar to that of female *Archaeopelma* (Gibson 1989, fig. 3) and may represent the groundplan state for Pteromalidae as well as Calosotinae.

3. **Scrobal depression**: **0** = head with distinct scrobal depression consisting of both scrobes and channel (Figs 3, 27; 35); **1** = head with distinct scrobes, but with very short and inconspicuous scrobal channel above interantennal region (Figs 6, 87–90); **2** = head possibly with very shallowly concave scrobal depression above interantennal region, but without differentiated scrobes and channel (Figs 83–86).

Most taxa classified in Cleonyminae have a distinct scrobal depression, which sometimes consists mostly of a common channel if the interantennal region is short (Figs 3, 35) and other times consists mostly of elongate scrobes if the toruli are widely separated (Fig. 51) and/or the interantennal region is comparatively long (Fig. 27). My interpretation of 'deep' *versus* 'shallow' differs from Heydon (1997, character 6) because of the more diverse structures represented by the taxa included in the present analysis, but I did assign state 0 for *Plutothrix* (Heydon 1997, figs 50, 55) because there is a recognizable bell-shaped scrobal depression and evident scrobes in *Plutothrix*. I assigned state 0 for *Nefoenus* because even though distinct scrobes are lacking there is an elongate though comparatively shallow scrobal depression. I assigned state 1 for *Zeala* because the individual scrobes are quite distinct, but the heads lacks a distinct, concave scrobal channel above the interantennal region (Fig. 6). This structure resembles that of *Dasycleonymus* and of a very few species of *Cleonymus* and *Zolotarewskya*, except in such Cleonymini the scrobes are deeper and more conspicuous (Figs 87–90). In such instances the face has at most a very short and shallow scrobal channel above the interantennal region. The deep scrobes of *Dasycleonymus* and a few other Cleonymini is correlated with relatively closely approximated toruli in the taxa (see character 1). Coding of scrobal structure in *Macromesus* (Fig. 4) is ambiguous. I assigned state 2 for *Macromesus* because any scrobal depression is quite obscure, though the face above the interantennal region is on a lower plane because the interantennal region is reflexed. Most Eupelmidae have a deep scrobal depression and state 0 is undoubtedly the groundplan state for at least Calosotinae and Eupelminae. Within Neanastatinae, two of four genera (*Metapelma* Westwood and *Neanastatus* Girault) lack a scrobal depression, having a structure most similar to described state 2 of most Cleonymini (Gibson 1989, character 30, figs 13, 14).

4. **Structure of dorsal angle of interantennal region**: **0** = unmodified, at most carinate; **1** = dorsal angle above plane of interantennal region, convex or more distinctly recurved into anteriorly projecting process (Figs 204, 265, 344, 433).

This character is relevant only for Lyciscini. An interantennal region that dorsally projects into an anteriorly faced denticle or convex to truncate lobe is possessed by *Grooca* and *Solenura* in the Old World (Figs 204, 265). Some members of several New World Clade genera have the interantennal region convergent dorsally to an almost linear, vertical flange that is variably distinctly convex or lobelike (Figs 344, 433). The different structures intergrade with similar structures possessed by *Grooca* and *Solenura*, but no New World Clade genus is characterized by all members having a distinct lobe or denticle. Furthermore, because of variability it is difficult to assign unambiguously either state 0 or 1 to all New World taxa.

5. **Inner orbits of eyes**: **0** = distinctly diverging over at least ventral half (Figs 5, 27, 35, 51, 84, 131, 151, 448); **1** = subparallel to uniformly convex or only slightly divergent ventrally (Figs 2–4, 6).

This feature is one of the historical features used to characterize Cleonyminae, but it is a qualitative feature that is difficult to divide into discrete states or to assign unambiguously to all taxa. Individuals of *Callimomoides* usually have the face collapsed because the scrobal channel is membranous above the interantennal region (Fig. 5). If the point of intersection of the malar sulcus with the eye is used as the landmark to distinguish the lowest point of the eye orbit then the lower inner orbits are obviously divergent in *Callimomoides* (Fig. 5). Graham (1969: 42) also characterized *Macromesus*

(Fig. 4) in part by "inner orbits of eyes diverging rather strongly in their lower part." Female *Macromesus* have a relatively extensive frontovertex and ventrally the inner orbits are distinctly recurved toward the malar sulcus (Bouček 1988*a*, fig. 433) so that the lower inner orbits diverge, but only over a comparatively short distance (Fig. 4). Female *Nefoenus* have subcircular eyes with strongly convex inner orbits. The inner orbits could be construed as diverging ventrally because of this, but I assigned state 1 for both *Macromesus* and *Nefoenus*. In *Zeala* and some Trigonoderini, each inner orbit has quite a distinct angulation so that the lower margins of the inner orbits diverge somewhat relative to the upper margins (Fig. 6), but I interpret the divergence as slight. Individuals of *Doddifoenus* have the inner orbits diverging over most of their height (Fig. 2), but again I interpret the divergence as slight and assign state 1 to both genera of Leptofoeninae. The inner orbits also diverge over most of their height in *Boucekius* (Fig. 27) and *Chalcedectus* (Fig. 35). I assigned state 0 for these two genera, though the divergence is only slightly more conspicuous than in *Doddifoenus* and is less conspicuous than for typical Chalcedectini (Figs 51, 53), Cleonymini (Figs 84–90), Heydeniini (Fig. 131) and Ooderini (Fig. 448). Divergence of the eyes is quite variable within Lyciscini. Individuals of *Chadwickia* do not have as distinctly divergent eyes as for other members of the tribe (Fig. 167), but this probably is because the eyes are unusually long in *Chadwickia*; the ventral inner margins of the eyes do diverge. Eupelmidae have divergent eyes and, similar to Cleonyminae, are variable in whether the inner orbits diverge over most of their height or have the lower part of the inner orbit diverging distinctly relative to the upper part of the orbit. They are also variable in the degree to which the inner orbits diverge (*cf*. figs 3, 5, 10, 15 in Gibson 1989 and figures in Gibson 1995). It is possible that there is some structural correlation between ventrally divergent eyes and more widely spaced toruli (character 1).

6. **Setation of eye**: **0** = bare or extremely sparsely and inconspicuously microsetose, with any setae very short and distance between setae greater than length of a seta; **1** = densely or obviously microsetose over surface when viewed with reflected light.

This feature appears to form a continuum and is very difficult to divide unambiguously into discrete states. Some taxa appear to have an entirely bare eye (Figs 3, 5, 27), whereas others have very short and sparse setae evident along the orbit under high magnification using reflected light (Figs 4, 6), and others have quite dense setae that are more or less conspicuous over the surface depending on the length of the setae (Figs 51, 86). Although a setose eye is undoubtedly a groundplan feature of Lyciscini based on commonality, the setae apparently have been independently reduced several times within the tribe. In some instances the absence or sparsity of setae may reflect ancestry and may be evidence one genus renders another paraphyletic (e.g., *Mesamotura* may render *Thaumasura* paraphyletic), but in most instances the similar states likely evolved convergently among the different genera. A setose eye is indicated also as the groundplan state for Chalcedectini and Cleonymini, whereas either state might be the groundplan for *Oodera*. I assigned state 0 for *Heydenia*, though some species have the eyes very sparsely and inconspicuously microsetose. Eye setation is variable in all three subfamilies of Eupelmidae (Gibson 1989, 1995). A bare eye is likely the groundplan state for at least Calosotinae based on this state being possessed by individuals of *Archaeopelma* (Gibson 1989, figs 3, 4).

7. **Upper parascrobal region**: **0** = sculpture variable, but not cristate; **1** = raised above plane of eye and cristate (Figs 2, 3, 43, 211, 388, 389, 449).

State 0 is undoubtedly the groundplan state for Cleonyminae. The modified structure represented by state 1 is likely one of several features correlated with being a parasitoid of insects living in wood, and the necessity of an adult having to emerge from a tunnel blocked by debris. The coarser cristate sculpture likely both strengthens the head capsule and helps the adult wasp push debris from the tunnel. Similar apomorphic head structures are shared with some Calosotinae (Gibson 1989, figs 3–9) and the state undoubtedly has evolved several times independently in different groups of wood-boring parasitoids. Individuals of *Hetreulophus* have the upper inner orbits undulating so as to be more or less distinctly 'terraced' with at least one transverse ridge, but this is an autapomorphic feature for the taxa treated in this analysis.

8. **Vertex**: **0** = uniformly sculptured and convex; **1** = with median impunctate line behind posterior ocelli (Figs 220, 283); **2** = with linear groove behind posterior ocelli (Fig. 304).

A uniformly convex vertex is undoubtedly the groundplan state for Cleonyminae and this feature is significant only as evidence *Mesamotura* may render *Thaumasura* paraphyletic (see also character 50).

9. **Occipital carina**: **0** = absence of any carina; **1** = vertical lateral portion of carina present on either side of occipital foramen (Figs 304, 357); **2** = complete ∩-like carina present (Figs 282, 305).

Grissell (1995, character 1) discussed presence or absence of an occipital carina in Cleonyminae and Pteromalidae and hypothesized absence was the groundplan state for Pteromalidae. Absence of any occipital carina is likely also the groundplan state for Cleonyminae. The ∩-like carina of some species of *Leptofoenus* may have evolved secondarily from one of several fine, concentric carinae on the back of the head, which are characteristic of *Doddifoenus* and some species of *Leptofoenus*. Coding the presence or absence of an occipital carina is complicated for some New World Lyciscini and the listed character-state distribution should be accepted with caution. Members of some taxa have two carinae or ridges on the posterior and lateral surfaces of the head, one on the gena (see following character) and one on the postocciput near the occipital foramen (Fig. 357). Members of other New World genera have only a single, straight or sinuate carina or flange extending from the mouth margin dorsally to near the occipital foramen (Fig. 346). Members of yet other taxa lack distinct carinae, but have an oblique groove on the postocciput (Fig. 406, grv). If two carinae are present, I interpreted the more dorsal and vertical carina as the occipital carina (e.g., Figs 357, 362). I also interpreted the upper portion of a single carina as the occipital carina if the carina is sinuate and the upper portion is on the postocciput near the occipital foramen. Consequently, I do not interpret the upper portion of the genal flange in *Epistenia* (Fig. 346) as the occipital carina, but do so tentatively for some *Shedoepistenia* (Fig. 435) and *Urolycisca* (Fig. 442), which have a short carinate margin or denticle on the postocciput. When two carinae or flanges are present they form a groove between them, into which fits the anterolateral margin of the pronotum so that the head and mesosoma can be appressed to form a rigid structure. Because of this functional relationship, it is very possible the carina or denticle on the postocciput of at least some New World Lyciscini represents a secondary feature that is not homologous with the occipital carina of Old World and some New World taxa. Further, exact distribution of the different states remains uncertain because a groove or carina on the postocciput can only be observed if there is a separation between the posterior of the head and the prothorax. Comprehensive analysis would have required dissecting the head from the body in many specimens, which I was unwilling to do (see following character). An occipital carina appears to be absent from all Eupelmidae.

10. **Genal carina/flange**: **0** = absent, at least when head is appressed to pronotal panel; **1** = gena with shiny carina or more distinct flange extending for variable length from mouth margin at level of basoventral angle of mandible (Figs 346, 357, 416, 426, 434).

Exact distribution of a genal carina or flange within Chalcidoidea is uncertain, but a flange is at least characteristic of many Chalcididae (Wijesekara 1997, character 9) and Eurytomidae. A genal carina or flange apparently has evolved several times within Chalcidoidea and is correlated with a head that is closely appressed to the pronotum so the two form a more rigid association. Interpretation of this feature within Lyciscini is hampered because of uncertain structural relationships with the previous character, the putative occipital carina, and uncertain character-state distribution. Size and therefore how readily evident is the flange varies considerably, particularly if the gena is appressed to the pronotum, as it is in many specimens. Confident appraisal of this feature would require separating the head from the mesosoma to view the posterior surface of the head fully, not only to determine whether a slender or very short genal carina/flange exists near the mouth margin (e.g., male *Hadroepistenia*, Fig. 362), but also to determine whether it intercepts or is separated from an 'occipital' carina or any other groove or projection on the postocciput. I was unwilling to do this because many New World species are currently represented by only one or two specimens. The character-state coding for *Chalcedectus* and *Epistenia* is reversed in Wijesekara (1997, table 1). Within Cleonyminae, a genal carina/flange is restricted to New World Lyciscini, including some New World *Proshizonotus* and some New World Clade genera. This character-state distribution can be explained by several different transformation series, including the possibility the New World Clade of genera is not be monophyletic (see Results). Eupelmidae lack a genal flange.

11. **Number of flagellar ring segments (anelli)**: **0** = single basal flagellar segment either ringlike or at least without multiporous plate sensilla if elongate and similar to subsequent segments; **1** = two basal flagellar segments ringlike.

What constitutes an anellus or anelli in Chalcidoidea is not always clear, but if ring segments evolved through shortening of funicular segments with resulting loss of multiporous plate sensilla, then one ring segment is likely symplesiomorphic relative to two or more ring segments (Grissell 1995, character 2). Consequently, a single ring segment is likely not evidence for monophyly of those taxa sharing the state, even though it is undoubtedly a groundplan feature of Cleonyminae. The second flagellar segment of female *M. americanus* is bare and lacks multiporous plate sensilla (Fig. 4). It therefore superficially appears to be an elongate anellus, but males have a single anellus, as do most other species of *Macromesus* for which Yang (1996) illustrated the antennae. Females of *Roptrocerus* have the basal three segments ringlike, as do members of several genera of Pteromalinae (see Bouček and Heydon 1997), but this is not significant at the level of the present analysis (see also Grissell 1995, character 2). Exact distribution of a single anellus in Pteromalidae and Chalcidoidea is unknown, but is shared with Eupelmidae (Gibson 1989, 1995).

12. **Number of segments comprising clava of female**: **0** = 3-segmented, the segments differentiated by at least very fine annulations encircling clava (Figs 23, 58, 264); **1** = 2-segmented, with single distinct annulation obliquely encircling clava so apical portion short dorsally but extensive ventrally (Fig. 254); **2** = 1-segmented, without annulation subdividing clava or with any groove extremely shallow and evident only under some angles of light.

The groundplan number of antennal segments for Chalcidoidea and Pteromalidae is uncertain. For Pteromalidae, the groundplan number could be 14 with 4 apical segments comprising the clava, or 13 with 3 apical segments comprising the clava (Gibson 1986*a*, character 1; Gibson *et al.* 1999). Some males of *Solenura* with a fully expanded clava appear to have a 4-segmented clava, with the third, most apical annulation differentiating a small terminal micropilose sensory region. A similar structure is possessed by some other pteromalids (Fig. 23*b*) and may indicate the clava was originally composed of 4 segments and the antenna of 14 segments in Pteromalidae. The annulations between the segments of the clava vary in development within Pteromalidae, sometimes appearing as distinct sutures, sometimes as comparatively broad and shallow furrows, sometimes as very shallow grooves evident only under some angles of light, and sometimes not at all evident so that the clava appears to be composed of a single segment (see Grissell 1995, character 3). Even in the last instance the clava may still superficially appear to be 3-segmented because uniform rows of elongate multiporous plate sensilla are linearly separated (e.g., clava of female *Callimomoides*). Distinct sutures defining the segments are likely symplesiomorphic, with increasingly vague annulations increasingly more apomorphic prior to complete absence of any evidence of fusion. It sometimes was difficult to assign a particular state unambiguously to a particular taxon because there appears to be all stages between very distinct annulations and vague or absent annulations, and because I did not examine the macerated clava of any of the taxa with a compound microscope. Some male *Cleonymus* and *Zolotarewskya* have an obscurely 3-segmented clava (Bouček 1988*a*, figs 410, 412), but I coded absence of claval segmentation for both sexes of Cleonymini because any putative segmentation in males is visible only under some angles of light. The apparent segmentation is more evident using reflected light than SEM (Fig. 96). Gibson (1989: 20) incorrectly stated the clava was formed from only one flagellar segment in Leptofoeninae and all Lyciscini. The clava is 3-segmented in both *Leptofoenus* and *Doddifoenus*. Furthermore, all females of *Grooca* and *Solenura* have a 3-segmented clava (Fig. 264), except for those of *Grooca* n. sp. #5, which appear to have a 2-segmented clava. This feature is associated with a 7-segmented funicle in *Grooca* n. sp. #5 (see following character), and both aberrant states of the species likely are secondarily derived within *Grooca*. The 3-segmented clava of *Grooca* and *Solenura* is an anomaly within Lyciscini, representing either a uniquely retained groundplan feature of the tribe or a synapomorphic reversal for the two genera.

Female *Macromesus* have a 2-segmented clava because there is only one distinct suture, whereas males have a 3-segmented clava (Graham 1969). Sexual dimorphism in the number of segments comprising the clava also occurs in two genera of Lyciscini. Females of *Marxiana* and *Parepistenia* (Fig. 254) have a 2-segmented clava, whereas males of these two genera apparently have an unsegmented clava (see following character). Females of the two genera have an oblique suture surrounding a ventrally extensive micropilose sensory region. Males lack a suture and the large sensory region. Because of this, the suture in females most likely represents a secondary feature correlated with a secondarily enlarged sensory region rather than an intermediate stage in the loss of claval segments from 3 → 2 → 1. More detailed examination of the clava of other Lyciscini with SEM or a compound microscope might show that members of other genera also have a 2-segmented clava, with the apical segment very tiny. Although individuals of *Agrilocida* have a 1-segmented clava, most or all individuals of *Chalcedectus* appear to have a 3-segmented clava (Fig. 58). The segments are differentiated by fine sutures that may not always encircle the clava, but which are at least evident dorsally and which extend to the ventral micropilose sensory region. A segmented or partially segmented clava is often most evident in males and is not always evident when the clava is collapsed, particularly in those females having an almost spherical clava. The correct character-state coding for female *Rhaphitelus* is uncertain because of ambiguity concerning what comprises the clava, but I assigned state 2 because I believe it more likely the funicle is composed of eight segments in both sexes (see character 14). Within Eupelmidae, the clava is 1-, 2- or 3-segmented in Neanastatinae, whereas it is either 1- or 3-segmented in Calosotinae (Gibson 1989, character 2). Gibson hypothesized a 1-segmented clava most likely evolved independently in some Cleonyminae and Calosotinae, but presence of a 1-segmented clava in *Boucekius* and *Agrilocida* as well as for five of eight genera of Calosotinae, including *Archaeopelma*, might indicate a 1-segmented clava as the groundplan state for Calosotinae. Gibson (1989, character 2) incorrectly stated that both sexes of Eupelminae have a 3-segmented clava. Although this is true for females, males have a 1-segmented clava (see figures in Gibson 1989).

13. **Number of segments comprising clava of male**: **0** = 3-segmented, the segments differentiated by at least very fine annulations encircling clava; **1** = 1-segmented, without distinct annulations subdividing clava.

As discussed for previous character.

14. **Number of flagellar segments excluding clava**: **0** = eight; **1** = seven.

Eight funicular segments between the pedicel and clava is undoubtedly the groundplan structure for Pteromalidae and Cleonyminae. *Callimomoides, Nepistenia* and *Grooca* n. sp. #5 have one fewer segment, which likely represent three independent losses. Character-state coding for *Rhaphitelus* is based on males of *R. maculatus*, which have eight funicular segments between the pedicel and a 3-segmented clava. The number of funicular segments possessed by female *R. maculatus* is uncertain. The flagellum appears to be composed of 10 segments, with the spinelike process apparently a process of the apical claval segment rather than a separate segment (Fig. 24, see character 16). The funicle has eight segments if the clava is composed only of the apical-most segment bearing the process, but it has six segments if the three apical segments compose the clava. Because the apical three segments are distinctly separated in some females, rather than being fused as in other taxa with a 3-segmented clava, I interpret only the most apical segment as the clava in female *Rhaphitelus*.

15. **Preclaval segment for female**: **0** = apical margin truncate relative to sides; **1** = apical margin projecting slightly on one side so as to be angulate; **2** = apical margin prolonged into attenuated, fingerlike process along one side of clava (Figs 91, 92); **3** = apical margin abruptly narrowed into spinelike process (Figs 93, 94, 246).

The presence of a lateral process on the preclaval segment of females has often been used to differentiate Cleonymini from other Cleonyminae (Bouček 1988*a*) (Figs 91–94). Most female Cleonymini have one side of the preclaval segment prolonged into a attenuated, fingerlike process (Figs 91, 92). Females of *Callocleonymus* have a much more slender, spinelike process (Figs 93, 94) similar to the process of female *Nepistenia* (*Anepistenia*) (Fig. 246). Very rare *Cleonymus* females, including those of *C. dendatifemur* (Girault) and the female of uncertain generic placement relative to *Cleonymus* or *Dasycleonymus* (see Remarks for *Dasycleonymus*), have the apical margin almost symmetrical, with only a very slight angulation (Bouček 1988*a*, fig. 402). The latter structure is very similar to that of female *Agrilocida*, which has the preclaval segment longer on one side than the other and the apical margin slightly concave. Females of some species of *Cleonymus* as well as some *Notanisus* and *Zolotarewskya* have the apical margin of the preclaval segment distinctly angulate, but not extending into an attenuated, fingerlike lobe. Consequently, the structure appears to form a continuum between a very slightly angularly produced margin and one that projects conspicuously, either as an attenuated lobe or as a subequally slender spinelike process. It is quite possible that an only very obscurely asymmetrical preclaval segment is the groundplan state for female Cleonymini, in which case the similar structure in *Agrilocida* could indicate a common ancestor with Cleonymini. The spinelike process of female *Nepistenia* (*Anepistenia*) is certainly independently derived to that of female *Callocleonymus*.

16. **Claval structure for female**: **0** = narrowly rounded apically or at most attenuated into fingerlike process (Fig. 92); **1** = abruptly constricted apically to form non-articulated terminal spinelike process (Figs 24, 246); **2** = with subapical, non-articulated spinelike process that forms bifurcation in combination with attenuated dorsoapical portion of clava (Figs 93, 94); **3** = with superficially terminal spinelike process that in dorsal view appears articulated because of very short region of clava projecting over base of process, but in ventral view uniformly projected from clava (Figs 44*a*, *b*); **4** = with articulated spinelike process (Figs 57, 58).

Although the clava of female *Callocleonymus* has a spinelike process similar to *Nepistenia* (*Anepistenia*) (Fig. 246) and *Rhaphitelus* (Fig. 24), structure differs significantly in that the process is subapical and forms a bifurcation with the attenuated dorsoapical portion of the clava (Figs 93, 94). I also designated a separate state for female *Agrilocida*, though the structure is similar to female *Callocleonymus*. The few female *Agrilocida* I have seen, including one critical-point dried specimen, all have the ventral surface of the clava collapsed, with a spinelike process projecting from the apex

(Fig. 44*a*). In dorsal view, however, the process is seen to be very slightly subapical because its base is covered by a very short dorsoapical portion of the clava (Fig. 44*b*). Consequently, the spinelike process appears to be articulated in dorsal view under lower magnifications, but in ventral view appears as an uninterrupted prolongation of the cuticle. This structure is similar to that of *Callocleonymus* except in *Callocleonymus* the dorsoapical portion of the clava is much larger and the process therefore more distinctly subapical. A completely encircled or apparently articulated spinelike process is possessed only by female *Chalcedectus* (Figs 57, 58). It is possible that the structure in female *Agrilocida* represents an intermediate structure in a transformation series represented by state 2 (Figs 93, 94) → state 3 (Figs 44*a*, *b*) → state 4 (Fig. 57), in which a subapical spinelike process first evolved, one side of the clava subsequently 'collapsed' so that the base of the process was partly surrounded by the rest of the clava, and finally the two sides of the clava met and fused on either side of the process so the process appears to be articulated with the clava.

17. **Antennal sensillar pattern**: **0** = preclaval segment without distinctly differentiated region of modified trichoid sensilla (Figs 231, 332); **1** = preclaval segment with distinctly differentiated region of modified trichoid sensilla similar to that on clava, but region non-collapsing (Figs 224, 297); **2** = preclaval segment with region of modified trichoid sensilla similar to that on clava, and sensillar regions on both clava and preclaval segment flat or collapsed in air-dried specimens (Figs 164, 177, 188).

This character was included primarily to analyze transformation within Lyciscini. The groundplan structure of the flagellum for both Cleonyminae and Lyciscini undoubtedly included only a very small, terminal micropilose sensory region on the clava, as well as the absence of any differentiated sensory region on the preclaval segment. Within Lyciscini, only members of *Agamerion* (Figs 163, 164) and *Eupelmophotismus* (Fig. 188) have both sexes characterized by a large, specialized sensory region on the clava and preclaval segment. The sensilla are so dense that the regions appear amorphous using a binocular microscope. Females of the two known species of *Chadwickia* also have specialized sensillar regions on the two segments, but the sensillar patterns appear to differ between the two species (*cf*. Figs 176, 177). Finally, females of *Mesamotura* (Fig. 224) and some species of *Thaumasura* (Fig. 297) have distinct sensory regions on the clava and preclaval segment. In such instances similar sensillar regions are usually present also on one or more of fl_5–fl_7 and the individual sensilla are evident within the regions using a binocular microscope. The sensory regions of the above taxa may not be homologous and my codings and interpretation for phylogenetic analysis remain unreliable without a detailed study using scanning electron microscopy. Such a study is necessary to accurately determine sensillar structure and distribution of the modified sensilla on each funicular segment. Within Cleonymini, both sexes of *Callocleonymus* have at least some modified trichoid sensilla on the clava and on three or more apical funicular segments (Figs 93, 95). I did not assign state 1 for the genus because the sensilla do not form distinctly differentiated regions and they are not limited to just the clava and preclaval segments when viewed with a binocular microscope. I did assign state 1 for some *Leptofoenus*, though my coding is an oversimplification for the genus. Both sexes of *Leptofoenus* have a differentiated sensory region on the clava; females also have a large sensory region on the preclaval segment and apically on the preceding funicle segment, but males only sometimes have a sensory region on the preclaval segment and never on the preceding segment (LaSalle 1985). I did not bother to treat the sexual dimorphism as two characters and simplified the character-state coding because the sexually dimorphic structure in *Leptofoenus* is certainly convergent to similar structures in Lyciscini. More comprehensive study of flagellar sensillar patterns using SEM would certainly provide additional information for phylogenetic analyses within Lyciscini. For example, species of *Riekisura* and at least females of some species of *Proshizonotus* share a slender, longitudinal band of specialized sensilla on the clava (*cf.* Figs 258, 259 with 333–335), which might indicate a common ancestor. Determining exact distribution and structure of modified trichoid sensilla on the flagellum of different species of *Thaumasura* (Figs 296, 297), *Mesamotura* (Fig. 224) and *Westwoodiana* would likely also be helpful in postulating species and generic relationships.

18. **Pronotal median line**: **0** = pronotum uniformly sculptured without median longitudinal line; **1** = pronotum with median suture or line of weakness, the cuticle sometimes folded into apparent median carina; **2** = pronotum with smooth and shiny median band extending for variable distance from anterior margin of neck (Figs 197, 212, 221, 249, 340, 366).

Although the median line is sometimes concealed by the head and/or is not very distinct in some small-bodied specimens, such as those of *Nepistenia*, it is characteristic of all Lyciscini except for *Chadwickia* (Fig. 169) and some very small-bodied *Proshizonotus*. I coded all *Proshizonotus* as having a pronotal median line because complete absence is rare and then correlated with very small body size. Absence of a pronotal median line from *Chadwickia* cannot be explained by small body size. At least females of virtually all genera of Eupelminae also have a median sulcus or line of weakness on the pronotum, which is often lighter in color than the surrounding cuticle (Gibson 1995, character 14). Many *Chalcedectus* having the pronotum almost vertical or strongly shortened with the dorsal (posterior) margin emarginate also have a sulcus or median line of thinner cuticle that is sometimes folded into what appears as a median carina. I coded the structure in *Chalcedectus* as a separate state, but some taxa with an apparent median carina are quite similar to the more heavily sclerotized median line of Lyciscini. It is possible that a median line of weakness is evidence of a common ancestor for *Chalcedectus* and Eupelmidae, and possibly Lyciscini, if the structure is the groundplan state rather than a secondarily derived structure within *Chalcedectus*. The pronotal median line of Lyciscini may have evolved through the following transformation series: state 0 → state 1 → state 2.

19. **Notauli**: **0** = notauli evident to posterior margin of mesoscutum as distinct furrows or lines; **1** = notauli extremely obscure posteriorly, sometimes evident only as lines of aligned sculpture or slight difference in convexity (Fig. 266); **2** = notauli not at all evident posteriorly (Figs 45, 107, 109, 135, 137).

Distinct, sulcate notauli extending to the posterior margin of the mesoscutum (Fig. 13, not) are undoubtedly symplesiomorphic within Pteromalidae and represent the groundplan state for Cleonyminae (see Grissell 1995, character 15; Heydon 1997, character 14; Wijesekara 1997, character 11). Within Lyciscini, individuals of *Grooca* have extremely shallow and obscure notauli evident posteriorly only under some angles of light and, surprisingly, more obvious in the scanning electron micrographs (Figs 197, 198) than when viewed with a binocular microscope. Many individuals of *Solenura* also have quite obscure notauli (Fig. 266), though the notauli are evident to the posterior margin of the mesonotum in at least *S. ania*, as distinct or almost as distinct as for other Lyciscini. Absence of distinct notauli is one of the traditional defining features of Cleonymini (Bouček 1988*a*) (Figs 107, 109, 111, 113), but they are also absent from *Agrilocida* (Figs 45, 50) and *Hetreulophus*. Some *Heydenia* also lack distinct notauli (Figs 135, 137), but only from those species I consider exhibit more apomorphic body structures within the genus (see Remarks for *Heydenia*). Presence or absence as well as structure of the notauli is variable in Eupelmidae (Gibson 1989, character 7; Gibson 1995, character 17). The notauli often are V-like in Calosotinae, but they do not extend to the transscutal articulation, except only very obscurely, and in some *Archaeopelma* they are contiguous over much of their length (Gibson 1989, fig. 73). Neanastatinae and female Eupelminae have a highly modified mesosoma without distinct notauli, but most male Eupelminae have variably distinct notauli extending to the transscutal articulation, where they are widely separated (Gibson 1995, figs 427, 431, 433).

20. **Posterior level of notaulus**: **0** = notaulus intercepts posterior margin of mesoscutum distinctly exterior to scutoscutellar suture (Figs 11–15, 37); **1** = notaulus intercepts posterior margin of mesoscutum at level of scutoscutellar suture (Fig. 31), or at least inner margin of notaulus recurved to level of scutoscutellar suture (Fig. 59).

Structure of the notauli relative to the posterior margin of the mesoscutum was analyzed by Gibson (1989, character 7) and Grissell (1995, character 17) and therefore I attempted to analyze it for Cleonyminae. Definition of the two character states is similar to that of Grissell (1995), i.e., position of the notaulus relative to the scutoscutellar suture. Those taxa coded as lacking notauli (state 2) for character 19 were coded as missing data for this character. Pteromalinae included in the analysis (Fig. 13), most of the other outgroup taxa with complete notauli, and apparently *Chalcidiscelis* (Fig. 37), have the posterior limit of the notaulus distinctly exterior to the scutoscutellar suture. The female of *Boucekius* clearly has the notaulus intercepting the scutoscutellar suture (Figs 29, 31), but the posterior limit of the notaulus relative to the scutoscutellar suture is not so straightforward in Lyciscini, *Chalcedectus* or *Heydenia*. Most Lyciscini and *Chalcedectus* have at least the outer margin of the notaulus exterior to the level of the scutoscutellar suture, but in such instances the notaulus usually either widens posteriorly or recurves toward the scutoscutellar suture very close to the posterior margin of the mesonotum (e.g., Fig. 241). The posteriorly sinuate type of notaulus is most distinct in many *Chalcedectus*, where the recurved notaulus delimits an incurved, angulate portion of the mesoscutal lateral lobe that usually is transversely strigose (Figs 60, 62, sr). Individuals of Lyciscini sometimes also have the region strigose, with some other differentiated sculpture or smooth and shiny. It is sometimes very difficult to assign state 0 or 1 unambiguously for taxa within Lyciscini because of the variability, but I assigned state 0 only for *Mesamotura* (Fig. 221) and some *Thaumasura* (including the species of *Thaumasura* similar to *Mesamotura* in characters 8 and 50). The posterior limit of the notauli is often quite obscure in *Heydenia* and therefore relative placement is uncertain.

Some species of *Heydenia* similar to *Heydeniopsis*, which I consider exhibit more plesiomorphic structures for the genus, appear to have the notaulus meeting the scutoscutellar suture (see Hedqvist 1961, fig. 2A), whereas other species have the notaulus distinctly exterior to the scutoscutellar suture. In these latter instances, and in those Lyciscini in which the notaulus appears to be distinctly exterior to the scutoscutellar suture, the structure may simply be a consequence of a secondarily narrowed anterior margin of the scutellum (see character 24). Within Eupelmidae, only some male Eupelminae have sulcate notauli extending to the posterior margin of the mesoscutum. The notauli usually are distinctly exterior to the scutoscutellar sutures, but again this may simply reflect an anteriorly pointed or anteriorly very narrow scutellum in most male Eupelminae (Gibson 1995, *cf.* figs 431, 433).

21. **Scutellar setation**: **0** = uniformly setose dorsally to posterior margin of scutellum or to frenal line (e.g., Fig. 11); **1** = variably extensively setose, but at least bare medially along length (Figs 10, 12–16).

A uniformly setose scutellum, at least anterior to any frenal line, is likely the groundplan state for Cleonyminae *sensu* Bouček (1988*a*) and possibly Pteromalidae. All Lyciscini, Cleonymini, Chalcedectini and *Oodera* have a uniformly setose scutellum, and this likely also is the groundplan state for *Heydenia* and Boucekiini. Although scutellar setation is variable within *Heydenia*, those species exhibiting what I consider to be more plesiomorphic structures (see Remarks for *Heydenia*) have a uniformly setose scutellum. Female *Chalcidiscelis* also have the scutellum uniformly setose anterior to the frenal line. Although the scutellum of *Boucekius* is only sparsely setose, it is essentially uniformly setose anterior to the frenal line (posteromedial triangular region apparently bare, Fig. 31). Individuals of *Leptofoenus* also have a uniformly setose scutellum, whereas the scutellum is only obscurely setose laterally in *Doddifoenus*. In several other groups there appears to have been a tendency toward loss of the scutellar setae medially, until only a single paralateral line or anterolateral and posterolateral seta remain. Correlated with increasingly more extensive loss of the setae is lengthening of the remaining setae so that the paralateral setae are variably distinctly spinelike (Figs 10, 12, 14–16). I attempted to segregate amount of setation and whether or not paralateral setae were spinelike into separate states because the two extremes are conspicuously different. For example, individuals of *Ogloblinisca* have the scutellum extensively setose except medially and all setae are white, hairlike, and about the same length (Fig. 13), whereas individuals of *Callimomoides* and *Hetreulophus* have only a couple of elongate, black, spinelike paralateral setae. However, extent of loss and length of the setae both intergrade, particularly within the Pteromalinae included in the analysis (*cf.* Figs 13–16), and I was unsuccessful. I assigned state 0 to *Nefoenus* even though the scutellum is bare centrally because it is setose anteriorly and posteriorly. Those pteromalid taxa with only a paralateral line of setae have the posteriormost seta(e) in line with the apex of the frenal arm and these setae may indicate the posterior limit of the frenum in those taxa lacking a frenal line (see following character). Pattern of scutellar setae is quite variable in Eupelmidae, though a uniformly setose scutellum is common in all three subfamilies and may represent the groundplan structure (see Gibson 1995, character 18). A comprehensive analysis is required to determine whether the states described above can be applied unambiguously to all Eupelmidae.

22. **Scutellar frenum**: **0** = scutellum with about posterior quarter to third differentiated as frenum by variably distinct line of punctures dorsally between frenal arms (Figs 11, 15, 31); **1** = scutellum without frenal line connecting frenal arms, but with about posterior quarter to third differentiated as bare frenal area by posterolateral seta at level of each frenal arm (Fig. 16); **2** = scutellum without distinct frenal line or frenal area, the shiny frenal arm or posteriormost seta(e) very near posterior margin of scutellum (Figs 7, 10, 46, 117, 156); **3** = scutellum without evident frenal line or frenum, but with posterodorsally faced bandlike region apically, the region bare and smooth or finely sculptured (Figs 9, 454); **4** = scutellum without evident frenum or frenal area and setose apparently to posterior margin, but with vertical or ventrally angled, variably sculptured bare region below posterior margin (Fig. 66).

The groundplan structure of the scutellum for Pteromalidae and possibly some other related chalcid families (Fig. 11) may have included a frenum differentiated by a furrow or line of punctures dorsally across the scutellum between the posterolateral frenal arms. However, interpretation of this and the following character (marginal rim) is complicated by different taxa having conspicuously different scutellar structures of uncertain homology, some of which probably evolved through different transformation series. Grissell (1995, character 15), Heydon (1997, character 15) and Wijesekara (1997, character 20) all included analysis of the frenum in their phylogenetic analyses, but none mentioned the presence of a marginal rim. Some Toryminae (Fig. 11) and most Trigonoderini (Heydon 1997, figs 33, 49, 51–54) have a distinct frenal line across the scutellum between the frenal arms in addition to a variably distinct band of aligned crenulae differentiating a slightly reflexed marginal rim (*cf*. Figs 13–15). Individuals of *Platygerrhus* have only the extreme apex of the scutellum differentiated by a distinct band of crenulae (Heydon 1997, fig. 31), which Heydon (1997) interpreted as a reduced frenum. This structure is similar to that of *Zeala*, except in *Zeala* the slender region posterior to the crenulate furrow is more distinct (Fig. 12). Individuals of *Hetreulophus* also have a very slender posterior portion of the scutellum differentiated by a distinct band of crenulae (Bouček 1988*a*, fig. 438), though this is not as conspicuous as in *Zeala* because it is smooth and shiny and sometimes is partly concealed under the dorsal margin of the dorsellum. Except for *Nefoenus*, those taxa with an evident frenal line near the posterior third of the scutellum have the scutellum setose anterior to the frenal line, but bare posterior to the line (e.g., Fig. 11). Although the frenal line is quite obscure in *Nefoenus*, a line is evident and the scutellum is setose anterior and posterior of the line (Fig. 8). Either this line is a secondary feature that is not homologous with the frenal line of other taxa or a setose frenum is an autapomorphy of *Nefoenus*. Except for *Nefoenus*, I interpret the posteriormost setae of the scutellum to indicate the anterior ‘margin’ of the presumptive frenum, whether or not there is a crenulate line across the scutellum differentiating a distinct frenum. If this interpretation is accurate, the scutellar structures characteristic of *Dinotiscus*, *Rhaphitelus*, *Rhopalicus*, and possibly *Callimomoides*, likely evolved through a separate transformation series from state 0 than did most other taxa without a distinct frenum. In these four taxa, absence of a frenum likely evolved through simple loss of the original frenal line at about the posterior quarter to third, which is still marked by the position of the posteriormost seta (*cf*. Figs 15, 16). In many other taxa, including *Zeala* (Fig. 12) and *Macromesus* (Fig. 10), the surface between the frenal line and posterior margin of the scutellum likely was reduced, resulting in the frenal line being displaced posteriorly to delineate a very slender marginal rim (= frenum) delineated by a crenulate line (= frenal line) or perhaps resulting in coalescence of the frenal line and any original obscure marginal rim to produce a composite structure (state 2). In such instances the slender posterior region is still delineated by the posterior limit of the scutellar setae (e.g., Figs 10, 12). In most instances a variably distinct marginal rim is evident, at least posterolaterally (Figs 10, 46, 117) and sometimes entirely around the posterior margin of the scutellum (e.g., Figs 12, 112, 114, 160, 171) (see following character). Other scutellar structures may have evolved through different transformation series. The scutellum in *Chalcedectus* varies from being highly convex above the dorsellum (Fig. 66) to flat and in the same plane as the dorsellum (Fig. 64) (Grissell 1991, figs 14–16), and may or may not have a carina extending from the axillular carina partly (Fig. 62) or entirely (Fig. 64) around its apparent posterior margin (see following character). In my interpretation of structure, this carina does not extend around the true posterior margin of the scutellum. Species of *Chalcedectus* with a convex scutellum have a much more finely sculptured to smooth bare region delineated posterior to short posterolateral frenal arms (Fig. 66). This differentiated region is abruptly angled and vertical relative to the dorsal surface or, more often, obliquely angled under the apex of the scutellum and therefore not obvious from a dorsal or even lateral view (Figs 61–64). Although this structure is similar to other taxa with an apically smooth scutellar region (state 3) (Figs 9, 454), I coded the structure in *Chalcedectus* as a unique state (state 4) because it does not face posterodorsally. I also assigned just the single state for members of the genus though structure is quite variable. A comprehensive study of species relationships is required to determine the groundplan scutellar structure for *Chalcedectus* prior to resolving structural transformation series. Finally, *Oodera* (Figs 454, 455) and *Doddifoenus* (Fig. 9) have a smooth band posteriorly, which I coded as state 3. Individuals of *Callimomoides* also have the scutellum extensively smooth posteriorly, but I assigned state 2 for *Callimomoides* because of its scutellar setal pattern. No known Eupelmidae have an evident frenum; some have scutellar setal patterns similar to described state 2, whereas others have the setae continuous to the posterior margin, sometimes apparently posterior to the dorsal limit of the frenal arm.

23. **Marginal rim**: **0** = posterior margin of scutellum not differentiated by evident band of aligned crenulae (Figs 31, 39, 142, 199–202, 266–269); **1** = posterior or posterolateral margin of scutellum with a flat or down-curved marginal rim differentiated by a relatively obscure band of aligned crenulae (Figs 46, 110, 117, 214, 250); **2** = posterior margin of scutellum with distinct band of aligned crenulae differentiating a reflexed or extensive marginal rim (Figs 112, 114, 160, 171); **3** = scutellum with carina delineating posterior smooth region on scutellum, but furrow differentiated by posterior continuation of axillular carina (Figs 64, 450, 454).

Interpretation of this character is complicated partly by uncertainty regarding homology of the frenum and marginal rim (see discussion of previous character) and partly because states 0, 1 and 2 form a virtual continuum of structure. Furthermore, structure of a marginal rim is highly variable and the different types may not represent homologous structures. The character was included primarily in an attempt to analyze possible transformation within Lyciscini. Most Lyciscini have a distinct marginal rim differentiated by aligned crenulae along the entire posterior margin of the scutellum (e.g., Figs 155, 156). Exceptions include *Grooca* (Figs 199–203) and *Solenura* (Figs 266–269), which have the scutellum curved down evenly to the dorsellum without regular crenulae along the posterior margin. This structure is similar to *Chalcidiscelis*, except *Chalcidiscelis* has a differentiated frenum (Figs 37–39). Two other Old World genera, *Parepistenia* (Figs 250, 251) and *Marxiana* (Fig. 214), also lack a distinctly reflexed marginal rim, but have a downwardly projecting posterior margin delineated by a band of aligned crenulae. Individuals of *Neboissia* also have a comparatively obscure marginal rim (Fig. 235), but in *Neboissia* the rim is slightly reflexed posteriorly (Fig. 234). For this reason I assigned state 2 to *Neboissia*, but state 1 to *Marxiana* and *Parepistenia*. The structures in *Parepistenia* and *Marxiana* could represent an intermediate stage between absence of a marginal rim in *Grooca* and *Solenura* and presence of a more distinct or reflexed marginal rim in other Lyciscini. Structure in *Parepistenia* and *Marxiana* is likely not homologous with structures designated as state 1 in other taxa, unless it represents the groundplan structure for Lyciscini. Relative visibility of the marginal rim is quite variable in Cleonymini. Individuals of *Dasycleonymus* have a down-curved marginal rim that is most obvious laterally (Fig. 117), similar to several other taxa such as *Agrilocida* (Fig. 46), *Macromesus* (Fig. 10) and some other Cleonymini (Fig. 110). All observed *Callocleonymus* have an entire and quite distinct, crenulate marginal rim (Fig. 112), but in the other genera of Cleonymini the structure is variable and often difficult to assign unambiguously as state 1 or 2. It is possible the distinct marginal rim (= reduced frenum?) characteristic of Hetreulophini, most Lyciscini and some Cleonymini, represents an intermediate stage prior to further reduction of the region that resulted in the more obscure posterolateral region of the taxa listed above. My coding of absence of a true marginal rim for *Chalcedectus* (states 3) is based upon the hypothesis of structure and what constitutes the true posterior margin of the scutellum as discussed for character 22. I interpret a marginal rim to be a highly reduced frenum (Fig. 12), an originally reflexed posterior margin of the scutellum (Fig. 15), or perhaps a composite of the two. In *Chalcedectus*, I interpret any superficial marginal rim (Fig. 65) to result from secondary extension of the axillular carina, which is not truly ‘marginal’ and not present in all species. This interpretation of structural evolution may be supported by the fact that only in *Chalcedectus* can any differentiated rim be setose posterior to the crenulate furrow (Fig. 64). Those *Chalcedectus* with a crenulate margin have a structure that is at least superficially similar to *Oodera*. I therefore assigned state 3 to *Oodera*, even though the structures likely were derived independently. No Eupelmidae have a marginal rim, of any type, and therefore this feature is a primary external feature to assist differentiating male Eupelminae from male Lyciscini.

24. **Scutellar base**: **0** = scutellum with anterior margin variably broadly truncate along posterior margin of mesoscutum between axillae; **1** = scutellum anteriorly convergent to angle between axillae.

This represents another variable feature that is difficult to segregate into discrete states or to assign unambiguously. The states could have been more finely subdivided based on the width of the scutellum anteriorly relative to the width of the preaxillar margin (= width of the axilla measured from the anteromedial angle). This would have increased the number of states for analysis of transformation, but I do not believe it would decrease the ambiguity of assigning states to some taxa (*cf*. Figs 59, 61, 63, 65). In some taxa, such as *Boucekius*, the anterior margin of the scutellum is at least twice the width of the preaxillar margin (Figs 29, 31); other taxa have the scutellar margin narrower relative to the preaxillar margin. All Lyciscini have an anteriorly truncate scutellum, perhaps being narrowest in *Mesamotura*, in which it is much narrower than the width of the preaxillar margin (Fig. 221). I suspect a very broadly truncate scutellum is the most likely groundplan state for Cleonyminae, with increasingly more narrowly truncate scutella as more apomorphic structures. I assigned both states for *Gastracanthus* because individuals of *G. conicus* have a truncate scutellum and *G. pulcherrimus* have an anteriorly angulate scutellum. I assigned state 1 for *Agrilocida*, though this coding is ambiguous and specimens often appear to have the anterior of the scutellum rounded rather than angulate. I assigned state 0 for all *Chalcedectus*, though some species having a metafemur with large teeth separated by gaps (e.g., species previously classified in *Dryadochalcis*) have only a very narrowly truncate region between the axillae (Fig. 61). I also assigned state 0 for all Cleonymini, though there are a very few species having only a very narrowly truncate scutellum or one appearing anteriorly angulate. Individuals of *Heydenia* also have the anterior of the scutellum at most very narrow. Some species have the scutellum anteriorly angulate, with two contiguous pits separated by a septum anteriorly; other species appear to have a very narrowly truncate scutellum (Fig. 135; see also Hedqvist 1961, fig. 2A). I therefore assigned both states to *Heydenia*. My character coding for *Oodera* is also questionable because the scutellum is only very narrow anteromedially (Fig. 450). Scutellar structure is highly varied in Eupelmidae. The scutellum is at least narrowly truncate anteriorly in most Calosotinae (Gibson 1989, figs 67–71), but it is angulate in the hypothesized most basal lineage, *Archaeopelma* (Gibson 1989, fig. 73). It is also anteriorly angulate in two of four genera of Neanastatinae, *Metapelma* and *Lambdobregma* Gibson (Gibson 1989, figs 39, 41), and is highly variable in Eupelminae (see figures in Gibson 1995).

25. **Axillula**: **0** = dorsal limit indistinct, not delimited by carina or distinct sulcus; **1** = dorsal limit defined by a longitudinal carina, which may or may not be evident as the ventral or outer margin of a crenulate sulcus (Figs 157, 261, 318); **2** = dorsal limit defined by definite sulcus, but with neither side of furrow carinately margined (Figs 12, 14).

The known female of *Boucekius* has an irregular pattern of shiny crenulae delimiting a strongly rugose triangular region on the lateral surface of the scutellum posterior to the axilla (Figs 29, 31), which I interpret as the axillula. The lower margin of the dorsalmost line of crenulae is carinate. I therefore assigned state 1 for *Boucekius*, even though it does not form a straight carina as in other taxa assigned state 1. Most *Grooca* lack an axillular carina (Figs 199, 200) and I assigned state 0 for all members even though *Grooca* n. sp. #3 has an incomplete axillular carina developed near the axilla. Species of *Heydenia* exhibiting what I consider to be more plesiomorphic structures have the scutellum uniformly punctate-reticulate without a recognizable axillula. I consider this as the groundplan for *Heydenia*, but also assigned state 1 for the genus because some species have the lateral surface of the axilla smooth and shiny with an abrupt, straight dorsal margin (Figs 134, 141). This structure is undoubtedly secondarily derived within *Heydenia*. I assigned state 0 to *Oodera* even though a longitudinal carina does differentiate a small lateral portion of the scutellum in most species. The scutellum is entirely longitudinally strigose in *Oodera*. Furthermore, the most lateral ridge is not obviously recurved from the frenal arm nor does it differentiate a distinct axillular region (Fig. 454). I believe the most lateral ridge simply represents the most lateral of several rugae and is not homologous with an axillular carina. Eupelmidae lack a differentiated axillula, having the lateral portion of the scutellum differentiated by neither a distinct sulcus nor a carina. See also Wijesekara (1997, character 19).

26. **Setal pattern of dorsellum for female**: **0** = bare; **1** = variably setose.

All outgroup taxa examined have a bare dorsellum, but Heydon (1997: 69) stated that two of three species of *Ogloblinisca* have a setose dorsellum and I coded the genus accordingly. For the purposes of the analysis, I assigned state 0 for all *Thaumasura* even though at least some females of *T. fera* have a few setae on the dorsellum. Insufficient males of *T. fera* were seen to confidently assess whether some males of this species might also have a few dorsellar setae. The single known female of *Hadroepistenia erwini* has a few long dorsellar setae arranged in a single transverse row (Fig. 359), whereas the single female of *H. glabra* and the only known male of the genus has a bare dorsellum (Figs 361, 363). All other taxa with setae on the dorsellum have the dorsellum much more extensively setose. This may indicate the line of setae on the dorsellum of *H. erwini* females was derived secondarily from a bare dorsellum rather than being a uniquely retained symplesiomorphy within the New World Clade of Lyciscini. *Dasycleonymus* is sexually dimorphic for this feature, assuming my association of sexes is correct. Females of *D. bakeri* have dorsellar setae (Fig. 115), whereas all males assigned to the genus have a bare dorsellum (Fig. 117). Otherwise, Cleonymini have a bare dorsellum except for a female of one undescribed species with uncertain generic placement relative to *Dasycleonymus* and *Cleonymus* (see Remarks for Cleonymini). I assigned state 0 for all *Cleonymus* because of the uncertain relationships of this species. Within Eupelmidae, some Calosotinae have an extensively setose dorsellum (Gibson 1989, fig. 35), including three of five morphospecies of *Archaeopelma*, but known Eupelminae and Neanastatinae have a bare dorsellum.

27. **Setal pattern of dorsellum for male**: **0** = bare; **1** = setose.

As discussed for previous character.

28. **Prepectal panel shape**: **0** = triangular in lateral view or with posteroventral margin only slightly and evenly incurved; **1** = pedunculate in lateral view, with posteroventral margin distinctly incurved and posterodorsal angle narrowed before subapically expanding into small rounded lobe (Figs 316, 348, 383, 416, 417, 425, 444).

Although the two general types of prepectus described above are quite distinct, they do not comprise an either-or structure because the posteroventral margin varies from straight (Fig. 312) to variably incurved so that the posterolateral angle of the prepectus can be more or less distinctly lunate (Fig. 315). All New World Clade Lyciscini have a pedunculate prepectus (Fig. 444), but some New World *Proshizonotus* also appear to have a pedunculate prepectus (Fig. 316). An essentially triangular prepectal panel is undoubtedly the groundplan structure for Pteromalidae and Cleonyminae and is possessed by all Eupelmidae.

29. **Setal pattern of upper mesepimeron**: **0** = entirely bare; **1** = partly to entirely setose, at least with some setae in subalar pit (Figs 203, 213, 274, 285).

Setal patterns of the mesepimeron are quite diverse within Cleonyminae and for the purpose of the analysis I recognized two characters, setal patterns of the upper mesepimeron and lower mesepimeron, respectively (see following character). I assigned both states 0 and 1 for *Chalcedectus*, though the only species I have seen with a setose upper mesepimeron are the two species previously classified in *Dryadochalcis* (see Remarks for *Chalcedectus*). A bare upper mesepimeron is likely the groundplan state for Cleonyminae based on commonality in the outgroup. Within Eupelmidae, the upper mesepimeron bare in those Calosotinae having a recognizable upper mesepimeron because the acropleuron is not fully enlarged (Gibson 1989, figs 27, 32). The upper mesepimeron is also bare in known male Eupelminae (see figures in Gibson 1995) and in *Metapelma*, the only member of Neanastatinae having a recognizable upper mesepimeron (Gibson 1989, fig. 45).

30. **Setal pattern of lower mesepimeron**: **0** = entirely bare; **1** = with setae along posterior margin (Figs 110, 170, 203, 267); **2** = with few scattered setae (Fig. 290); **3** = entirely setose (Fig. 222).

Within Lyciscini, *Chadwickia* (Fig. 170), *Solenura* (Figs 267, 269) and all but one species of *Grooca* (Fig. 203), *G. coorgensis*, have the lower mesopleuron setose along its posterior margin. This setal pattern is similar to that of many Cleonymini (Fig. 110). Only *Chadwickia* has a bare upper mesepimeron (see previous character) in combination with a posteriorly setose lower mesepimeron. Individuals of *Mesamotura* are also unique in having both the upper and lower mesepimeron entirely setose (Fig. 222). A few species of *Thaumasura* not only have the upper mesepimeron extensively setose, but also have a few scattered setae on the lower mesepimeron (Fig. 290). This may represent an intermediate stage in the evolution of the setal pattern characteristic of *Mesamotura*, and evidence *Mesamotura* renders *Thaumasura* paraphyletic. However, more comprehensive analysis of species relationships is necessary prior to confident hypotheses. A setose upper mesepimeron and posteriorly setose lower mesepimeron is undoubtedly the groundplan state for Cleonymini, with a tendency toward loss of the setae from both regions within the tribe. The mesopleuron is not separated distinctly into an upper and lower mesopleuron in most *Oodera* (Leptofoeninae have a similar structure), but it appears only the ‘upper’ mesopleuron is setose along its posterior margin (Fig. 454). Within Eupelmidae, only some members of Calosotinae with a strongly reduced mesepimeron have setae within the region (Gibson 1989, figs 29, 36). Male Eupelminae always have a bare lower mesepimeron (see figures in Gibson 1995), as does *Metapelma*, the only member of Neanastatinae with a recognizable lower mesepimeron (Gibson 1989, fig. 45).

31. **Sculpture and setal pattern of metapleuron**: **0** = uniformly sculptured and setose (Figs 30, 67, 110, 156, 454); **1** = setose and sculptured ventrally, but obviously

smoother and bare dorsally (Figs 68, 136, 158); **2** = entirely bare or with only a few scattered setae, but more or less conspicuously reticulate-coriaceous; **3** = entirely bare, but with distinct meshlike pattern defined by impressed lines (Fig. 112); **4** = entirely bare, smooth and shiny; **5** = transversely strigose ventrally and rugulose dorsally, densely setose dorsally and anterodorsally, but very sparsely setose to bare posteriorly and ventrally (Fig. 9).

Although the above states are treated within a single character they obviously comprise two characters, type of sculpture and extent of setation. Attempts to divide either type of sculpture or extent of setation into discrete states proved too complex for the range of taxa treated and the states described are therefore a simplification. Within Trigonoderini, setal and sculpture patterns appear to be quite variable even within some genera. I assigned states 0, 2 and 3 for *Platygerrhus* because *P. algonquinius* has the metapleuron uniformly reticulate and setose, *P. americanus* has an entirely bare and distinctly coriaceous metapleuron similar to individuals of *Callocleonymus*, and other *Platygerrhus* have a distinctly sculptured but bare or very sparsely setose metapleuron. Similarly, *Ogloblinisca americana* has the metapleuron uniformly setose, though Heydon (1997: 69) stated that the other two known species have "the metapleuron setose at most in the ventral half." I assigned both states 0 and 2 for *Ogloblinisca* because of this, but I did not examine representatives of the other two species and am uncertain as to their exact metapleural sculpture and setal patterns. All Pteromalini included in the analysis have a sculptured, bare metapleuron, which is by far the most common structure within the tribe (S. Heydon, *in lit.*). A uniformly sculptured and setose metapleuron (Figs 67, 157, 185, 290) is undoubtedly the groundplan structure for Cleonyminae, but in most tribes there appears to be a convergent trend for the metapleuron to become smoother and bare dorsally, though remaining sculptured and setose ventrally (Figs 68, 158, 186, 285). Within Lyciscini, I assigned state 0 for all *Neboissia* because the metapleuron is uniformly sculptured even though in some species setal density is reduced dorsally. The dorsally reduced setae undoubtedly represents a secondarily derived feature within *Neboissia*. Although *Striatacanthus* is assigned state 1, its sculpture/setal pattern (Figs 274, 276) is quite different from other genera of Lyciscini assigned state 1 and therefore is likely independently derived. *Doddifoenus* has an autapomorphic pattern (Fig. 9), as does *Callocleonymus* (Fig. 112) within Cleonymini. Within Eupelmidae, a uniformly sculptured and setose metapleuron is likely the groundplan state for Calosotinae based both on commonality and presence of this state in *Archaeopelma*. Ingroup analysis also indicates an entirely setose metapleuron as the groundplan for Neanastatinae. The groundplan for Eupelminae is uncertain. Gibson (1995) recognized males of 29 genera or subgenera of Eupelminae; of these, the metapleuron is at least partly setose in males of some or all species of 6 genera (Gibson 1995, character 52, figs 424, 438). Of the 45 genera or subgenera he recognized based on females, only 10 have species with a setose metapleuron and 7 of these have some species with a bare metapleuron (Gibson 1995, character 23).

32. **Propodeal structure**: **0** = propodeum without median carina and essentially undifferentiated between spiracles (Figs 7–9, 31); **1** = propodeum without median carina, but with anterior crenulate furrow recurved paramedially to differentiate a median, variably sculptured region (Figs 47, 69); **2** = propodeum with partial

to complete median carina, the carina often differentiated by crenulate furrow recurved from along anterior margin (Figs 113, 135, 160).

Propodeal structure is highly variable within Pteromalidae. In addition to differences encompassed by this character there is also variation, and therefore possible phylogenetic information, in relative width of attachment of the meso- and metasoma (*cf.* Figs 8, 10), shape of the propodeal spiracles (*cf.* Figs 9, 10), and in distance between the spiracle and anterior margin of the propodeum (*cf.* Figs 10, 47), but I was unable to segregate observed differences into discrete states for these potential characters. Presence or absence of a median carina usually is quite obvious. There also appears to be variation in the extent to which the anterior crenulate furrow extends mesally, and whether or not it is recurved posteriorly as a paraspiracular furrow. Most taxa have a crenulate furrow along the anterior margin of the propodeum anterior to the callus. This furrow appears to extend mesally only to about the lateral limit of the dorsellum in some taxa (Figs 15, 31, 201, 202), whereas in others a crenulate line extends across the entire or virtually the entire anterior margin of the propodeum (Figs 118, 160). Furthermore, taxa differ in whether the furrow terminates near the lateral limit of the dorsellum (Figs 15, 269), or is recurved to the posterior margin of the propodeum paramedially so as to differentiate a median plical region (Fig. 376), or extends medially to a median carina and is recurved posteriorly on either side of the carina (Figs 223, 287). I was unable to determine the true mesal limit of the anterior crenulate furrow in all taxa, or whether or not a paraspiracular furrow was always a recurved portion of the anterior crenulate furrow or a separate structure in addition to the anterior crenulate furrow (Figs 171, 215). I therefore simplified observed variation to the three states described above, although admittedly the present treatment of propodeal structure is unsatisfactory because of uncertain homology. Individuals of *Chalcedectus* typically have a median plical region delineated by a distinct furrow or carina that is recurved from the anterior crenulate furrow (Figs 69, 70), often obviously mesal to a variably distinct paraspiracular carina (Fig. 66). This median region is variably sculptured and sometimes is partly longitudinally carinate (*cf.* Figs 69–71); however, I interpret a median carina as secondary within *Chalcedectus* and assigned state 3 for all members of the genus. Although less obvious, individuals of *Agrilocida* (Figs 47, 48; Bouček and Rasplus 1991, *cf.* figs 30, 32) have a similarly structured propodeum, with a median plical region as for *Chalcedectus*. I assigned state 0 to *Leptofoenus* even though a median region is differentiated by very shallow longitudinal furrows because the furrows are not distinctly sulcate nor obviously a continuation of the anterior crenulate furrow (Fig. 7). *Doddifoenus* has a distinct, longitudinal crenulate furrow (Fig. 9), but behind the spiracle rather than mesal to it. I therefore also assigned state 0 to *Doddifoenus*. Some genera of Lyciscini, including *Grooca*, *Solenura* and females of several genera of New World Lyciscini, have the propodeum very short medially and more or less regularly crenulate or with a median smooth band rather than a median carina. I assigned state 2 for all such propodeal structures because males typically have a longer propodeum with a definite median carina (*cf.* Fig. 200 with 202, 268 with 269). Propodeal structure is highly variable in Eupelmidae. Some Calosotinae, such as female *Archaeopelma*, have a similar propodeal structure to that of *Boucekius* (Fig. 31). The propodeum is transverse-rectangular, very broadly attached to the metasoma without a distinctly differentiated callus and plical region, and almost uniformly sculptured (reticulate to reticulate-rugulose). Other

Calosotinae usually have a plical region differentiated from the callus by a distinct paraspiracular furrow and sometimes have a differentiated median region (Gibson 1989, figs 55–58) similar to *Chalcedectus*, though some have a more or less pentagonal propodeum with an incomplete median carina (Gibson 1989, fig. 54). Propodeal structure is highly variable in female Eupelminae, but most males have a propodeum with a median carina and a narrow metasomal attachment (Gibson 1995, character 54).

33. **Lateral setal pattern of propodeum**: **0** = bare mesal to spiracle and mostly bare behind spiracle, though possibly with line or band of setae along posterior margin; **1** = bare mesal to spiracle, but extensively setose behind spiracle to level near foramen (Figs 160, 140, 185, 201, 223, 235, 268, 286); **2** = setose from anterior to posterior of propodeum mesal to spiracle (Figs 8, 9).

This character was included primarily to analyze transformation within Lyciscini, but Leptofoeninae (Figs 7, 9) appear to be unique in having setae along the length of the propodeum mesal to the propodeal spiracle. It is difficult to segregate the extent of propodeal setation into discrete states for the other taxa because some setae often extend along the posterior margin of the callus to or partly to the foramen. Furthermore, this character is partly correlated with how broadly attached are the meso- and metasoma. For example, the very broad foramen of female *Boucekius* occupies almost the entire region between the spiracles. Because of this, there is only a very narrow region for any setae to occupy between the inner margin of the spiracle and lateral margin of the foramen. There is also a correlation between the presence of an extensively setose plical region and the lack of a distinct paraspiracular furrow or carina, though not all taxa without a distinct paraspiracular furrow have the propodeum extensively setose behind the spiracle. I assigned state 1 for some *Chalcedectus* because the surface behind the spiracle is setose for a variable distance toward the paraspiracular furrow (see previous character). The groundplan state for Lyciscini is uncertain, but based on commonality within the genera I hypothesize state 1 as the groundplan for both *Grooca* and *Thaumasura*. Although propodeal setal pattern is somewhat variable in Eupelminae (see figures in Gibson 1995) and Calosotinae (Gibson 1989, figs 54–58), a propodeum that was not extensively setose behind the propodeal spiracle likely represents the groundplan structure for all three subfamilies.

34. **Medial setal pattern of propodeum for female**: **0** = bare; **1** = with some setae medially (Figs 214, 251, 392).

A medially setose propodeum is treated separately for females and males because of apparent sexual dimorphism in *Paralycisca*. Females of *P. cristata* have setae on the plical region (Fig. 392), whereas males of this species do not (Fig. 393). Other males I identify as an undescribed species of *Paralycisca* also lack plical setae (Fig. 395). Association of females of this undescribed species is necessary to determine whether they have a setose plical region and the feature is sexually dimorphic in *Paralycisca*, or whether the setose plical region of *P. cristata* females is a species specific feature. Presence or absence of plical setae was included to analyze transformation within Lyciscini. Individuals of *Leptofoenus* usually have the plical region at least very narrowly bare mediolongitudinally (Fig. 7). When the propodeum is virtually entirely setose (e.g., *L. westwoodi*), I believe this results from expansion of the lateral setae and the medial setae are not homologous with the plical setae possessed by some Lyciscini. Because of this, I assigned state 0 for all *Leptofoenus*. Eupelmidae always have the plical region bare.

35. **Medial setal pattern of propodeum for male**: **0** = bare; **1** = with some setae medially (Fig. 215).

As discussed for previous character.

36. **Setal pattern of humeral plate of forewing**: **0** = variably extensively setose along leading margin, but dorsal surface and apical margin next to base of venation almost or entirely bare except usually for single long, strong seta adjacent to apical margin (Figs 20, 143); **1** = dorsal surface entirely setose or at least extensively setose along apical margin (Figs 17–19).

Specimens with the wings held back over the body, rather than down on either side of the body, are better for comparable observation of the dorsal surface of the humeral plate because the sclerite rotates with the wing. Observed character-states have been simplified somewhat for the purpose of the analysis. Most taxa assigned state 0 have a conspicuously long seta near the apical margin of the humeral plate (Fig. 20), including *Boucekius* and *Chalcidiscelis*. This seta is absent from the single female of *Doddifoenus* I saw; furthermore, individuals of *Heydenia* (Fig. 143) and *Leptofoenus* usually have only one or two small, hairlike setae in the same position. *Oodera* can have two or three setae along the mesal margin basally. Obviously, within taxa assigned state 0 there have been transformation series including these setae, but at levels unimportant for the present analysis. Only members of Chalcedectini (Fig. 17), Cleonymini (Fig. 18) and Lyciscini (Fig. 19) share a humeral plate that is extensively setose dorsally. There is considerable variation among all the taxa included in the analysis concerning degree of setation along the leading margin or within the posteroapical angle of the humeral plate. Superficial examination of different genera of the three subfamilies of Eupelmidae also shows considerable diversity in setal patterns of the humeral plate. For example, all species of *Archaeopelma* have the humeral plate mostly bare dorsally except for setae along the leading margin, but some have a complete row of setae along the apical margin and others have only one or two setae similar to described state 0. Analysis of humeral plate setal pattern in Eupelmidae will require a comprehensive study.

37. **Forewing setal pattern**: **0** = forewing entirely setose or if with bare region beyond basal cell then basal cell uniformly setose without distinctly differentiated basal or cubital setal lines; **1** = forewing with at least basal setal line differentiated because setae reduced in basal cell and speculum present beyond basal setal line (Fig. 149); **2** = forewing entirely or almost entirely bare behind costal cell, sometimes with setae on basal fold near parastigma or with cubital setal line, but not with both setal lines differentiating speculum from obscure basal cell (Fig. 150); **3** = forewing entirely bare.

Forewing setation is one more highly variable feature that is difficult to divide into discrete states, although a uniformly setose forewing is likely the groundplan state for all Cleonyminae except *Heydenia* and *Agrilocida*. Most Lyciscini have an entirely setose forewing, though some members of some genera have a bare spot, band, or < -like angulate region beyond the uniformly setose basal cell. I included such setal patterns within state 0 because complete absence of a bare region is difficult to differentiate from presence of a small bare or very slender angulate region. Within those genera characterized by a bare region, further analysis might prove fruitful for inferring species relationships. Several outgroup taxa have a broad bare region (speculum) behind the parastigma. This bare region is distal to a basal cell that also is mostly or entirely bare, but which is differentiated from the speculum by a basal setal line and often posteriorly by a cubital setal line (state 1). Individuals of *Agrilocida* have a basal cell that is distinctly differentiated by complete basal and cubital setal lines, a broad speculum beyond the basal setal line, and the basal cell itself only sparsely setose. Some species of *Heydenia* from the Oriental region have a similar setal pattern (Fig. 149), whereas other species have the forewing entirely bare behind the costal cell except for a tuft of setae at the base of the parastigma (Fig. 150). This latter pattern is similar to the setal pattern of *Hetreulophus* (Bouček 1988*a*, fig. 438). A forewing that is entirely or almost entirely bare behind the costal cell is also known for one undescribed species of *Agamerion* within Lyciscini, the *maculipennis* species-group of *Chalcedectus*, and within Cleonymini by at least females of most species of *Callocleonymus*, some *Notanisus* and a very few species of *Cleonymus*. The setal patterns exhibited within Cleonymini are more diverse than encompassed by the described states. Further analysis within the tribe may be fruitful for inferring relationships, but I hypothesize an entirely setose forewing as the groundplan for Cleonymini. I assigned state 0 for *Nefoenus* because the basal cell is uniformly setose, even though there is an oblique bare region on the dorsal surface of the wing immediately behind the elongate parastigma and marginal vein. This bare region is not obvious because on the ventral surface of the wing the setae extend to the elongate parastigma. *Rhopalicus tutela* is sexually dimorphic for this character, females having a bare basal cell and distinct speculum, but males having a uniformly setose forewing. I assigned state 1 for all *Rhopalicus* because females of *R. tutela* and other members of the genus I saw have a speculum; however, the setal pattern of *R. tutela* males suggests that a forewing can sometimes regain setae. In addition to *Ogloblinisca*, Heydon (1997) recorded absence of a speculum from *Trigonoderus* and *Miscogasteriella* within the *Trigonoderus*-group (Heydon 1997, character 20). Within Eupelmidae, an entirely setose forewing is likely the groundplan state for at least Neanastatinae and Eupelminae, and may be the groundplan state for Calosotinae. Based on their mesosomal structures, *Archaeopelma* and *Paraeusandalum* Gibson are hypothesized as basal lineages within Calosotinae (Gibson 1989). Individuals of *Paraeusandalum* have an entirely setose forewing, whereas individuals of *Archaeopelma* have a distinct speculum and often the wing largely or entirely bare behind the costal cell. Furthermore, some species in all three subfamilies have a slender linea calva (Gibson 1989, character 16; Gibson 1995, character 55).

38. **Costal cell of hind wing**: **0** = ‘narrow’, vein path curved toward and paralleling leading margin of wing so as to result in very slender costal cell over much of length; **1** = ‘broad’, vein path concave or if straight then angled to margin of wing, but resulting in broad costal cell over much of its length.

Only individuals of *Oodera*, *Chalcedectus*, *Boucekius*, and to a lesser extent *Chalcidiscelis*, have a hind wing with a broad costal cell over much of its length. The structure in *Chalcidiscelis* is somewhat intermediate between the two extremes because the apical portion of the vein is recurved along the wing margin, but the costal cell is wide over most of its length. The costal cell is more obviously narrow in most other genera included in the analysis, usually because the vein closely parallels the wing margin over a substantial though variably long portion of its length (*cf*. Bouček 1988*a*, fig. 420 with figs 358, 406, 418, 433). The vein is virtually straight in *Riekisura*, which results in an evenly attenuated and comparatively conspicuous costal cell. Even though the structure is quite similar to state 0, I included it within state 1. Based on commonality, a narrow costal cell is likely the groundplan structure for Pteromalidae and Cleonyminae. This character is significant within Chalcedectini. If a broad costal cell is apomorphic, then monophyly of species classified in *Chalcedectus* plus those formerly classified in *Amotura* and *Dryadochalcis* is supported. Within Calosotinae, at least *Archaeopelma* has a broad costal cell, though breadth of the costal cell appears to be quite variable in other members of the subfamily. Most, if not all, Eupelminae and Neanastatinae have a costal cell similar to that described for state 1.

39. **Structure of profemur**: **0** = profemur more or less slender or at least smoothly expanded apically, without ventral teeth or spines; **1** = profemur ventrally with distinct preapical angulation, but without teeth or spines beyond angle (Figs 317, 375, 384, 405); **2** = profemur ventrally with distinct preapical angulation and with teeth beyond angle (Fig. 236); **3** = profemur more or less uniformly enlarged and ventrally with irregular cuticular denticles (Fig. 145); **4** = profemur more or less uniformly enlarged with line of ventrally directed spicules and obliquely angled spinelike setae (Figs 457, 458).

A slender profemur is undoubtedly the groundplan state for Cleonyminae and is likely the groundplan state for Lyciscini. State 2 (Fig. 236) is an autapomorphy of *Neboissia*, which could have been derived from state 1 or *de novo* from state 0. States 3 (Fig. 145) and 4 (Figs 457, 458) likely represent two independent transformation series from state 0. The enlarged profemora of *Oodera* and some *Heydenia* are superficially similar (*cf*. Figs 145, 457); however, in *Heydenia* tiny cuticular protrusions form the denticles along the ventral surface of the femur, whereas *Oodera* has an autapomorphic pattern of ventrally projected spicules and obliquely projected spinelike setae (Figs 457, 458). A distinct preapical angulation (Figs 317, 375, 384, 405) is possessed by a few Old World Lyciscini, but is characteristic of New World Clade genera. A preapical angulation might be a groundplan feature of the New World Clade, but if so the protibia has reversed to a slender structure in members of some genera. This character and character 42 (presence of a carinate margin along the ventral or ventrobasal margin of the protibia) are partly correlated. In most instances the preapical angulation or enlarged profemur likely forms a functional complex with a carinate protibia, the two together forming a pincerlike apparatus for grasping (Figs 375, 384). The unique profemoral structure of *Neboissia* is an exception. In this genus the teeth on the angulation of the profemur (Fig. 236) are hypothesized to function as a comb to clean a setal patch on the side of the head (Fig. 229, see Remarks for *Neboissia*). Eupelmidae have a slender profemur.

40. **Protibial dorsoapical spicules**: **0** = one or more spicules present (Figs 21–23); **1** = spicules absent (Fig. 99).

Exact distribution of protibial dorsoapical spicules throughout Chalcidoidea is unknown, though Wijesekara (1997, character 23, state 1) showed at least one spicule is present in two genera of Chalcididae. Short, stubby spicules are shared by most taxa classified in Cleonyminae (Figs 23, 146, 178, 459), but also by Eupelmidae (Gibson 1989, character 18) and most of the outgroup taxa. I also observed some type of dorsoapical spines within those Pteromalinae included in the analysis, ranging from stubby spicules to comparatively strong setae in a similar position as the spicules (Fig. 21). How conspicuous are the spines depends partly on whether they are the same or a darker color than the surrounding setae. There certainly is a qualitative difference between the strong setae characteristic of some Pteromalinae and the stubby spicules of other taxa, but I was unable to segregate the difference into discrete states. Significant for the present analysis is the complete absence of dorsoapical spines or spicules from Cleonymini (Fig. 99) and Chalcedectini. Individuals of *Callimomoides* (Louriciinae) are parasitoids of the eggs of Cerambycidae in tropical forests, whereas other members of the outgroup taxa with dorsoapical spicules are either known or suspected larval-pupal parasitoids of wood-boring hosts or insects associated with wood (Bouček 1988*a*). There appears to be a correlation between the presence of dorsoapical spicules and parasitism of insects associated with wood. Because of this, I hypothesize presence of dorsoapical spicules as a relict feature in those Eupelmidae having other hosts, i.e., that they evolved from an ancestor that was a parasitoid of a wood-boring host (Gibson 1989). Cleonymini and Chalcedectini are also mostly parasitoids of insects living in wood (Bouček 1988*a*; Heydon 1997). Absence of dorsoapical spicules from these two tribes more likely results from secondary loss, which may represent a synapomorphy for Cleonymini + Chalcedectini.

41. **Protibial dorsal spicules**: **0** = no spicules present; **1** = row of several spicules along dorsal margin of protibia (Figs 146, 217, 248).

Based on commonality, absence of protibial dorsal spicules is likely the groundplan state for both Cleonyminae and Lyciscini. Protibial dorsal spicules are possessed also by *Leptofoenus* and *Macromesus* within the outgroup taxa examined, as well as by some Calosotinae (Gibson 1989, character 20). Similar to protibial dorsoapical spicules, dorsal spicules likely evolved to help adult parasitoids of wood-boring insects exit the host tunnel and undoubtedly have been derived more than once. Further phylogenetic information might be derived within Cleonyminae using scanning electron microscopy for more comprehensive and detailed study. The protibia of some taxa were observed with slightly stronger, spinelike setae in a similar location as the dorsal spicules (Fig. 178). I did not code such spines for the purpose of this study because they are very difficult to observe using only a binocular microscope, and their presence or absence could not be coded confidently.

42. **Protibial structure**: **0** = ventrally not carinate; **1** = with sinuate, ventral carinate margin over about basal half to three-quarters (Figs 317, 375); **2** = with carinate margin along entire ventral length (Fig. 146).

The presence of a carinate margin ventrally or basoventrally on the protibia is correlated partly with the presence of a preapical angulation on the profemur in Lyciscini, and with a greatly enlarged profemur in *Oodera* and *Heydenia*. The entirely carinate ventral margin of the protibia of these last two genera certainly is derived independently to the much more conspicuously sinuate carina characteristic of *Neboissia* or *Lycisca*. Taxa without a preapical angulation always lack a carinate margin from the protibia, but not all taxa with a distinct preapical angulation have the carina. The two structures undoubtedly comprise a functional complex, the carina of the tibia and either the ventroapical angle of the femur in Lyciscini or the various teeth or spines in *Oodera* and *Heydenia* forming a pincerlike apparatus likely used for grasping. A very few Old World *Proshizonotus* have a distinct preapical profemoral angulation and a sinuate carina on the protibia (Fig. 317), but no New World *Proshizonotus* is known to have either feature.

43. **Setal pattern of exterior surface of metacoxa**: **0** = exterior surface (the usually flat to slightly concave surface relative to the convex ventral or dorsal surfaces) bare mediolongitudinally; **1** = exterior surface extensively setose at least apically or basally (Figs 157, 187).

Doddifoenus has a unique metacoxal setal pattern; there is a slender dorsolateral band of setae, which I interpret as 'dorsal' setae, and more conspicuous ventral setae, but there are also a few setae on the shallow concave lateral surface. I assigned state 1 to *Doddifoenus* because of these setae, though certainly the region is far more sparsely setose than for individuals of *Leptofoenus* or those Lyciscini assigned state 1. In contrast, I assigned state 0 to *Ogloblinisca* because there is a continuous though very slender bare band mediolongitudinally. Other pteromalid outgroup genera have the exterior surface of the metacoxa more conspicuously bare, though always setose ventrally and usually setose at least dorsobasally if not along the entire dorsal surface. A metacoxa that is bare at least mediolongitudinally is also characteristic of most Cleonyminae, though the extent of setation varies considerably. Most Cleonymini also have the outer surface of the metacoxa setose along the extreme basal margin adjacent to the metapleuron. Setal pattern is variable within *Heydenia*, but those species exhibiting what I consider as more plesiomorphic structures have the metacoxa extensively setose laterally and this is likely the groundplan structure for the genus. Based on commonality in most genera, an externally setose metacoxa is likely the groundplan state for Calosotinae, whereas an externally bare metacoxa is undoubtedly the groundplan state for Neanastatinae. A comprehensive study is required to accurately hypothesize the groundplan state for Eupelminae. Gibson (1995, character 53) analyzed the feature for Eupelminae, but only for males. An externally setose metacoxa appears to be more common for females and the feature may be sexually dimorphic in some genera. For example, all known females of *Phlebopenes* Perty have an externally setose metacoxa, whereas those males identified as *Phlebopenes* by Gibson (1995) have the exterior surface bare.

44. **Metacoxal structure for female**: **0** = dorsally rounded or acutely angled, but not carinately margined; **1** = with carinate, often externally crenulate ridge along dorsal length for variable length (Figs 30, 278, 352, 403, 430).

Presence or absence of a carina along the dorsal length of the metacoxa is treated separately for females and males because the character appears to be sexually dimorphic in some genera. Males of *Dasycleonymus* have a distinct carina dorsally on the metacoxa (Fig. 117), whereas the single known female of *D. bakeri* lacks a distinct carina though the metacoxa is longitudinally strigose dorsally. The metacoxa is non-carinate in both sexes of all other genera of Cleonymini. Within *Grooca* and *Solenura*, the feature is sexually dimorphic in at least *G. coorgensis*, *S. ania* and *S. nigra*, but in these instances females have a distinct carina. Males either lack the carina or the coxa is at most acutely angled dorsoapically. The structure also appears to be dimorphic in *Agrilocida*. Males that I have seen lack a metacoxal carina, whereas females have a carina except along the extreme dorsobasal angle (Bouček and Rasplus 1991, fig. 30). I assigned both states for *Heydenia* because larger females of *H. unica* and females of at least two species from the Australasian region appear to have a dorsally carinate or crested metacoxa. I have not seen any male *Heydenia* with a dorsally carinate metacoxa and absence of a dorsal carina is undoubtedly the groundplan state for the genus. Females of a very few species of *Thaumasura* have the metacoxa dorsally carinate, but the non-carinate metacoxal condition is characteristic of those species exhibiting other features discussed as likely groundplan features of the genus. Because of this, I hypothesize a carinate metacoxa to be secondarily derived in *Thaumasura*. A non-carinate metacoxa is likely also the groundplan structure for *Proshizonotus*, based on this state being possessed by the vast majority of species. I have not seen any *Proshizonotus* males with a carinate metacoxa, but males are not associated with the very few species whose females have a carinate coxa. Presence or absence of a dorsal carina is sometimes difficult to determine in those New World Clade species having the coxa densely setose dorsally, which obscures the carina. Eupelmidae have a non-carinate metacoxa.

45. **Metacoxal structure for male**: **0** = dorsally rounded to acutely angled, but not carinately margined; **1** = with carinate, often externally crenulate ridge along dorsal length for variable extent.

As discussed for previous character.

46. **Structure of metafemur**: **0** = without denticles or teeth ventrally; **1** = with single, rounded preapical lobe (Figs 32, 101); **2** = with acutely angled lobes or spinelike teeth of irregular size, shape and spacing, mostly or entirely within apical half (Figs 40, 102–106); **3** = with small, uniform teeth similar to blade of saw over most of length (Fig. 75); **4** = with large, regular, lobelike teeth (Figs 77, 79); **5** = with irregular tiny denticles (Fig. 166).

An enlarged metafemur with some pattern of cuticular denticles ventrally has undoubtedly evolved several times within Chalcidoidea. Both Grissell (1995, character 43) and Wijesekara (1997, character 25) included analysis of metafemoral structure. Wijesekara (1997, table 1) apparently reversed the character coding for *Chalcedectus* and *Epistenia*. Within Lyciscini, the polymorphisms (states 0 and 5) I coded for *Agamerion* and *Eupelmophotismus* are based on very few exceptions within each genus. Most *Agamerion* have a variably enlarged and denticulate metafemur (state 5; Figs 165, 166), whereas only one aberrant species of *Eupelmophotismus* has an enlarged and denticulate metafemur (Fig. 140). A very few species of *Agamerion* have the ventral denticles evenly sized and spaced so as to appear serrate, similar to *Agrilocida* and *Chalcedectus* (*cf.* Figs 75, 77). In such instances, the metafemur has both an outer and inner ventral margin, which forms a concave ventral surface into which the tibia can be appressed (Fig. 77). Those *Agamerion* with a superficially serrate metafemur have the outer ventral margin serrate over at most its apical half, whereas the outer ventral margin is serrate over almost its entire length in *Agrilocida* and *Chalcedectus* (Fig. 75). I assigned state 3 only to *Agrilocida* and *Chalcedectus* because of this difference. Furthermore, the described states for Cleonymini are oversimplified (see Remarks for Cleonymini); based on character-state distribution I am uncertain whether the groundplan structure for the tribe was a simple metafemur (Fig. 100) or one having a subapical lobe or some other pattern of denticles ventrally (Figs 101–106). The metafemoral structures of *Boucekius* (Fig. 32) and *Chalcidiscelis* (Fig. 40) are so different from each other that they likely represent independent derivations, but either structure could be the groundplan structure for Cleonymini (*cf*. Fig. 32 with 101, and 40 with 102). Eupelmidae do not have enlarged or ventrally dentate metafemora.

47. **Structure of metatibial apex**: **0** = truncate, with base of tibial spurs exposed (Figs 100, 102, 104); **1** = portion above tibial spurs abruptly recurved into short lobe covering base of spurs (Fig. 76); **2** = portion above tibial spurs elongated into attenuated, spinelike process (Figs 78, 80).

State 0 is certainly the groundplan structure for Pteromalidae and Cleonyminae. State1 is possessed only by *Agrilocida* and most *Chalcedectus* with two tibial spurs, including those with a serrate metafemur (see preceding character). I hypothesize state 1 as an intermediate structure within a transformation series from an apically truncate metatibia to one that apically is prolonged into a spinelike process over the metatibial spurs. Eupelmidae exhibit state 0. See also Grissell (1995, character 11) and Wijesekara (1997, character 26).

48. **Number of metatibial spurs**: **0** = two (Fig. 76); **1** = one (Fig. 78); **2** = none (Fig. 80).

Heydon (1997, character 21) included the same character and coding, primarily to differentiate Trigonoderini from two outgroup taxa, Panstenoninae and Pteromalini. There is also a transformation series within *Chalcedectus* from two spurs, to one spur, to no spurs. Those species with two spurs either have state 1 or 2 of the previous character, but those with a single spur or without a spur always have state 2 of the previous character (see Remarks for *Chalcedectus*). Hedqvist (1967*a*) described *Heydenia mateui* as having a single metatibial spur. I have not seen the type material of *H. mateui* and all *Heydenia* I examined had two metatibial spurs. There might be a minute second metatibial spur in *H. mateui*, but even if Hedqvist's description is accurate the loss of one spur is certainly independently derived within the genus. Eupelmidae have two tibial spurs. See also Grissell (1995, character 14) and Wijesekara (1997, character 27).

49. **Length metatibial spurs**: **0** = 'short', both spurs only about as long as apical width of tibia (Figs 102, 299 (bottom)); **1** = 'long', at least inner spur conspicuously longer than apical width of tibia (Figs 189*b*, 299 (top)).

This character is included because it may have some value for inferring relationships within Lyciscini, but there is considerable variation in length of the metatibial spurs relative to each other, or to the apical width of the tibia, or to the length of the basitarsus. Because of this, relative length of the spurs is difficult to segregate into discrete states. The inner spur is always at least slightly longer than the outer spur and therefore is the most conspicuous spur when the spurs are lengthened. Individuals of *Striatacanthus*, *Agamerion*, and some species of *Thaumasura* (Fig. 299, top) and *Eupelmophotismus* (Fig. 189*b*), have conspicuously long metatibial spurs relative to the apical width of the tibia or length of the basitarsus. The comparatively robust spurs in *Agamerion* and some *Eupelmophotismus* is likely functionally correlated with the enlarged or robust metafemur characteristic of these two genera. I assigned state 0 for *Leptofoenus*, even though the inner spur is relatively long in some species, because the spur is short relative to the basitarsus and is not as distinctively long as in the other taxa assigned state 1.

50. **Structure of metatibia**: **0** = tubelike, sometimes abruptly widened apically but not paddle-shaped; **1** = moderately compressed with carinate margin over about dorsal half; **2** = strongly compressed and paddle-shaped apically (Fig. 226).

A tubelike metatibia is undoubtedly the groundplan state for Cleonyminae and this feature is significant only as evidence *Mesamotura* may render *Thaumasura* paraphyletic. State 2 is an autapomorphy of *Mesamotura*, but state 1 is possessed by a single species classified in *Thaumasura*, the same species with a mediolongitudinal impunctate line on the vertex (see character 8).

51. **Structure of male petiole**: **0** = in dorsal view transverse (Figs 120*a*, 328*a*) to about twice as long as wide and tubelike (Figs 114, 119), but in ventral view broadly membranous (∩-like in cross section) or at least divided along midline by suture (Fig. 329*a*) and with posterior margin not angled under Gt_1 (*cf*. state 2); **1** = in dorsal view similar to state 0, but entirely sclerotized so as to form a tube (= tubular, Figs 119, 120); **2** = in dorsal view transverse (Fig. 291*a*), but consisting of a heavily sclerotized tubelike structure (i.e., with suture along ventral midline) that is angled posteroventrally so as to be somewhat collarlike in lateral view (Fig. 291*b*), with posterior ventral margin distinctly posterior to anterior margin of Gt_1; **3** = similar in structure to state 2 except entirely sclerotized so as to form a tube (Fig. 277*b*); **4** = in dorsal view transverse (Fig. 232*a*), dorsoventrally flattened, and in ventral view heavily sclerotized, sculptured, and somewhat W-like with emarginate anterior and posterior margins, with anterolateral margin projecting into denticle, and with contiguous ventromedial margins (Fig. 232*b*); **5** = in dorsal view a conspicuous, dorsally convex sclerite with angular or outcurved, flangelike lateral margins (Figs 215, 252*a*), but in ventral view membranous along median (Fig. 252*b*); **6** = in dorsal view similar to state 4 (Fig. 328*b*), but in ventral view entirely sclerotized (Fig. 329*b*); **7** = in dorsal view a large, elongate sclerite similar in appearance to subsequent terga, but in ventral view broadly membranous, ∩-like in cross section; **8** = a slender subcylindrical tube at least four times as long as wide.

In order to properly assess petiolar structure it is necessary to dissect the metasoma from the mesosoma to examine the petiole from all angles. The states I differentiate and assign to genera are based on comparatively few dissections. Furthermore, my inference of structure was obtained without dissecting the individual terga and sterna comprising the basal segments of the metasoma. I suspect that what I sometimes interpret as part of the petiole is actually a modified, integrated portion of the first sternum. A comprehensive morphological study, including structural relationship of the petiole with the first sternum and method of articulation with both the gaster and propodeum, is required before reliable hypotheses of character-state transformation and synapomorphy can be postulated. My described states actually comprise several features, including length, shape, and whether or not the petiole is a complete tube or is at least linearly divided ventromedially. There is some correlation between length of the petiole and whether or not it forms a complete tube. A dorsally transverse petiole tends to be membranous or at least divided ventromedially, whereas an elongate petiole tends to be an entirely sclerotized tube. However, male Cleonymini have an entirely sclerotized tubular petiole (Figs 119*b*, 120*b*) regardless of whether in dorsal view it is elongate (Fig. 119*a*) or transverse (Figs 116, 120*a*). Males of *Agrilocida* also have an entirely sclerotized tubular petiole that is distinct in dorsal view, like most Cleonymini. The petiole of *Chalcedectus* is always a transverse strip in dorsal view. Dissections I made show that some species of *Chalcedectus* have the petiole broadly membranous ventrally, whereas others have a short ringlike structure along the anterior margin of the first sternum, which is narrowly separated along the ventral midline or entirely sclerotized and forming a tube. Most Pteromalinae included in the analysis have the petiole incomplete ventrally regardless of length (see Heydon 1997, character 29). The only exception is *Gastracanthus pulcherrimus*, which has a tubular petiole. Male *Heydenia* also have a variably long petiole (Fig. 140), which varies from being broadly membranous ventrally to being an entirely sclerotized tube. Males from the Oriental region exhibiting what I consider as more plesiomorphic structures within the genus (see Remarks for Heydeniini) have the petiole broadly membranous ventrally; this likely represents the groundplan state for *Heydenia*. Those male *Oodera* I dissected had the petiole almost tubular, but narrowly divided ventrally. At least females of *Doddifoenus* and both sexes of *Leptofoenus* have a very long and slender, tubular petiole (Fig. 7). The structure described as state 7 represents the petiolar structure of female *Nefoenus*. This state was not included in the character-state matrix but was defined because the unknown males of *Nefoenus* very likely have a petiolar structure much like females. Females have a comparatively long petiole that dorsally is similar in appearance to subsequent terga (Fig. 8), but broadly membranous ventrally. Bouček (1988*a*: 270) stated an elongate petiole might be evidence for a relationship between Leptofoeninae and Nefoeninae. This may be true if the petiole was first lengthened (*Nefoenus*) prior to becoming a narrowed and entirely sclerotized tube (Leptofoeninae). Although most male Lyciscini have a dorsally transverse petiole, dissections reveal their structure to be much more diverse. Male *Chadwickia* have a comparatively long (Fig. 172) though ventrally membranous petiole. The comparatively long petiole is a diagnostic feature of male *Chadwickia*, but I include the structure within state 0 because a tubelike petiole apparently has evolved independently several times. Male *Marxiana* (Fig. 215), *Parepistenia* (Fig. 252*a*) and some Old World *Proshizonotus* (Fig. 328*b*) have petioles that are dorsally conspicuous and laterally flanged with broadly outcurved or angulate sides. I described two states for the similar structures because in *Marxiana* and *Parepistenia* the petiole is membranous ventromedially (state 5, Fig. 252*b*), whereas it is entirely sclerotized (state 6, Fig. 329*b*) in those male *Proshizonotus* I dissected. More comprehensive study is required to determine whether males of some *Proshizonotus* having the petiole similar in appearance to *Marxiana* and *Parepistenia* also have it medially divided in ventral view. I also differentiated a separate state for the apparently unique petiolar structure of *Neboissia* (state 4, Fig. 232). Two additional states (2 and 3) are designated for a distinctive, collarlike petiole that projects ventrally under the base of the gaster. In *Mesamotura* and *Thaumasura* the collarlike petiole is divided mediolongitudinally by a suture (state 2, Fig. 291*b*), whereas in *Striatacanthus* it is entirely sclerotized (state 3, Fig. 277*b*). One or both of these structures likely evolved from a structure similar to that possessed by some *Proshizonotus* males. Many *Proshizonotus* males having a dorsally transverse petiole (Fig. 328*a*) have it broadly membranous ventrally, but some have a tubelike petiole that is only linearly separated along the ventral midline (Fig. 329*a*). The lateral portions of the petiole are not as heavily sclerotized as in *Mesamotura*, *Thaumasura* or *Striatacanthus*, but they are somewhat angled posteroventrally and the ventromedial margins are broadly contiguous. This structure may be an intermediate ancestral state from which states 2 and 3 evolved (*cf*. Figs 329*a*, 291*b*), but I included it as one of the diverse structures under state 0 for the present analysis. Petiolar structure has not been investigated for male Eupelmidae.

52. **Setation of female petiole**: **0** = bare; **1** = setose laterally.

Females of one undescribed species of *Zolotarewskya* have a setose petiole, but a setose petiole is otherwise shared only by Leptofoeninae and Nefoeninae among the taxa studied and is a putative synapomorphy for these two taxa.

53. **Gastral terga of female**: **0** = rounded laterally, not margined dorsolaterally; **1** = abruptly or linearly margined dorsolaterally (Figs 207, 253, 257, 385, 418).

State 0 is undoubtedly the groundplan state for Pteromalidae and all included taxa except possibly Lyciscini. Ingroup analysis suggests a laterally rounded gaster is also the groundplan structure for Lyciscini, though it is sometimes difficult to assign one or the other state to all members. For example, females of *Neboissia* (Fig. 237) and *Nepistenia* (Fig. 244) have the gaster quite abruptly angled laterally, but are assigned state 0 because the setae and sculpture extend uninterrupted from the dorsal surface onto the lateral surface. A margined gaster is characteristic of New World Lyciscini, including New World *Proshizonotus* and all New World Clade genera, but is possessed also by some Old World *Proshizonotus* and a few other Old World Lyciscini. The feature is sexually dimorphic in some Old World genera (see following character).

54. **Gastral terga of male**: **0** = rounded laterally, not margined dorsolaterally; **1** = abruptly or linearly margined dorsolaterally (Figs 209, 210, 271, 330, 403).

Polarity hypotheses and problems with assigning states within Lyciscini are as discussed above for females. *Parepistenia*, *Grooca*, *Solenura* and *Dasycleonymus* are sexually dimorphic for this feature. Males I assign to *Dasycleonymus* are the only non-Lyciscini known to have the gaster definitely margined (Fig. 123). Females of *Dasycleonymus* have a non-margined gaster and this pattern of sexual dimorphism is the same for *Solenura* (Fig. 271) and some *Grooca* (Figs 209, 210). All males of *Grooca* and *Solenura* have a margined gaster, though some *Grooca* females also have a margined gaster. The opposite pattern is exhibited by *Parepistenia*, females having a laterally margined gaster (Fig. 253) and males having a non-margined gaster.

55. **General type of gastral sculpture**: **0** = fine (transversely coriaceous to aciculate-strigose); **1** = coarse (meshlike-reticulate to punctate-reticulate).

Sculpture of the gaster is highly variable in Cleonyminae, but at least within Lyciscini there are two general patterns, ‘coarse’ and ‘fine’, as originally recognized by Bouček (1958) when he established Lyciscini and Thaumasurini. This general characterization excludes the sculpture of Gt_1 as well as Gt_2 when it is mostly or entirely concealed under Gt_1. Within Lyciscini, *Grooca* has a distinct meshlike-reticulate sculpture (Figs 205–207, 209, 210), whereas *Solenura* has more punctate-reticulate terga (Figs 270, 271). Within the Old World, a distinctly reticulate to punctate or ‘coarse’ sculpture is otherwise possessed only by some species of *Proshizonotus* (Figs 318, 324, 328*a*) and some *Riekisura* (Fig. 262), though this gastral sculpture is characteristic of New World *Proshizonotus* (Figs 322, 327, 330) and all New World Clade genera. Of the other tribes included in the analysis, all except some Cleonymini have types of sculpture designated as ‘fine’. Female *Dasycleonymus* have a punctate-strigose sculpture (Fig. 125) and females of a few species of *Cleonymus* have a distinctly punctate gaster or one with a sculpture pattern quite similar to *Grooca coorgensis* (Fig. 205). Males of *Dasycleonymus* have a punctate or distinctive punctate-scalloped sculpture (Figs 120*a*, 124) intermediate between ‘fine’ and ‘coarse’. Furthermore, some *Zolotarewskya* have a meshlike-reticulate pattern on at least some terga, though the ridges are always very fine (Fig. 128). I coded such sculpture in *Zolotarewskya* as ‘fine’, but the sculpture of *Dasycleonymus* and some *Cleonymus* females as ‘coarse’.

56. **Sculpture of Gt_1 for female**: **0** = either smooth and shiny or at most very obscurely coriaceous under some angles of light when subsequent terga obviously more coarsely sculptured, or coriaceous to strigose if subsequent terga sculptured similar to Gt_1 (Figs 162, 237); **1** = distinctly and extensively coriaceous under any angle of light when subsequent terga obviously more coarsely sculptured (Fig. 387); **2** = punctate to reticulate, the sculpture defined by raised ridges (Figs 200, 262, 322, 351).

This feature is correlated partly with the gaster being comparatively lightly or heavily sclerotized, and hence whether or not it is margined laterally. I was unable to segregate all the different and intergrading types of gastral sculpture into discrete states. The character states defined above were differentiated primarily to analyze possible transformation series for those Lyciscini with a heavily sclerotized gaster, of which only some have Gt_1 coarsely sculptured. More comprehensive analysis of gastral sculpture probably would be useful for inferring species relationships within each of the tribes. For example, *Westwoodiana* females have a transversely strigose-coriaceous Gt_1, which is similar to some species of *Thaumasura*, e.g., *T. imperialis* and *T. terebrator*. This and other types of gastral sculpture may prove useful for phylogenetic analysis at the species level, but they were included within state 0 for the purpose of the present study, even though they are quite similar to sculpture defined as state 2. Some other genera characterized by ‘fine’ gastral sculpture (see character 55) sometimes also have strongly coriaceous or other sculptural patterns on Gt_1, e.g., *A. prasinum* within *Agamerion* and a few species of *Cleonymus* and *Zolotarewskya*. These instances are also included within state 0 because the same sculpture is evident on the subsequent terga. Although states 0 and 2 are assigned for *Grooca*, all females with a distinctly margined gaster have Gt_1

distinctly sculptured; state 0 is possessed only by *G. coorgensis*, which lacks a distinctly margined gaster.

57. **Sculpture of Gt_1 for male**: **0** = either smooth and shiny or at most very obscurely coriaceous under some angles of light when subsequent terga obviously more coarsely sculptured, or coriaceous to strigose if subsequent terga sculptured similar to Gt_1; **1** = distinctly and extensively coriaceous under any angle of light when subsequent terga obviously more coarsely sculptured; **2** = punctate to reticulate, the sculpture defined by raised ridges.

Sculpture types were analyzed and coded for males with the same caveats as stated above for females. The diversity recorded for *Solenura* partly reflects what appears to be infraspecific variation in male *S. nigra*; in males, Gt_1 varies from being smooth and shiny, to slightly coriaceous, to quite distinctly reticulate. Males of other known species of *Solenura* have Gt_1 distinctly punctate-reticulate.

58. **Structure of Gt_2 for female**: **0** = extensively exposed or if obviously shortened then distinctly reticulate to punctate (Fig. 206); **1** = largely concealed, with exposed portion strongly transverse and either smooth and shiny or at most coriaceous to transversely strigose (Figs 207, 278, 324, 392, 428, 431); **2** = normally entirely concealed, with tergum visible only in lateral view as triangular sclerite (Fig. 352) (if secondarily exposed through telescoping then lateral setal/sculptured region dorsally attenuated to an angle, Fig. 353).

There is a virtual continuum in structure between Gt_2 being extensively exposed or entirely concealed under Gt_1 except for a triangular portion laterally, making division into discrete states or unambiguous assignment of states for taxa often difficult. Because the gastral terga can telescope to some degree there is the additional problem of determining what is a natural position and what represents a secondarily exposed tergum, particularly in specimens preserved by different methods (e.g., air dried *versus* critical-point dried) and in genera represented by very few specimens (e.g., see Remarks for *Paralycisca*). A Gt_2 that normally is concealed, or almost so, never has coarse sculpture. I tried to use this difference to help differentiate the states, even though sculpture of Gt_2 is obviously a different character. I had particular problems assigning a state for many New World Lyciscini and most Cleonymini. Females of *Dasycleonymus bakeri* have Gt_2 smooth and only sublinearly exposed (Fig. 125). Although Gt_2 is also short in male *D. bakeri*, it is distinctly sculptured (Fig. 120*a*). For these reasons I assigned state 1 for females and state 0 for males of *Dasycleonymus*. I assigned both states 0 and 1 for all other genera of Cleonymini because it is difficult to decide whether a comparatively short Gt_2 results from being partly concealed under Gt_1 or is simply short (Fig. 121) in most genera. A Gt_2 that normally is entirely concealed in dorsal view is characteristic only of female *Epistenia* (Fig. 352) and *Protoepistenia* (Figs 408, 409) within New World Lyciscini. I also assigned state 2 for some *Solenura* females because Gt_2 can be entirely concealed under Gt_1 medially (Fig. 270), though the structure is different from those New World taxa assigned state 2. In *Solenura*, the gaster is not margined laterally and Gt_2 is slightly emarginate. I assigned either state 0 or 1 for females of other Old World Lyciscini, though both sexes of *Neboissia* (Fig. 237), females of some species of *Grooca* (Fig. 207), and at least females of a very few species of *Proshizonotus* (Fig. 324) have Gt_2

only very narrowly exposed dorsally. The structure in *Chalcidiscelis* is autapomorphic for the taxa included in the analysis because both Gt_2 and Gt_3 are partly to entirely concealed under Gt_1 (Fig. 41), though some *Chalcedectus* also have Gt_2 and Gt_3 strongly reduced in length (Grissell 1991, fig. 9). The structure in *Chalcidiscelis* is at least superficially most similar to that of female *Solenura* because Gt_2 and Gt_3 are medially emarginate in both taxa (Figs 41, 270).

59. **Structure of Gt_2 for male**: **0** = extensively exposed and with distinct sculpture; **1** = largely concealed, with exposed portion strongly transverse and smooth and shiny without sculpture (Figs 210, 393); **2** = normally entirely concealed, with tergum visible only in lateral view as triangular sclerite (Figs 209, 271, 403, 447) (if secondarily exposed through telescoping then lateral setal/sculptured region dorsally attenuated to an angle).

The same difficulties apply for males in differentiating and assigning states of this character as discussed above for females. Within New World Lyciscini, an exposed or concealed Gt_2 is sexually dimorphic within *Urolycisca* (*cf*. Figs 446, 447), *Proglochin* (*cf*. Figs 400, 402), and at least *S. scutata* within *Scaphepistenia*. Females of these taxa have Gt_2 exposed for varying lengths, but males have G_2 concealed or have only the posterior margin exposed as a sublinear strip. An exposed Gt_2 is undoubtedly the groundplan structure for both sexes of Cleonyminae and Lyciscini. Sexual dimorphism may indicate the exposed Gt_2 in *Urolycisca* and *Proglochin* females results from secondary reversal, or that these two taxa shared a common ancestor with *Epistenia* and *Protoepistenia* prior to Gt_2 being concealed in females of these last two genera. Sexual dimorphism also occurs within *Grooca* and *Solenura* in Old World Lyciscini. All male *Solenura* have Gt_2 concealed (Fig. 271), though structure is quite variable in male *Grooca*. Unlike females, males of some species of *Grooca* have Gt_2 entirely concealed (Fig. 209), whereas others have Gt_2 linearly exposed (Fig. 210) and yet others have Gt_2 extensively exposed and sculptured.

60. **Structure of Gt_7 and Gt_8 for female**: **0** = two sclerites separated by membrane (Figs 25, 34); **1** = one sclerite divided into presumptive Gt_7 and Gt_8 by carinate furrow extending entirely across tergum anterior to cerci (Figs 49, 238, 255, 331); **2** = one incompletely subdivided sclerite, the furrow at least narrowly separated medially (Figs 206, 208, 295) and sometimes evident only lateral and anterior to each cercus (Figs 82, 122, 294, 355).

Whether all the taxa assigned state 0 actually do have Gt_7 and Gt_8 as separate sclerites should be accepted with caution because this hypothesis is based on a light colored line dorsally between the terga in dried specimens, which I interpret as membrane. Specimens were too rare to dissect in order to ascertain exact structure. Furthermore, there are various degrees of fusion and reduction of the suture toward complete loss. For example, I assigned state 0 to *Zeala* because in some females there appears to be a continuous hyaline line anterior to the cerci between the presumptive Gt_7 and Gt_8, with the posterior margin of Gt_7 overlying the base of Gt_8 (Fig. 25). Females of *Hetreulophus* apparently have $Gt_7 + Gt_8$ fused, but the cerci are in comparatively deep lateral depressions, the anterior margins of which form a continuous ridge across the tergum. Female *Agrilocida* also have a very deep suture separating what appears to be a fused Gt_7 and Gt_8 (Fig. 49). I assigned state 1 for both *Hetreulophus* and *Agrilocida*, but there is little difference between these structures and the structure of *Zeala*. It is possible that Gt_7 and Gt_8 are also fused in *Zeala* and the apparent line of separation is simply a very deep, non-melanized suture. Furthermore, it is often difficult to determine whether a suture extends entirely across the tergum or is narrowly separated medially (e.g., Figs 206, 295). I interpret a distinct suture entirely across the syntergum (state 1) as the line of fusion between Gt_7 and Gt_8, which in some genera has secondarily been partially to entirely lost (state 2). All or almost all female *Proshizonotus* have a complete suture and I hypothesize this as the groundplan structure for the genus. Character-state distribution of a separate Gt_7 and Gt_8 in Pteromalidae and Chalcidoidea is uncertain. Gibson (1989, character 15) recorded this structure for *Eusandalum* Ratzeburg (Calosotinae) and *Metapelma* (Neanastatinae) in Eupelmidae. Grissell (1995) recorded an “articulated” Gt_8 in Agaonidae (*sensu stricto*) and Torymidae, as well as in Sycophaginae, *Ecthrodape* Burks and *Chromeurytoma* Cameron (all of uncertain relationships and familial classification, see Grissell 1995). Bouček (1988*a*, fig. 429) had previously documented a very long and slender, separate Gt_8 in *Doddifoenus*. Wijesekara (1997, character 34) analyzed structure of the syntergum in Chalcididae; his states 1 and 2 appear to be subsets of the structure I describe as state 1.

61. **Structure of cerci for female**: **0** = exserted digitlike structures (Figs 26, 42, 49, 463); **1** = low tubercle or platelike structures (Figs 82, 122, 294).

Grissell (1995) recorded distribution of exserted cerci in female Torymidae, in some Agaonidae *sensu lato*, some Pteromalidae, and in *Archaeopelma*, which Gibson (1989) hypothesized as the basalmost clade of Calosotinae. Exact distribution of digitlike cerci among Pteromalidae remains unknown and the two described states are sometimes difficult to assign unambiguously to taxa. I assigned state 0 to all included Pteromalinae, though the cerci are comparatively short and tuberclelike in Pteromalini. I also coded *Callimomoides*, *Macromesus* and Hetreulophini as having digitlike cerci because they project into an apically angulate lobe, though they are comparatively short. Because of sporadic occurrence, Grissell (1995) postulated digitlike cerci were prone to evolve independently and interpreted them as a synapomorphy for Torymidae. I interpret digitlike cerci as more likely plesiomorphic relative to platelike cerci, and thus common occurrence in *Boucekius* and *Chalcidiscelis* as symplesiomorphic rather than as synapomorphic. Consequently, I interpret digitlike cerci as possibly the groundplan state of Cleonyminae, but not of Lyciscini. Within Eupelmidae, only *Archaeopelma* is known to have distinctly digitlike cerci.

RESULTS. Morphological data sets were analyzed by maximum parsimony using PAUP* 4.0b10 (Swofford 2001). Order of taxa entered in PAUP was the same as given in Appendix III, except as discussed below. All analyses used the heuristic search algorithm with random stepwise addition, holding one tree at each step, Tree-Bisection-Reconnection (TBR) branch swapping, MULPARS, and with all characters unordered and unweighted. PAUP provides two options for analyzing taxa coded with multistates, ‘uncertainty’ and ‘polymorphism’. The uncertainty option selects the variable state that minimizes tree length, whereas the polymorphic option derives all but one of the states in a polymorphic taxon from a monomorphic ancestral taxon in the most parsimonious way possible. The uncertainty option retrieves the shortest tree and therefore was generally accepted over results indicated by the parsimony option, but both options were used for all analyses in order to investigate differences resulting from the two methods. Successive weighting was applied according to the rescaled consistency index. Analyses were conducted with 100 random replications. Two characters (8, 50) included for purposes of character-state analysis are parsimony uninformative, resulting in 59 informative characters for 57 taxonomic units using the complete data set (Appendix III). Transformation of the character states across resulting trees was examined using MacClade (Maddison and Maddison 1992).

PAUP does not use character states of the designated outgroup(s) to polarize characters, only to root the resulting most parsimonious tree(s). Consequently, designation of the outgroup or outgroups does not affect the overall length of the most parsimonious trees, but does affect topology. PAUP uses the first-entered outgroup taxon to root the tree when more than one outgroup taxon is included; consequently, order of entry of multiple outgroup taxa can affect apparent topology significantly. I initially designated only Lyciscini + Chalcedectini + Cleonymini as the ingroup because only these three taxa are indicated as minimally monophyletic based on one putative autapomorphy, an extensively setose humeral plate (36:1). Under this restriction, PAUP uses *Dinotiscus* to root the tree because it is the first entered outgroup taxon (Appendix III). The same topology is achieved if only Pteromalinae is designated as the outgroup and all the other taxa are included in the ingroup. I therefore used Pteromalinae as the only designated outgroup for all analyses discussed below, with the outgroup enforced as monophyletic as one of the options. The character states listed in Appendix III are the result of an initial examination of structure and coding prior to any parsimony analyses, plus several rounds of reexamination and coding following different PAUP iterations, examining how interpretation of various characters affected results. Consequently, character-state interpretation and coding cannot be said to be hypothesis-independent, but I believe the final treatment of structure (see Character-state Analysis and Appendix III) is more accurate because of the process and parsimony analysis.

Higher-level Relationships. In addition to analyzing monophyly and relationships of the genera and tribes of Cleonyminae, I was interested also in testing the hypothesis that the New World Clade of Lyciscini represent a monophyletic group of genera most closely related to NW *Proshizonotus* (i.e., all New World *Proshizonotus* species excluding *P*. n. sp. #1). Consequently, I initially analyzed two data sets: the complete data set (Appendix III), which included NW *Proshizonotus* as a taxonomic unit, and the data set excluding NW *Proshizonotus*. For the latter data set, NW *Proshizonotus* was deleted and the character-state matrix for *Proshizonotus* changed to include the two unique states of NW *Proshizonotus* (10:1, 28:1) in order to accurately reflect character-state distribution in the genus. Figure 1*a* illustrates the strict consensus tree of 2,072 equally most parsimonious trees when NW *Proshizonotus* is subsumed within *Proshizonotus* for the analysis (length = 235 using uncertainty option, 432 using polymorphism option; CI = 0.4145, RI = 0.7370). When NW *Proshizonotus* was treated as a separate taxonomic unit for the analysis, results included both a longer tree (length = 240 using uncertainty option, 438 using polymorphism option; CI = 0.4076, RI = 0.7335) and many more (11,192) equally most parsimonious trees, but had no affect on retrieved higher-level relationships as illustrated in Fig. 1*a*. When NW *Proshizonotus* was treated as a separate taxonomic unit, the only difference from Fig. 1*a* is that Lyciscini, excluding *Chadwickia* + (*Agamerion* + *Eupelmophotismus*), is retrieved as an unresolved polychotomy including NW *Proshizonotus* rather than being resolved into two clades. Figure 1*b* illustrates strict consensus relationships retrieved after successive weighting using the uncertainty option when NW *Proshizonotus* is subsumed within *Proshizonotus* for the analysis. Figure 1*c* illustrates strict consensus relationships of genera within Lyciscini after successive weighting when NW *Proshizonotus* is treated as a separate taxon; other relationships are the same as is illustrated in Fig. 1*b*. When NW *Proshizonotus* is treated as a separate taxon, the New World Clade of Lyciscini is neither retrieved as a monophyletic clade nor indicated to be most closely related to NW *Proshizonotus* prior to or after successive weighting (Fig. 1 *c*). When NW *Proshizonotus* is subsumed within *Proshizonotus*, the New World Clade of Lyciscini is indicated to form a monophyletic clade with *Grooca* + *Solenura* prior to successive weighting (Fig. 1*a*), and is indicated to be the monophyletic sister group of *Grooca* + *Solenura* after successive weighting (Fig. 1*b*) (see Biogeography of Lyciscini for further discussion).

Whether NW *Proshizonotus* is treated as a separate taxonomic unit or not, the analysis results in little resolution of Cleonyminae *sensu* Bouček (1988*a*) prior to successive weighting (compare Fig. 1*a* with Fig. 1*b*). Lack of higher-level resolution results from the absence of multiple congruent features to support monophyly or relationships of the tribes. For example, monophyly of Lyciscini is not supported by any unique feature possessed by all members. Presence of a pronotal median line (18:2) may indicate monophyly, but the line is absent from *Chadwickia*. A similar line on the pronotum is also possessed by some *Chalcedectus* (18:1), though I interpreted this line as non-homologous with the pronotal median line of Lyciscini for the analysis. If state 0 is changed to state 2 for *Chadwickia*, this is sufficient to retrieve Lyciscini as a monophyletic group prior to successive weighting. Chalcedectini is supported as a monophyletic tribe by propodeal structure (32:1) as well as by two variable features, a serrate metafemur (46:3) and structure of the metatibial apex (47:1). Cleonymini is not supported as monophyletic by any feature because females of *Agrilocida* have a slightly angulate preclaval segment (15:1) and obsolete notauli (19:2) similar to some or all Cleonymini. Monophyly of Chalcedectini + Cleonymini is supported by one putative autapomorphy, complete absence of any sort of spine or spicule on the dorsoapical margin of the protibia (40:1). Monophyly of Lyciscini + (Chalcedectini + Cleonymini) is also supported by one putative autapomorphy, an extensively setose humeral plate (36:1). These indicated relationships are not retrieved prior to successive weighting because homoplasy results in other equally most parsimonious minimum length trees, but are retrieved after successive weighting (Fig. 1*b*). Much of the homoplasy occurs within the diverse tribe Lyciscini. If Lyciscini is removed from the analysis, tree length is reduced to 136 and only 8 equally most parsimonious trees are retained prior to successive weighting (CI = 0.4836, RI = 0.7083). The strict consensus tree of these eight trees shows the same relationships as retrieved after successive weighting using the complete data set (Fig. 1*b*) except for the absence of Lyciscini. Examination of the eight individual trees shows differences only within the internal relationships of Pteromalinae and Cleonymini, and whether *Boucekius* + *Chalcidiscelis* is part of a trichotomy as illustrated in Fig. 1*b* or is retrieved as the sister group of Chalcedectini + Cleonymini.

Callimomoides + (*Hetreulophus* + *Zeala*) was not indicated as the sister-group of Chalcedectini + Cleonymini in any of the eight equally most parsimonious trees.

The results obtained, including or excluding Lyciscini, do not support the monophyly of Cleonyminae *sensu* Bouček (1988*a*) because *Callimomoides* + (*Hetreulophus* + *Zeala*) are indicated to be more closely related to Lyciscini + (Chalcedectini + Cleonymini) than are *Oodera* and *Heydenia* (Fig. 1*b*). Monophyly of Cleonyminae under the pattern of relationships illustrated in Fig. 1*b* could be obtained by classifying Louriciinae and Hetreulophini within Cleonyminae. However, this new group would not be supported as monophyletic by any putative autapomorphies possessed by all members. Possession of widely spaced toruli (1:1) supports monophyly of the group (Cleonyminae *sensu* Bouček 1988*a* + Louriciinae + Hetreulophini) if Boucekiini is excluded, but is not compelling evidence because widely spaced toruli are also diagnostic of Eupelmidae. Distinctly divergent eyes (5:0) would support monophyly of the group if Hetreulophini is excluded, and supports monophyly of Cleonyminae *sensu* Bouček 1988*a* if my interpretation of structure is incorrect for *Callimomoides*. However, Eupelmidae definitely possess distinctly divergent eyes; hence, once again monophyly of Cleonyminae is supported only because of the taxa included in the analysis. Furthermore, the eyes are comparatively inconspicuously divergent in females of *Boucekius* (Fig. 27) and *Chalcidiscelis* (Fig. 35) relative to other Cleonyminae *sensu* Bouček (1988*a*). The eye structure characteristic of *Boucekius* and *Chalcidiscelis* could be the groundplan structure for Pteromalidae, from which the other two structures evolved. *Chalcidiscelis* and/or *Boucekius* also display several other unusual features for Cleonyminae, but which may represent groundplan features of the subfamily, Pteromalidae, and perhaps Chalcidoidea in general. *Chalcidiscelis* and *Boucekius* both have closely approximated toruli (1:0) and a differentiated frenum (22:0), and female *Boucekius* have the toruli comparatively high on the face (2:0), an independent Gt_7 and Gt_8 (60:0), and a very broadly attached and essentially undifferentiated propodeum (last feature not segregated into states in character-state analysis because of complexity). Based on intuitive concepts, I suspect *Boucekius* may represent a very basal clade within Pteromalidae. Figure 1*d* illustrates the same relationships as illustrated in Fig. 1*b* if *Boucekius* rather than Pteromalinae is used to root the tree (generic relationships collapsed). Under this topology, Cleonyminae *sensu* Bouček (1988*a*) cannot be made monophyletic because *Heydenia* and *Oodera* are indicated to be more closely related to various outgroup taxa than they are to other Cleonyminae. Monophyly of Cleonyminae can only be achieved if this subfamily is restricted to Lyciscini + Chalcedectini + Cleonymini, defined on the presence of an extensively setose humeral plate (36:1; Figs 17, 18, 19). Although such a definition may well delimit a monophyletic group, setal pattern of the humeral plate remains unknown for most pteromalids and other chalcids. A more thorough knowledge of character-state distribution is required prior to confident hypotheses of polarity and of relationships based on this feature.

Within the character-state analysis, assignment of character states were ambiguous for at least some taxa for several characters. Altering the coding to reflect an alternative interpretation of structure in different PAUP iterations sometimes only affected length of the most parsimonious trees, whereas other times it affected topology. For example, coding of degree of torular separation (character 1) and relative height of the toruli (character 2) are both ambiguous for *Macromesus* because the structures are intermediate between the two extremes coded and because of sexual dimorphism in at least *M. americanus*. If coding is changed to 1:1 and 2:1 for *Macromesus*, tree length is increased by only 1 step (236) from the initial analysis, but further collapses *Macromesus* and *Heydenia* into the unresolved polychotomy. Indicated relationships among the taxa after successive weighting remain the same as in Fig. 1*b*, except *Macromesus* is retrieved as the clade subsequent to *Nefoenus* + Leptofoeninae rather than the clade preceding this sister-group relationship.

Although the present analysis failed to unambiguously resolve relationships (Fig. 1*a*), monophyly of Cleonyminae *sensu* Bouček (1988*a*) does not appear to be supported, even with exclusion of Eupelmidae from the analysis. Any support for monophyly would be further weakened by including Eupelmidae, which among other features possess strongly divergent eyes (5:0), a single anellus (11:0) and widely separated toruli (1:1) that are below the lower margin of the eyes (2:1). For the present, I include *Boucekius* and *Chalcidiscelis* within Cleonyminae as the new tribe Boucekiini. This action least affects existing classification and stability. I do not make other changes to higher classification based on the results of the present analysis because these are so tenuous. A much more comprehensive analysis is required prior to confident appraisal of monophyly, relationships and classification of Cleonyminae. Such an analysis should include representatives of all 31 recognized subfamilies of Pteromalidae as well as representatives of the three subfamilies of Eupelmidae and of other chalcid families. Uncertainties concerning the true distribution of some character states and the evolution of some structures (e.g., homology of a frenum *versus* a scutellar marginal rim) also require clarification prior to accurate assessment of character-state evolution. The information included in my character-state analysis and character matrix (Appendix III) should have value for future studies in Pteromalidae and Chalcidoidea. The patterns of relationships recovered (Figs 1*a*–1*d*) are also valuable in that they establish hypotheses that can be tested in the future. However, I do not consider these patterns to be sufficiently supported for proposing any new higher-level classification. Further discussion of tribal or generic relationships based on maximum parsimony or intuitive analyses is included under ‘Remarks’ for the respective taxa. Lyciscini is the only generically diverse tribe and exhibits interesting biogeographic and character-state distributions, which are discussed below.

Biogeography of Lyciscini. Parsimony analysis was largely insufficient to resolve generic relationships within Lyciscini (Figs 1*a*–1*c*). Two factors likely are major reasons for the lack of resolution within Lyciscini, before or after successive weighting, regardless of whether NW *Proshizonotus* is treated within *Proshizonotus* (Fig. 1*b*) or as a separate taxonomic unit (Fig. 1*c*). First, *Proshizonotus* very likely is paraphyletic to some, if not most, other genera recognized in Lyciscini. This intuitive assumption is based partly on the relatively large number of polymorphisms recorded for the genus (Appendix III). I interpret this character-state distribution as evidence of the evolution of features and species-groups within *Proshizonotus*, which may be ancestral to morphologically more derived assemblages classified as separate genera. In particular, resolution of relationships among Old World genera of Lyciscini is likely not possible because Old World *Proshizonotus* probably is paraphyletic relative to at least some other taxa classified as genera. If so, it will be necessary to resolve species-group relationships within *Proshizonotus* prior to resolution of generic validity and relationships within Lyciscini. A second factor contributing to the lack of resolution is that New World Clade genera are differentiated from each other primarily by several features that intergrade and thus are difficult to divide into discrete states. The features also occur in different combinations among the genera recognized and are not necessarily exhibited by all species classified in any one genus. As such, most of the New World Clade genera likely represent grades of structure or at least nested paraphyletic taxa rather than monophyletic taxa. Because of this, I am unsatisfied with the generic classification proposed. The alternative is to recognize only a single genus of Lyciscini in the New World, which would still likely render *Proshizonotus* paraphyletic and would comprise a morphologically highly diverse and speciose group. For this reason I opted for a generic concept comprising quite narrow limits. Some of the characters by which the genera are differentiated, such as sculpture and structure of the scrobal depression and propodeum, intergrade. Because of complexity in delineating or assigning discrete states these were not included in the character-state analysis. Future collecting and taxonomic revisions are necessary to more accurately document patterns of character-state distribution prior to delimiting discrete genera or their relationships to one another.

As discussed above, the New World Clade of genera is not retrieved as a monophyletic group if NW *Proshizonotus* is treated as a separate taxonomic unit (Fig. 1*c*). The New World Clade is retrieved as a monophyletic group along with *Grooca* + *Solenura* if NW *Proshizonotus* is subsumed within *Proshizonotus* (Figs 1*a*, 1*b*). This relationship does not concur with my intuitive concepts of the evolution of the New World Clade. When NW *Proshizonotus* is treated as a part of *Proshizonotus*, *Grooca* + *Solenura* likely are retrieved with the New World Clade because of similar structures of the interantennal region and male gaster among some, but not all members of the two groups. *Solenura* and almost all *Grooca* share an interantennal region that dorsally is expanded into a convex (Fig. 196), angulate (Fig. 265) or truncate (Fig. 204) lobe (59:2). A similar lobe is also developed in members of some New World Clade genera (Figs 344, 356, 396, 433). Because only some members of any New World Clade genus have this derived structure, I interpret the similarity as convergent to that of *Grooca* and *Solenura*. All male *Solenura* and some male *Grooca* also share a dorsally concealed Gt_2 with some New World Clade males (59:2; *cf*. Figs 209, 271 with 403, 447). Because the gaster is also laterally margined in all male *Grooca* and *Solenura* (54:1), gastral structure is also very similar to that of New World Clade males. However, *Grooca* + *Solenura* do not share any unique features with all New World Clade genera. My intuitive concept of relationships suggests the New World Clade was derived from *Proshizonotus*. *Proshizonotus* is the only genus present in both the Australasian region and the New World. I recognize at least 21 morphospecies of *Proshizonotus* in the New World, consisting *P*. n. sp. #1 and 20 other species that appear to comprise a morphologically cohesive group of species. Morphologically, these 20 species are much less diverse than Old World *Proshizonotus*. The 20 species, which I refer to as 'New World (NW) *Proshizonotus*', share the following features: eyes setose (6:1), scutellum without obvious axillula (25:0), dorsellum setose in both sexes (26:1, 27:1), upper mesepimeron setose (29:1), metapleuron entirely setose and punctured (31:0), profemur slender (39:0), metacoxa of both sexes lacking dorsal carina (44:0, 45:0), and gaster of both sexes abruptly margined (53:1, 54:1) and coarsely sculptured (55:1), including Gt_1

(56:2, 57:2), and with Gt_2 exposed (58:0, 59:0). Of these features, some are shared with all members of the New World Clade (25:0, 29:1, 31:0, 45:0, 53:1, 54:1, 55:1), whereas others are shared with only some New World Clade members (6:1, 39:0, 44:0, 56:2, 57:2, 58:2, 59:2). One feature (26:1, 27:1) is absent from all New World Clade members except for females of a single species of *Hadroepistenia*. Perhaps more significantly, some NW *Proshizonotus* possess a distinctly lunate (Figs 308, 315) or pedunculate prepectus (Fig. 316). I interpret a lunate prepectus as an intermediate stage within a transformation series from a triangular prepectus (Figs 312–314) to a pedunculate prepectus. A pedunculate prepectus (28:1) is shared by all New World Clade members and a few NW *Proshizonotus*. Further, some NW *Proshizonotus* possess a genal flange (10:1; Fig. 308), which otherwise is possessed only by members of some New World Clade genera. I interpret the character-state distribution discussed above as evidence the New World Clade of genera had a common ancestor with all or part of NW *Proshizonotus*. If so, then the taxon distribution indicates one of two biogeographic scenarios. *Proshizonotus* may have been present in South America and Australia prior to separation of the two land masses with opening of the Bass Strait, approximately 30–60 million years ago. Alternatively, *Proshizonotus* may have dispersed to South America from Australia by long distance dispersal subsequent to separation. If long distance dispersal explains distribution of *Proshizonotus*, then there must have been at least two independent dispersals into South America (*P*. n. sp. #1 and the common ancestor of NW *Proshizonotus*). If present in South America prior to separation of the land masses, then *Proshizonotus* likely was present in Australasia at least 90 million years ago. This hypothesis is based on presence of several species of *Proshizonotus* in New Zealand, which separated from Australia about 90 mybp. *Proshizonotus* is the only genus of Lyciscini known from New Zealand. This unique presence might also indicate all genera recognized in Australia diversified from *Proshizonotus* after separation of New Zealand, i.e., within the last 90 million years. Because New World *Proshizonotus* is morphologically much less diverse than Old World *Proshizonotus*, I suspect one species group entered South America, either prior to or subsequent of separation from Australia + New Zealand, rather than *Proshizonotus* originating in the New World and entering and subsequently diversifying in Australia + New Zealand. If so, the genera recognized as the New World Clade must have diversified from *Proshizonotus* within a maximum of 30–60 million years, subsequent to opening of the Bass Strait. This lesser time for morphological divergence may explain why the New World Clade genera do not seem to be as discrete as most genera recognized in the Old World. Absence of *Proshizonotus* from Africa indicates the genus likely was not present in South America + Africa more than 110 mybp, prior to opening of the mid-Atlantic channel, unless the common ancestor was present, from which *Proshizonotus* and *Grooca* + *Solenura* were both derived. Regardless of the biogeographic scenario, I interpret character-state distribution to indicate the New World Clade of genera and NW *Proshizonotus* share a common ancestor. Possession of a pedunculate prepectus by some NW *Proshizonotus* likely indicates this group is paraphyletic relative to the New World Clade. Furthermore, because some members of both the New World Clade of genera and NW *Proshizonotus* have a genal flange, the New World Clade may not be monophyletic. It is possible that a pedunculate prepectus was derived in the common ancestor, but those New World Clade members with a genal flange were derived from a different lineage of

NW *Proshizonotus* than those without a flange. This hypothesis requires secondary loss of the dorsellar setae independently from the two clades. A monophyletic origin of the New World Clade of genera either requires independent gain of a genal flange in NW *Proshizonotus* and some New World Clade members or secondary loss of the genal flange from some members. In summary, my biogeographic and classificatory concepts involving *Proshizonotus* are as follows: in the New World, some members of NW *Proshizonotus* evolved a pedunculate prepectus and one or more lineages of this group secondarily lost their dorsellar setae and diversified into the taxa here recognized as the New World Clade of Lyciscini, whereas in the Old World, *Proshizonotus* is hypothesized to have diversified morphologically, with some of the more distinctively modified lineages here recognized as separate genera. Consequently, I suspect both the New World Clade of genera and several Old World genera render *Proshizonotus* paraphyletic.

Possible relationships of *Grooca* + *Solenura* within Lyciscini and why these genera comprise the only two genera in the Afrotropical and Oriental regions are uncertain (see Diversity for *Proshizonotus* for unconfirmed record from Sri Lanka). For the reasons discussed above I do not believe *Grooca* + *Solenura* represent the sister-group of the New World Clade of genera. *Chadwickia* + (*Agamerion* + *Eupelmophotismus*) may represent basal groups of Lyciscini (Fig. 1*a*) based on common possession of a bare upper mesepimeron (29:0). Some or all members of most outgroup taxa have a bare upper mesepimeron, but otherwise this feature is possessed only by some Old World *Proshizonotus* within Lyciscini. This character-state distribution either indicates *Chadwickia*, *Agamerion* and *Eupelmophotismus* are basal clades of Lyciscini or that they are most closely related to some species group of *Proshizonotus*. The former pattern of relationships would support absence of a pronotal median line as a uniquely retained groundplan feature of *Chadwickia* (18:0). The former pattern might also indicate the enlarged metafemur of *Agamerion* represents a retained groundplan rather than a secondarily derived feature within Lyciscini. Some sort of enlarged metafemur with a ventral process or processes are possessed by Boucekiini (Figs 32, 40) and Chalcedectini (Figs 75, 77, 79), and may be a groundplan feature of Cleonymini (Figs 101–106). Consequently, an enlarged or ventrally denticulate metafemur may be a primitive rather than a derived feature within Cleonyminae and Lyciscini. If so, the enlarged metafemur of most *Agamerion* (Figs 165, 166) may have been inherited from a common ancestor that had a metafemoral structure much like the hypothesized groundplan structure for Chalcedectini (Fig. 75).

Although some morphological features may support a *Chadwickia* + (*Agamerion* + *Eupelmophotismus*) basal relationship within Lyciscini, my intuitive analysis suggests a *Grooca* + *Solenura* basal relationship is equally possible. Scutellar structure of *Grooca* (Figs 199, 203) and *Solenura* (Figs 266, 267) is very similar to that of *Chalcidiscelis* (Figs 37–39) except for the absence of a frenal line across the scutellum. Absence of a scutellar marginal rim from *Grooca* + *Solenura* (23:0) may represent a uniquely retained symplesiomorphy prior to evolution of a marginal rim in other Lyciscini. However, a Lyciscini + (Chalcedectini + Cleonymini) sister-group relationship does not support such an hypothesis of character evolution. Individuals of *Agrilocida* have a down-curved scutellar margin rim (Fig. 46) and Cleonymini either have a similar structure (Fig. 117) or an even more distinctly differentiated marginal rim entirely around the scutellum (Fig. 112) similar to most Lyciscini. Consequently, one of the two latter structures probably is the groundplan structure for Lyciscini, unless Lyciscini is paraphyletic relative to Chalcedectini and Cleonymini. Gastral structure is another feature that is at least superficially similar between *Solenura* and *Chalcidiscelis*. Females of both genera have Gt_2 and Gt_3 medially emarginate; both terga are largely or entirely concealed medially under Gt_1 in *Chalcidiscelis* (Fig. 41), whereas only Gt_2 is largely or entirely concealed medially in *Solenura* (Fig. 270). Females of some *Grooca* species (e.g., *G. coorgensis*) have broadly emarginate terga with Gt_2 more obviously exposed (Fig. 205), but these structures could comprise a transformation series. Both sexes of *Grooca* and *Solenura* also uniquely exhibit a 3-segmented clava (12:0, 13:0) within Lyciscini. This claval structure supports a basal position for the genera in Lyciscini if the structure is a uniquely retained symplesiomorphy within the tribe. Alternatively, a 3-segmented clava may represent a reversal, and therefore a synapomorphy for the two genera. *Grooca* + *Solenura* also share comparatively obscure notauli (19:1) and almost all share a posteriorly setose lower mesepimeron (30:1) with Cleonymini, which may indicate a common ancestor. One or both genera are morphologically diverse relative to presence or absence of dorsellar setae (characters 26, 27), degree of setation of the propodeum (character 33), and structure and sculpture pattern of the gaster (characters 53, 56–59). *Grooca* is likely paraphyletic relative to *Solenura* (see Remarks for respective genera) and with inclusion of *G. coorgensis* may not be monophyletic relative to other genera. If *Grooca* + *Solenura* do represent basal lineages of Lyciscini, then it is possible the common ancestor of the tribe was present in Gondwana prior to separation of Africa + South America from Australia + New Zealand + Antarctica with the opening of the Mozambique channel, approximately 140 million years ago. For additional discussion of possible relationships among the genera of Lyciscini based on intuitive concepts, see 'Remarks' for respective genera.

CLEONYMINAE: SYSTEMATICS

Key to Tribes of Cleonyminae

1 Notauli sulcate and closely approximated posteriorly so as to be V-like (Fig. 450); axillae strongly advanced and with posterior half abruptly much more finely reticulate-coriaceous than anterior half (Figs 450, 454); profemur greatly enlarged and with ventrally projected spicules and longer, obliquely projected spinelike setae (Figs 457, 458) . . . . **OODERINI** (p. 250)

– Notauli either obsolete (Fig. 135) or conspicuously separated posteriorly (Fig. 133); axillae less distinctly advanced (e.g., Figs 59–65), variable in sculpture but not as described above; profemur variable in structure, but if enlarged (Figs 145, 236) then without system of ventral spines and oblique spinelike setae as described above **2**

2(1) *Female only known*: scutellum with posterior third bare and set off by frenal line (Figs 31, 38, 39); head with distance between toruli about equal to width of torulus (Figs 27, 35); metafemur toothed ventrally, either with 1 subapical rounded lobe (Fig. 32) or with several distinct teeth (Fig. 40); clava and preclaval segment simple and clava at most with small, apical, micropilose sensory region . . . . **BOUCEKIINI** (p. 61)

– *Both sexes*: scutellum uniformly setose to posterior margin or reflexed marginal rim; head with distance between toruli usually conspicuously greater than width of torulus; metafemur often not toothed ventrally, but if so then female clava and/or preclaval segment with fingerlike or spinelike process or clava with a large, collapsing micropilose sensory region **3**

3(2) Forewing with variably large and distinct brownish region around stigmal vein, often with tuft of black setae at apex of submarginal vein and/or at base of parastigma (Fig. 150), and either basal cell largely or entirely bare (Fig. 150) or with large speculum between basal setal line and discal setae (Fig. 149); prepectus long ventrally, in lateral view its posterior margin about in line with apex of procoxa (Figs 136, 138); scutellum evenly curved down to dorsellum without reflexed marginal rim (Figs 140–142) . . . . **HEYDENIINI** (p. 97)

– Forewing often hyaline, but if partly infuscate then either without setal tufts or at least with setal tuft on disc separated from parastigma, and usually wing almost or entirely setose; prepectus usually short ventrally, in lateral view its posterior margin usually near base or middle of procoxa; scutellum often with reflexed marginal rim **4**

4(3) *Both sexes*: mesoscutum evenly sculptured posteriorly (notauli at most distinct anteriorly) (Figs 107, 109, 111, 113); face without deep and distinct scrobal depression (Figs 83–86), except very rarely (Figs 87–90). *Female*: preclaval segment of flagellum with apical margin usually projecting into fingerlike (Figs 91, 92) or spinelike (Figs 93, 94) process along side of clava (rarely apical margin only inconspicuously angulate); syntergum evenly convex, without suture dorsally between cerci (Fig. 122) . . . . **CLEONYMINI** (p. 77)

– *Both sexes*: mesoscutum with notauli complete to posterior margin (sometimes very shallow posteriorly or only evident as line of subeffaced sculpture) and/or face with deep scrobal depression delineating ∧-like interantennal region. *Female*: preclaval segment of flagellum either unmodified or syntergum with suture across tergum anterior to cerci (e.g., Figs 49, 238) **5**

5(4) *Both sexes*: metafemur conspicuously enlarged and ventral margin either uniformly serrate (Fig. 75) or with several long teeth (Fig. 79); metatibia either without tibial spurs and ventroapical angle elongated into spine (Fig. 80) or, usually, with spurs originating from within more or less abruptly reflexed ventroapical projection (Figs 76, 78); pronotum only rarely with shiny median line. *Female*: clava with spinelike process (Figs 44, 57, 58) . . . . **CHALCEDECTINI** (p. 65)

– *Both sexes*: metafemur usually relatively slender, but if enlarged and with ventral teeth then other features different; metatibia with 2 tibial spurs originating from truncate apical margin (Figs 189; 299); pronotum almost always with at least short, smooth and shiny median line extending from anterior margin (Figs 197, 212, 282) (line sometimes concealed by head). *Female*: clava without spinelike process (except *Nepistenia*, Fig. 246) . . . . **LYCISCINI** (p. 103)

BOUCEKIINI new tribe

Description (based on female only). *Head* (Figs 27, 28, 35, 36) with scrobal channel almost parallel-sided rather than distinctly convergent dorsally, with sides abruptly declivous but not carinately margined except lateral to torulus. Interantennal region slender, its width subequal to width of torulus. Face with parascrobal region smoothly rounded into vertex, neither raised nor with distinctly differentiated sculpture. Vertex with posterior ocellus separated from inner orbit by distance slightly greater than 1 OD. Occiput without any indication of occipital carina. Gena without genal carina. Eye bare or conspicuously microsetose.

Antenna. Flagellum with 8 segments; preclaval segment and clava without processes; clava 1-segmented and at most with a small, apical, micropilose sensory region.

Mesosoma. Pronotum (Figs 29, 37) vertical or at most with medially very short, strongly transverse collar in dorsal view, and neck without median line. Mesoscutum without coriaceous subsculpture on interstices (Figs 29, 37); notauli extending to transscutal articulation, widely separated posteriorly. Scutellum without reflexed marginal rim, but with bare frenum differentiated over about posterior third by obscurely crenulate furrow or more distinct row of setiferous punctures between distinct frenal arms (Figs 31, 39), and with rugose axillula (Figs 29, 38) differentiated posteriorly by frenal arms and sometimes dorsally by axillular sulcus (Figs 29, 31). Dorsellum a transverse, bandlike sclerite between scutellum and propodeum, bare (Figs 31, 38). Mesepimeron entirely bare, including subalar pit (Figs 30, 38). Metapleuron uniformly sculptured and setose except sometimes within extreme dorsal angle (Figs 30, 38). Propodeum (Figs 29–31, 37–39) strongly transverse, posterior margin of foramen not extending beyond posterior margin of callus; variably sculptured, but at least with obscurely crenulate furrow along anterior margin to level of lateral limit of dorsellum; with transversely crenulate postspiracular furrow behind spiracle, but callus otherwise not distinctly differentiated from plical region; callus setose to level about equal with outer or inner margin of spiracle; plical region bare.

Wings. Forewing with marginal vein less than half length of subcostal cell and conspicuously shorter than postmarginal vein; uniformly setose; humeral plate setose within posteroapical angle, but bare dorsally except for 1 long seta near middle adjacent to apical margin (Fig. 29). Hind wing with costal cell broad, at most only extreme apex of vein noticeably convex and near wing margin.

Legs. Profemur at most with denticlelike preapical ventral angulation; protibia with dorsoapical spicules, but without dorsal spicules. Metacoxa with exterior surface setose over about ventral half, variably carinate along dorsal length, and setose dorsobasally; metafemur toothed, either with 1 low subapical lobe (Fig. 32) or with a few sharp teeth (Fig. 40); metatibia truncate apically, with 2 tibial spurs.

Metasoma. Gaster with Gt_7 and Gt_8 separate (Fig. 34) or fused into syntergum (Fig. 42), but with digitlike cerci; terga not margined laterally; Gt_1 shiny and at most very obscurely coriaceous. Ovipositor sheaths straight and rigid, extending conspicuously beyond apex of gaster by distance at least equal to length of metatibia.

Remarks. Boucekiini is newly established for *Chalcidiscelis* and the new genus *Boucekius*; *Chalcidiscelis* is known only from two females from Australia and *Boucekius* is based on a single female from Guyana. The two genera are classified together in a new tribe, partly to reflect a possible basal position within Cleonyminae and Pteromalidae (see phylogenetic analysis), and partly to establish Lyciscini as a monophyletic group by removing *Chalcidiscelis*. Unlike genera classified in Lyciscini, *Chalcidiscelis* has closely approximated toruli (1:0), lacks a pronotal median line (18:0), has a differentiated frenum (22:0), a primarily bare humeral plate (36:0), and digitlike cerci (61:0). These features are shared with *Boucekius*, though all may represent symplesiomorphies rather than synapomorphies. The unknown males of the two genera probably can be recognized by those features used to differentiate females in the key to tribes (except possibly for the gastral features).

Key to world genera of Boucekiini based on females

1 Mesonotum extensively transversely strigose-rugose (Fig. 29), but with row of setiferous punctures on scutellum delimiting coriaceous frenum (Fig. 31); metafemur ventrally with 1 rounded subapical lobe (Fig. 32); forewing with at least basal and cubital folds brown; Gt_2 and Gt_3 exposed and of similar length to Gt_4; Gt_8 separated from Gt_7 by a membranous line (Fig. 34) . . . . **_Boucekius_ new genus**

– Mesonotum almost uniformly reticulate-alveolate, including scutellum (Fig. 37); metafemur ventrally with a subapical spine and smaller, more apical denticles (Fig. 40); forewing uniformly hyaline basally; Gt_2 and Gt_3 mostly or entirely concealed under Gt_1 (Fig. 41); Gt_8 and Gt_7 fused into syntergum (Fig. 42) . . . . **_Chalcidiscelis_ Ashmead**

Boucekius new genus

Figs 27–34

Etymology. Named in honor of Zdenek Bouček, in recognition of his fundamental works in cleonymine and chalcid systematics and reflecting the outstanding position of both the man and the genus.

Type species. *Boucekius primevus* Gibson, by present designation.

Diversity. One species known from the Neotropical region [Guyana].

Biology. Unknown, but the long ovipositor indicates a concealed host.

Description (based on female only). *Head* (Figs 27, 28). Scrobal depression extending to anterior ocellus; scrobes transversely strigose, but channel much smoother and shinier with indication of transverse sculpture and partly divided by low longitudinal ridge above interantennal region. Face with parascrobal region reticulate-punctate. Interantennal region extending above torulus for distance obviously greater than length of torulus and for about half length of scrobal depression. Vertex with POL distinctly less than 2 times OOL or 3 times LOL. Gena primarily coriaceous with a few setiferous punctures posterior to malar sulcus (Fig. 28). Eye bare.

Antenna inserted slightly above level of lower margin of eyes (Fig. 28).

Mesosoma (Figs 29–31). Pronotum without collar, vertical medially with ∨-like emarginate dorsal margin. Mesoscutum transversely strigose-rugose to reticulate laterally; with notauli posteriorly at same level as anterior limit of scutoscutellar suture. Scutellum (Figs 29, 31) in lateral view flat and approximately in same plane as dorsellum; in dorsal view with distinct frenum differentiated by color and by transverse row of shallow setiferous punctures between frenal arms, the frenum coriaceous medially to punctate-reticulate posterolaterally, and surface anterior to frenum transversely strigose-rugose anteriorly to coriaceous posteriorly; with axillula delineated dorsally by crenulate axillular sulcus; and with truncate anterior margin wider than anterior margin of axilla, hence axillae widely separated. Dorsellum smooth and shiny, and about 6 times wider than long (Fig. 31). Prepectus subtriangular in lateral view, the posterolateral margin slightly incurved (Fig. 30). Upper mesepimeron smooth and shiny and lower mesepimeron finely coriaceous. Metapleuron with shallow setiferous punctures, but with extreme dorsal angle smooth except for fine coriaceous sculpture (Fig. 30). Propodeum (Fig. 31) with very broad foramen; plical region weakly convex, rugulose-punctate without median carina, with short crenulae along anterior margin but with crenulae as part of distinct furrow only lateral to dorsellum, and with posterior margin neither reflexed nor carinate.

Forewing with basal, costal, median and anal folds infuscate, and with infuscate region behind stigmal vein not extending to median fold; marginal vein almost half length of costal cell (SMV:MV:STV = 100:40:15).

Legs. Protibia ventrally without preapical angulation. Metacoxa coriaceous dorsal to ventral setose region and with uniform dorsal carina delineated by crenulate furrow (Figs 30, 32); metafemur ventrally with 1 rounded, low, lobelike process in apical third (Fig. 32).

Metasoma. Petiole a broad strip, crenulate along anterior margin but otherwise smooth and shiny (Fig. 31). Gaster with Gt_8 separated from Gt_7 by transverse membranous line anterior to cerci, hence with 8 evident terga (Fig. 34); Gt_2 and subsequent terga all exposed and of similar length; Gt_1–Gt_5 with posterior margins ∧-like emarginate; terga subsequent to Gt_1 reticulate-coriaceous, with finer sculpture medially and with broad smooth band posteriorly. Ovipositor sheaths projecting beyond apical tergum by about half length of gaster. Hypopygium extending almost to level of spiracle on Gt_6 (Fig. 33).

***Boucekius primevus* new species**
Figs 27–34

Type-material. *Holotype* ♀ (USNM) — GUYANA: Kanuki Mts., Kumu River & Falls, 3°15.9'N 59°3.5'W, 28-30 April 1995, Wayne N. Mathis / USNM 00135079.

Etymology. From the Latin word *primaevus*, meaning early or young, in reference to its postulated relationships within Cleonyminae.

Description. FEMALE. Head blue to purple, with slight metallic green luster under some angles of light, particularly over lower face; lower face and about ventral half of parascrobal region with slightly lanceolate, white setae. Mesosoma similar in color to head except tegula yellowish, frenum bright cupreous to rufous, and following dark or black: notaulus and about posterior half of mesoscutal medial lobe, pronotal panel posteriorly, and femoral depression. Legs dark brown with following yellowish to yellowish-brown: trochanters and trochantelli, knees of fore and mid legs narrowly, about basal quarter of metatibia, and all tarsi. Gaster dark with slight bronze luster under some angles of light on smoother areas and with blue to purple luster anterolaterally over more coarsely sculptured region of each tergum.

MALE. Unknown.

Chalcidiscelis Ashmead

Figs 35–42

Chalcidiscelis Ashmead, 1899: 201. Type species: *Chalcidiscelis koebelei* Ashmead; by original designation and monotypy.

Diversity. One species known from Australia.

✓ ***Chalcidiscelis koebelei* Ashmead**, 1899: 201; ♀ lectotype (USNM: 25517). DISTRIBUTION: Australia (*NSW).

Biology. Unknown, but the long ovipositor indicates a concealed host.

Description (based on female only). *Head* (Figs 35, 36). Scrobal depression extending to within about 1 OD from anterior ocellus, with region of reticulate-alveolate sculpture between depression and anterior ocellus; scrobes smooth and shiny ventrally, but channel strigose to transversely reticulate-rugulose dorsally. Face with parascrobal region punctate-alveolate. Interantennal region extending above torulus for distance less than length of torulus and less than half length of scrobal depression. Vertex with POL about 2 times OOL and 3 times LOL. Gena coarsely punctate and uniformly setose. Eye densely and conspicuously microsetose.

Antenna inserted slightly below lower orbits, with dorsal margin of torulus about at level of lower margin of eye (Figs 35, 36).

Mesosoma (Figs 37–39). Pronotum with very short collar abruptly inclined from neck, and neck uniformly reticulate-rugulose. Mesoscutum reticulate-alveolate; with notauli posteriorly distinctly lateral to anterior limit of scutoscutellar sutures (Fig. 37). Scutellum in lateral view weakly convex (Fig. 38); in dorsal view with obscurely differentiated frenum, the region delimited by shallow crenulate furrow but similar in color and sculpture (cells differing slightly in size) to surface anterior of frenal arms (Fig. 39); without distinct axillular carina (Fig. 38); and with anterior margin of scutellum narrower than anterior margin of axilla (Fig. 37). Dorsellum variably extensively reticulate-rugulose and only about 3.5 times wider than long (Fig. 39). Prepectus triangular in lateral view, the posterolateral margin straight. Upper mesepimeron extensively reticulate-rugulose and lower mesepimeron with similar sculpture ventrally and along posterior margin (Fig. 38). Metapleuron uniformly punctate-reticulate and setose. Propodeum (Fig. 39) with broad foramen; plical region with median carina and with radiating crenulae, or somewhat rugose, with band of short crenulae along anterior margin to level about equal with lateral limit of foramen, and with posterior margin slightly reflexed.

Wings. Forewing hyaline basally, but with large infuscate region behind stigmal vein and apical half of marginal vein extending to median fold; marginal vein only about one-quarter length of costal cell (SMV:MV:STV = 100:25:10).

Legs. Profemur with denticlelike preapical ventral angulation. Metacoxa punctate-reticulate dorsal to ventral setose area, and with irregular dorsal carina (Figs 38, 41); metafemur ventrally with 1 long, sharp tooth in apical third, and with 3 or 4 smaller, more apical teeth (Fig. 41).

Metasoma. Petiole broad, smooth and shiny, not crenulate along anterior margin (Fig. 39). Gaster with Gt_7 and Gt_8 fused into syntergum, hence with 7 evident terga, and syntergum with fine line posteromedial to cerci (Fig. 42); Gt_2 and Gt_3 almost or entirely concealed under Gt_1 (Fig. 41); Gt_4 and Gt_5 transversely strigose. Ovipositor sheaths projecting beyond apical tergum by about 1.5–2 times length of gaster. Hypopygium extending to about middle of gaster, near level of posterior margin of Gt_3 (Fig. 41).

Remarks. *Chalcidiscelis* is known from only two broken females, the type specimen labelled “Australia” and a largely complete specimen labelled “New South Wales, Kangaroo Flat, 30.X.1980, G.L. Baker” (BCRI). A slide in the USNM general collection contains one antenna and one forewing from the holotype. Monophyly of *Chalcidiscelis* is supported by Gt_3, along with Gt_2, being almost or entirely concealed under Gt_1 in females, which is unique within Cleonyminae. Another distinctive feature is the comparatively short marginal vein, which is only about one-quarter the length of the costal cell.

CHALCEDECTINI

Description. *Head* with or without deep scrobal depression including common scrobal channel, but at least with shallow, convergent scrobes separated by weakly convex, triangular interantennal region; with distinct occipital carina lateral to foramen only in female *Agrilocida*.

Antenna inserted distinctly below to distinctly above level of lower margin of eyes; with 8 funicular segments; preclaval segment of female at most only obscurely angulate apically (*Agrilocida*); clava 1- (Fig. 50) or 3-segmented (Fig. 58), often with large micropilose sensory region apically (region often collapsed in air-dried specimens) and in female with setose, spinelike process (Figs 44, 57, 58).

Mesosoma. Pronotum variable, either pentagonal with horizontal collar and neck in same plane as mesonotum and lacking median line (Fig. 45), or obliquely angled (Fig. 61) to almost vertical (Fig. 59) and with (Fig. 63) or without lightly sclerotized or sulcate median line, but only rarely with almost linear horizontal collar delineated posterior to carina (Fig. 65). Mesoscutum with notauli complete to transscutal articulation or obsolete posteriorly (Fig. 45). Scutellum variable in structure, with or without marginal rim and axillular carina, but without distinct frenum, a frenal line at most evident laterally and forming posterior margin of axillula. Axilla sometimes with differentiated region of color and/or sculpture along scutoscutellar suture (Figs 60, 62). Metanotum with dorsellum bare, often concealed in dorsal view by overhanging apex of scutellum. Prepectus triangular in lateral view. Mesopleuron ventrally often with transepisternal line of differentiated sculpture and/or color directed obliquely between anteromedial margin of pleuron and posterolateral margin of pleuron anterior to mesocoxa. Propodeum often with postspiracular furrow (Figs 47, 48) or variably distinct paraspiracular carina connected to spiracle differentiating lateral setose callus from bare plical region (Figs 66, 69, 70), and usually with variably distinct, longitudinal, crenulate furrow distinctly mesal of spiracle differentiating longitudinally carinate to rugulose medial portion of plical region (Figs 47, 48, 69, 70), but without distinct median carina unless part of more extensive sculpture (Figs 70, 71) and at most with indistinct crenulate furrow along about lateral third of anterior margin.

Wings. Forewing with variable venation and setation; humeral plate extensively setose dorsally (Fig. 17). Hind wing with costal cell broad or narrow.

Legs. Profemur without preapical angulation or teeth ventrally; protibia without dorsal or dorsoapical spicules, at most with spines along apicolateral margin. Metacoxa usually carinately margined along dorsal length; metafemur enlarged and ventrally serrate (Fig. 75) or toothed (Fig. 79); metatibia curved (Figs 75, 77, 79) and carinately margined along outer ventral edge, with ventroapical angle either recurved as small projection covering base of tibial spurs (Fig. 76) or prolonged into sclerotized spine (Figs 78, 80), and with 0–2 spurs.

Metasoma. Gaster with Gt_7 and Gt_8 fused into syntergum, the terga not margined laterally in either sex, and syntergum of female with (Fig. 49) or without (Fig. 82) transverse suture across tergum anterior to variably protuberant cerci. Petiole of male an entirely sclerotized tube or membranous ventrally.

Remarks. Generic concepts and nomenclature have fluctuated within Chalcedectini. *Chalcedectus*, *Polychroma* and *Amotura* were all established for single species from South America. *Polychroma* was discovered subsequently to be a homonym (Dalla Torre 1897) and until quite recently was considered a synonym of *Chalcedectus*. Bouček (1988*a*: 265) segregated the type species of *Chalcedectus* from other species in the genus because it was “rather outstanding” and classified the other species in *Amotura*, the name that replaced *Polychroma*. One Palearctic species has also been classified in *Agrilocida* Steffan (1964) and two New World species have been classified in *Dryadochalcis* De Santis (1970). In a revision of Nearctic Chalcedectini, Grissell (1991: 2) questioned whether the recognition of such monotypic genera as *Chalcedectus* served any purpose in understanding evolutionary pathways. He decided to follow the generic concepts of Bouček (1988*a*) until the New World species were revised “in order to maintain some semblance of nomenclatural stability.” Grissell (1991) used head structure to differentiate *Amotura* from *Chalcedectus* and structure of the metatibia and gastral syntergum to differentiate *Amotura* from *Dryadochalcis*. My character-state analysis indicates *Dryadochalcis* renders *Amotura* paraphyletic, with *Dryadochalcis* representing the most highly derived species of a lineage whose sister species are classified in *Amotura*. My analysis further indicates the tribe is composed of two monophyletic lineages: *Agrilocida*, and the rest of the tribe. Although I do not have definitive evidence that *Chalcedectus* renders *Amotura* paraphyletic as opposed to being its monotypic sister group, character-state distribution indicates the type species of

Chalcedectus is simply a conspicuously modified South American species of '*Amotura*'. I therefore recognize only two genera within Chalcedectini, *Chalcedectus* and *Agrilocida*. The character states and hypothesized transformation series upon which this classification is based are presented in 'Remarks' for *Chalcedectus*.

Bouček (1988*a*) and Grissell (1991) reviewed higher classification of Chalcedectini. Ashmead (1890) first recognized the group as the subfamily Polychrominae, but later changed the name to Chalcedectinae (Ashmead 1895). Historically, the group has most commonly been recognized as a subfamily of Pteromalidae, though it has sometimes been recognized as its own family (e.g., Ashmead 1904, Burks 1958, Peck 1963) or even as a subfamily of Podagrionidae (Peck 1951). Most recently, Bouček (1988*a*: 264) classified it as a tribe within Cleonyminae, stating that "it is rather difficult to keep it separate even on the tribal level." He distinguished the Chalcedectini from other tribes of Cleonyminae based on a unique combination of features: hind leg with an enlarged and ventrally serrate or dentate metafemur and a curved metatibia, and female clava with a finely sclerotized area and a fingerlike spicula. A ventrally serrate metafemur (i.e., one with numerous, regular, tiny denticles or teeth, Fig. 75) likely is synapomorphic for *Agrilocida* + *Chalcedectus* because the structure is possessed by *Agrilocida* and most likely is the groundplan structure for *Chalcedectus* (character 46). Some *Chalcedectus* from the Neotropical region have several lobelike teeth (Figs 77, 79) on the metafemur rather than being uniformly serrate, but I hypothesize this as secondarily derived (see under *Chalcedectus*). Other taxa within Cleonymini and Lyciscini have the metafemur variably enlarged and toothed and some form of toothed metafemur might even be the groundplan structure for the subfamily, but only Chalcedectini have a metafemur that is uniformly serrate over almost its entire ventral length. A curved metatibia is weaker support for monophyly of the tribe because a curved metatibia is correlated functionally with a greatly enlarged metafemur. *Dasycleonymus* has the metatibia slightly curved basally and a conspicuously curved metatibia is known for other chalcids with an enlarged-ovoid metafemur, such as Chalcididae, Leucospidae and some Torymidae (Grissell 1995, Wijesekara 1997). Because of the strong structural correlation, I did not include this feature in the character-state analysis. However, structure of the metatibial apex likely represents a second synapomorphy for *Agrilocida* + *Chalcedectus*. Some *Chalcedectus* have the metatibial apex prolonged into a spinelike-process (Figs 78, 79), but those species with a serrate metafemur, which I hypothesize as the groundplan structure for the genus (46:3), have the metatibia apically truncate with the portion above the tibial spurs abruptly recurved to form a short lobe covering the base of the spurs (47:1; Fig. 76). This same structure is possessed by both sexes of *Agrilocida* and undoubtedly represents an intermediate structure in a transformation from a truncate metatibia to one prolonged into a spine (see character 47). The spinelike structure likely has some functional correlation with a curved metatibia because some Chalcididae, Leucospidae and Torymidae have the apex similarly prolonged into a spine. Individuals of *Agrilocida* and *Chalcedectus* also share a similar propodeal structure, though this is not conspicuous for *Agrilocida*. Most *Chalcedectus* have about the medial third of the plical region longitudinally crenulate to rugulose between variably distinct paramedial furrows (Figs 63, 69, 70). A median plical region is also obscurely differentiated between very shallow paramedial furrows or irregular carinae in *Agrilocida* (Figs 47, 48). In both genera, the paramedial furrows/carinae are a continuation of obscure furrows along the anterolateral margin of the propodeum (Figs 47, 66). This structure differs from that of Lyciscini and Cleonymini, in which more distinct crenulate furrows along the anterior margin of the propodeum usually recurve posteriorly at the median on either side of a median carina (e.g., Figs 114, 160), and is likely synapomorphic. Consequently, even though *Agrilocida* and *Chalcedectus* are quite dissimilar in appearance, there is congruent evidence they comprise a monophyletic group. As discussed under character 16, structure of the clava in female *Agrilocida* may represent an intermediate stage in evolution of an articulated claval spicule, which is an autapomorphy of *Chalcedectus*. If so, this character-state transformation additionally supports monophyly of *Agrilocida* + *Chalcedectus*.

Complete absence of protibial dorsoapical spicules (40:1) supports monophyly of Chalcedectini + Cleonymini. *Agrilocida* also exhibits several other features that are more similar to those of some or all Cleonymini than to *Chalcedectus*. These features may support a Chalcedectini + Cleonymini sister-group relationship if in *Agrilocida* they represent uniquely retained groundplan features for Chalcedectini. The features include posteriorly obsolete notauli (Fig. 45), a pedunculate filiform flagellum (Fig. 50) and a tubular petiole in males, and possibly color pattern of the forewing and slightly angulate preclaval segment in females. Individuals of *Agrilocida* also have a comparatively obscure, down-curved scutellar marginal rim similar to some Cleonymini (*cf*. Figs 46, 117), though this may be symplesiomorphic at an even more inclusive level (see character 23 and phylogenetic analysis). The propodeal plical region tapers posteriorly between the base of the metacoxae in *Agrilocida* so that in dorsal view the foramen is distinctly posterior to the level of the posterior margin of the callus (Figs 47, 48). This structure is similar to most Cleonymini, but I hypothesize a more transverse propodeum (Figs 115, 116, 118) as the groundplan structure for Cleonymini and thus the similarity with *Agrilocida* as convergent (see Remarks for Cleonymini). Three features of *Agrilocida* do not necessarily support a close relationship of Chalcedectini with Cleonymini. I hypothesize the deep sulcus subdividing the syntergum of females and presence of a lateral remnant of an occipital carina as uniquely retained symplesiomorphies for *Agrilocida*. Both *Chalcedectus* and Cleonymini lack a differentiated syntergum and any occipital carina. Absence of these two features from the taxa must be convergent if my hypotheses of polarity and relationships are correct. Also, individuals of *Agrilocida* have a comparatively long, horizontal collar without a differentiated neck or median line, whereas individuals of *Chalcedectus* have the pronotum much shorter in dorsal view because it is obliquely angled and somewhat concave to almost vertical. When more or less vertical, it often has the dorsal margin medially emarginate and a median, somewhat membranous or sulcate line. The vertical, emarginate structure is very similar to that of *Boucekius*, whereas the presence of a median line is similar to Lyciscini and many Eupelminae (Eupelmidae) (see further under character 18). A possible sister-group or close relationship between Chalcedectini and Eupelmidae might also be indicated by common possession of an obliquely angled transepisternal line (Gibson 1989, fig. 107) in many Eupelmidae and Chalcedectini, including *Agrilocida*.

Polarity of some features that are different between *Agrilocida* and *Chalcedectus* is uncertain. For example, *Agrilocida* has a 1-segmented clava (Fig. 50), whereas *Chalcedectus* has a variably distinctly 3-segmented clava (Fig. 58). *Agrilocida* also lacks an axillular carina (Fig. 46), whereas *Chalcedectus* has an axillular carina (Fig. 62). I tentatively hypothesize presence of an axillular carina in *Chalcedectus* as apomorphic because the posterior continuation of the carina in many *Chalcedectus* (Fig. 64) is unique within the subfamily. Polarity of relative lengths of the marginal and postmarginal veins is also uncertain, though the comparatively short postmarginal vein in *Agrilocida* may be apomorphic relative to the longer vein of most *Chalcedectus*. In his key to Australasian Cleonyminae, Bouček (1988*a*) segregated *Amotura* from genera he assigned to Cleonymini based on the postmarginal vein being much longer than the marginal vein in *Amotura* as compared with being shorter than the marginal vein in Cleonymini. This feature does not work on a world basis for Chalcedectini because *Agrilocida ferrierei* and species of the *maculipennis* species-group of *Chalcedectus* have the postmarginal vein shorter than the marginal vein.

Key to world genera of Chalcedectini

1 Upper parascrobal region cristate (Figs 43, 50); axillula not differentiated dorsally by axillular carina (Fig. 46); pronotum medially almost as long as wide, in same plane as mesonotum, and reticulate (Figs 45, 50); dorsellum in dorsal view a transverse, reticulate-rugulose band posterior to scutellum (Figs 47, 48); female syntergum divided into presumptive Gt_7 and Gt_8 by deep sulcate furrow anterior to cercus (Fig. 49); male flagellum filiform with segments separated by short pedicel (Fig. 50) . . . . ***Agrilocida* Steffan**

– Upper parascrobal region not cristate; axillula with dorsal margin differentiated by distinct axillular carina (Fig. 62), the carina sometimes continued posteriorly as partial to complete scutellar rim (Fig. 64); pronotum at least concave if visible in dorsal view (Figs 61, 63), and often almost vertical (Fig. 59) with at most a transverse-linear horizontal surface (Fig. 65); dorsellum in dorsal view usually concealed under overhanging posterior portion of scutellum (Fig. 66), but if visible then smooth beyond basal crenulate band (Fig. 70); female syntergum not dorsally subdivided by sulcus (Figs 81, 82); male flagellum clavate to robust-filiform, with segments broadly joined (Figs 72–74) . . . . ***Chalcedectus* Walker**

Agrilocida Steffan

Figs 43–50

Agrilocida Steffan, 1964: 104–105. Type species: *Agrilocida ferrierei* Steffan; by original designation.
Chalcedectoides Hedqvist, 1967*b*: 182. Type species: *Chalcedectoides saharensis* Hedqvist; by original designation. Synonymy by Bouček (1976*b*: 348).

Diversity. One species known from the Palearctic region.

✓ ***Agrilocida ferrierei* Steffan**, 1964: 105–106; ♂ holotype (MHNG). DISTRIBUTION: Algeria, France, Israel.
= ✓ *Chalcedectoides saharensis* Hedqvist, 1967*b*: 182–184; ♀ holotype (MHNG). Synonymy by Bouček (1976*b*: 348).

Biology. Larval parasitoid of wood-boring beetles of the families Buprestidae and Scolytidae (Mendel 1986).

Description. *Head* (Fig. 43) in lateral view oval, with upper parascrobal region raised slightly above plane of eye, convex, and with transverse, cristate sculpture best seen in frontal view; vertex broad, POL at least twice maximum diameter of ocellus and posterior ocellus distinctly separated from inner orbit of eye; temple not differentiated by structure or sculpture behind eye; postgena with short vertical occipital carina lateral to foramen in female, but with carina not evident or extremely obscure in male. Scrobal depression with outer margin abrupt but carinate, extending almost to anterior ocellus; channel and scrobes at least dorsally reticulate. Interantennal region triangular, convex with abrupt margins. Eye oval, microsetose. Maxillary palpus with apical segment only slightly curved.

Antenna inserted slightly above lower margin of eyes in female and distinctly above lower margin of eyes in male (Fig. 50); flagellum clavate in female, filiform in male with each segment separated by distinct constriction or short pedicel, with conspicuous decumbent setae, and with 1 row of multiporous plate sensilla extending most of length (Fig. 50); preclaval segment of female with apical margin slightly angulate, in lateral view one side of segment longer than other and apical margin slightly concave; clava 1-segmented (Figs 44*a*, 50), in female with ventral surface of clava concave and apically prolonged into setose, spinelike process (Fig. 44*a*), but with extreme dorsoapical region of clava projecting slightly over base of process in 'hoodlike' manner (Fig. 44*b*).

Mesosoma. Pronotum (Figs 45, 50) pentagonal in dorsal view, narrowed anteriorly but otherwise without differentiated neck, with horizontal surface flat to weakly convex and reticulate without median line. Mesoscutum with notauli sulcate over convex anterior surface but obsolete over flat dorsal surface (Figs 45, 50); entirely reticulate. Scutellum with slender marginal rim delineated by crenulate furrow laterally (Fig. 46); without axillular carina differentiating dorsal margin of vertical axillula. Axilla reticulate to reticulate-rugulose. Dorsellum in dorsal view visible posterior to scutellum, reticulate-rugulose, bare (Figs 47, 48). Propodeum (Figs 47, 48) with postspiracular furrow but without distinct paraspiracular furrow; plical region without median carina, convergent posteriorly between base of metacoxae so in dorsal view foramen distinctly posterior to posterior margin of callus, particularly in male; callus sparsely setose to level about equal with outer margin of spiracle; propodeum of male reticulate medially relative to more coriaceous sculpture posterior and mesal to spiracles, but almost evenly convex between spiracles; propodeum of female with about medial third of propodeum somewhat more distinctly differentiated by longitudinal paramedial furrows. Mesepimeron entirely bare. Metapleuron uniformly sculptured and setose.

Wings. Forewing with postmarginal vein only about 0.6 times as long as marginal vein; basal cell mostly bare basally, but setose apically, differentiated by cubital setal line posteriorly, and with distinct speculum beyond basal setal line; female with disc slightly infuscate between about parastigma and apex of postmarginal vein but with large hyaline region behind marginal vein, hence the infuscate region more or less ∪-like. Hind wing with costal cell narrow, vein separated from wing margin by only about width of vein over much of its length beyond subbasal angulation.

Legs. Metacoxa not dorsally carinate in male, but variably distinctly carinate dorsally in female except basally; metafemur ventrally serrate; metatibia with 2 tibial spurs, with tibial comb, and with truncate apical margin except ventroapical angle reflexed as small lobe over base of spurs.

Metasoma. Female gaster with posterior margin of Gt_1 emarginate medially; Gt_2 short, mostly concealed under Gt_1; syntergum divided into presumptive Gt_7 and Gt_8 by deep, sulcate furrow across tergum anterior to cercus (Fig. 49); cercus projecting slightly as short digitlike process (Fig. 49). Petiole of male a short, entirely sclerotized tube.

Remarks. The cristate upper parascrobal region of individuals of *Agrilocida* (Fig. 43) is undoubtedly apomorphic. Most of the other features differentiating *Agrilocida* from *Chalcedectus* may reflect uniquely retained symplesiomorphies within the tribe (see Remarks for Chalcedectini).

Chalcedectus Walker

Figs 51–82

Chalcedectus Walker, 1852: 47. Type species: *Chalcedectus maculicornis* Walker; by monotypy.

Polychroma Westwood, 1874: 140. Type species: *Polychroma histrionica* Westwood; subsequent designation by Gahan and Fagan (1923: 117); preoccupied by *Polychroma* Dejean (1833), discovered by Dalla Torre (1897: 88). Synonymy with *Chalcedectus* by Ashmead (1899: 201); synonymy with *Amotura* by Bouček (1988*a*: 265). **Synonymy reestablished**.

Amotura Cameron, 1884: 130–131. Type species: *Amotura annulicornis* Cameron; by monotypy. **New synonymy**.

Polychromatium Dalla Torre, 1897: 88. Replacement name for *Polychroma* Westwood. Synonymy with *Chalcedectus* by Ashmead (1899: 201); synonymy with *Amotura* by Bouček (1988*a*: 265). **Synonymy reestablished**.

Chalcodectus Dalla Torre, 1898: 186. Unjustified emendation.

Chalcodectes Ashmead, 1899: 201. Unjustified emendation.

Episystole Girault, 1927[416]: 317. Type species: *Episystole poeta* Girault; by original designation. Synonymy with *Chalcedectus* by Bouček (1959: 485); synonymy with *Amotura* by Bouček (1988*a*: 265). **Synonymy reestablished**.

Neochalcodectus Masi, 1936: 68. Type species: *Neochalcodectus sinaiticus* Masi; by monotypy. Synonymy with *Chalcedectus* by Bouček (1959: 485); synonymy with *Amotura* by Bouček (1988*a*: 265). **Synonymy reestablished**.

Dryadochalcis De Santis, 1970: 25. Type species: *Chalcedectes* (!) *texanus* Brues; by original designation. **New synonymy**.

Diversity. Twenty-three nominal and an unknown number of undescribed species from all biogeographic regions. I have seen specimens from the Oriental and Afrotropical regions even though species have yet to be described from these regions.

✓ ***Chalcedectus annulicornis* (Cameron)**, **new combination**. *Amotura annulicornis* Cameron, 1884: 131–132; ♀ type (BMNH: 5.890). DISTRIBUTION: Nicaragua.

✓ ***Chalcedectus annulipes* (Ashmead)**, **combination reestablished**. *Chalcedectes* (!) *annulipes* Ashmead, 1904: 483; ♀ holotype (USNM: 60521). *Chalcedectus annulipes* (Bouček 1959: 485), *Amotura annulipes* (Grissell 1991: 14). DISTRIBUTION: Argentina, Brazil.

✓ ***Chalcedectus balachowskyi* Steffan**, 1968: 210–212; ♀ holotype (MHNG). DISTRIBUTION: Iran.

✓ ***Chalcedectus busckii* (Ashmead)**, **new combination**. *Euchrysia Busckii* Ashmead, 1900*a*: 256; ♀ syntypes (USNM: 6428). *Amotura busckii* (Grissell 1991: 14). DISTRIBUTION: Puerto Rico.

✓ ***Chalcedectus caelatus* (Grissell)**, **new combination**. *Amotura caelata* Grissell, 1991: 11–14; ♀ holotype (USNM). DISTRIBUTION: Mexico, USA.

✓ ***Chalcedectus cuprescens* (Westwood)**, **combination reestablished**. *Polychroma cuprescens* Westwood, 1874: 142; ♀ labelled as lectotype (OXUM: T. 665). *Polychromatium cuprescens* (Dalla Torre 1898: 186), *Chalcodectus* (!) *cuprescens* (Schmiedeknecht 1909: 151), *Chalcedectus* *cuprescens* (Bouček 1959: 485), *Amotura cuprescens* (Bouček 1988*a*: 265). DISTRIBUTION: Australia, New Caledonia.

***Chalcedectus guaraniticus* (Strand)**, **combination reestablished**. *Polychromatium 16-dentatum* var. *guaraniticum* Strand, 1911*c*: 95; ♀ holotype (ZMHB). *Chalcedectus guaraniticus* (Bouček 1959: 486), *Amotura guaranitica* (Grissell 1991: 14). DISTRIBUTION: Paraguay.

✓ ***Chalcedectus histrionicus* (Westwood)**, **combination reestablished**. *Polychroma histrionica* Westwood, 1874: 141; ♀ labelled as lectotype (OXUM: T. 661). *Polychromatium histrionicum* (Dalla Torre 1898: 186), *Chalcedectes* (!) *histrionica* (Ashmead 1904: 483), *Amotura histrionica* (Grissell 1991: 14). DISTRIBUTION: Brazil.

✓ ***Chalcedectus hyalinipennis* (Ashmead)**, **new combination**. *Euchrysia hyalinipennis* Ashmead, 1896*a*: 231; ♀ holotype (USNM: 3334). *Amotura hyalinipennis* (Grissell 1991: 7). DISTRIBUTION: Canada, Mexico, USA.

= ✓ *Euchrysia similis* Girault, 1917[314]: 15; ♀ holotype (USNM: 20464). Synonymy by Grissell (1991: 7).

***Chalcedectus lanei* De Santis**, 1970: 22–25; ♀ holotype (MLPA); **combination reestablished**. *Amotura lanei* (Grissell 1991: 14). DISTRIBUTION: Brazil.

✓ ***Chalcedectus maculicornis* Walker**, 1852: 47; ♀ type (BMNH: 5.889). DISTRIBUTION: Brazil, *Guyana (USNM), *Peru (BMNH), *Venezuela (CNCI).

✓ ***Chalcedectus maculipennis* (Ashmead)**, **new combination**. *Euchrysia maculipennis* Ashmead, 1896*a*: 232; ♂ lectotype (USNM: 3335) designated by Grissell (1991: 10). *Amotura maculipennis* (Grissell 1991: 10). DISTRIBUTION: USA.

✓ ***Chalcedectus meteorus* (Girault)**, **combination reestablished**. *Episystole meteora* Girault, 1927[416]: 317. *Chalcedectus meteorus* (Bouček 1959: 485), *Amotura meteorus* (Bouček 1988*a*: 265, stated as "probably just a form of *cuprescens*"). DISTRIBUTION: Australia (QLD).

✓ ***Chalcedectus poeta* (Girault)**, **combination reestablished**. *Episystole poeta* Girault, 1927[416]. *Chalcedectus poeta* (Bouček 1959: 486), *Amotura poeta* (Bouček 1988*a*: 265, stated as "probably the same as *cuprescens*"). DISTRIBUTION: Australia (QLD).

✓ ***Chalcedectus regalis* (Westwood)**, **combination reestablished**. *Polychroma regalis* Westwood, 1874: 141; 2♀ syntypes, one labelled as lectotype (OXUM: T. 662). *Polychromatium regale* (Dalla Torre 1898: 186), *Chalcedectes* (!) *regalis* (Westwood) (Ashmead, 1904: 483), *Chalcedectus regalis* (Bouček 1959: 486), *Amotura regalis* (Grissell 1991: 14). DISTRIBUTION: Brazil.

✓ ***Chalcedectus sedecimdentatus* (Westwood)**, **combination reestablished**. *Polychroma 16-dentata* Westwood, 1874: 141; ♀ labelled as lectotype (OXUM: T. 663). *Polychromatium sedecimdentatum* (Dalla Torre 1898: 186), *Chalcedectes* (!) *sedecimdentatus* (Ashmead 1904: 483), *Chalcedectus sedecimdentatus* (Bouček 1959: 486), *Amotura sedecimdentatum* (Grissell 1991: 14). DISTRIBUTION: Brazil.

✓ ***Chalcedectus septemdentatus* (Westwood)**, **combination reestablished**. *Polychroma 7-dentata* Westwood, 1874: 142; ♀ labelled as lectotype (OXUM: T. 664). *Polychromatium septemdentatum* (Dalla Torre 1898: 186), *Chalcedectes* (!) *sedecimdentatus* (Ashmead 1904: 483), *Chalcedectus sedecimdentatus* (Bouček 1959: 486), *Amotura sedecimdentatus* (Grissell 1991: 14). DISTRIBUTION: Brazil.

? = *Chalcedectus 7-dentatus* var. *pallidipes* Roman, 1920: 12; ♀ holotype (NHRS) (not found, B. Viklund, pers. comm.). Provisional synonymy by Bouček (1959: 486).

***Chalcedectus sinaiticus* (Masi)**. *Neochalcodectus sinaiticus* Masi, 1936: 68; 1♀, 1♂ syntypes (MCSN). Combination by Bouček (1959: 485). DISTRIBUTION: Algeria, Israel.

= ✓ *Chalcedectus niger* Hedqvist, 1967*b*: 180–182; ♀ holotype (MHNG). Synonymy by Steffan (1968: 209).

***Chalcedectus superbus* (De Santis)**, **new combination**. *Dryadochalcis superba* De Santis, 1977: 26; ♀ holotype (MACN). *Dryadochalcis texanus* De Santis (1970: 26) *nec* Brues, misidentification. DISTRIBUTION: *Brazil (BMNH), Paraguay.

✓ ***Chalcedectus texanus* (Brues)**, **combination reestablished**. *Chalcedectes* (!) *texanus* Brues, 1907*b*: 106–107; ♀ holotype (USNM: 42714). *Chalcedectus texanus* (Peck 1951: 584), *Dryadochalcis texana* (De Santis 1970: 25, 1977: 26). DISTRIBUTION: *Costa Rica (BMNH), *Nicaragua (UCDC), USA.

Biology. Grissell (1991) listed the known host records of Nearctic species, which included species of Bostrichidae, Buprestidae and Cerambycidae; hosts are unknown for any species from other regions. One female of *C. maculipennis* was listed by Grissell (1991) as reared from *Call*[*irhytis*] *crypta* (Ashmead) (Cynipidae). Grissell suggested the true host is likely some wood-boring beetle. The cited host record needs to be confirmed, but it is possible the highly modified structure of *C. maculipennis* (see Remarks) is correlated with a host that is also unusual for the tribe, such as a gall-forming cynipid rather than a wood-boring beetle.

Description. *Head* (Figs 51–56) in lateral view variable in shape, lenticular (Fig. 52) to flat triangular or cone shaped with subequally long, abruptly differentiated face and frontovertex (Fig. 54); upper parascrobal region neither convex above plane of eye nor cristate; vertex broad to very narrow, OOL and POL sometimes both less than minimum diameter of ocellus; temple rarely angularly produced into vertical, cristate 'crest' (Figs 55, 56); postgena without occipital carina. Scrobal depression variable, rarely with short separate scrobe above each torulus, usually with Λ- or bell-shaped depression consisting of convergent scrobes and common scrobal channel extending for at least about half distance to anterior ocellus and sometimes intercepting ocellus (Figs 51, 53, 55); scrobes and channel usually sculptured, rarely smooth and shiny. Interantennal region variable depending on structure of scrobal depression. Eye oval to quadrangular, usually microsetose, rarely bare. Maxillary palpus with apical segment slightly curved or with one side right-angled relative to point of attachment.

Antenna inserted slightly to distinctly below level of lower margin of eyes; flagellum clavate in female (Fig. 57) and clavate to robust filiform (Fig. 72) in male, but with segments broadly joined and with short and inconspicuous or appressed setae; male flagellum with sparse multiporous plate sensilla extending most of length of segment or with dense sensilla in one (Fig. 73) to numerous rows (Fig. 74); preclaval segment of female with sides subequally long and apical margin symmetrical (Figs 57, 58); clava 3-segmented (Fig. 58), with segments differentiated by very fine sutures completely encircling clava or evident dorsally but interrupted ventrally on either side of large micropilose sensory region, and in female with articulated spinelike process (Figs 57, 58).

Mesosoma. Pronotum usually almost vertical (Fig. 59) and concealed by posterior of head, only rarely obliquely angled and shallowly concave (Fig. 61) or with very short horizontal collar differentiated from neck by transverse carina (Fig. 65), often with median smooth or sulcate line (Fig. 63) and with dorsal margin broadly incurved to emarginate when almost vertical. Mesoscutum with notauli continuous to transscutal articulation, usually sulcate but sometimes differentiated only by series of aligned punctures and slight difference in convexity between medial and lateral lobes; reticulate or punctate-reticulate to punctate-alveolate, and often with variably distinct triangular region of strigose sculpture in angle formed between notaulus and posterior margin of lateral lobe (Figs 60, 62). Scutellum with dorsal margin of axillula delineated by distinct axillular carina (Fig. 62), with carina often extending beyond posterior margin of axillula to form partial or complete carinate marginal rim (Fig. 64). Axilla variably sculptured, often with smooth region (Figs 62, 64) or region of finer coriaceous sculpture (Fig. 60) adjacent to scutoscutellar suture and rarely entirely smooth and shiny (Fig. 65). Dorsellum shiny beyond basal crenulate band, often concealed under overhanging posterior portion of scutellum, but at most only slightly exposed and subvertical below scutellar apex (Fig. 66). Propodeum with or without distinct, often curved paraspiracular carina connected to spiracle, but usually with about medial third of plical region longitudinally carinate to rugulose between longitudinal paramedial furrows (Figs 63, 69, 70); callus sparsely to densely setose, often to level distinctly mesal of inner margin of spiracle, and sometimes setose almost to paramedial furrow of plical region if lacking paraspiracular carina (Fig. 63). Mesepimeron usually entirely bare (Figs 67, 68), only rarely upper mesepimeron setose posteriorly near metapleural suture. Metapleuron usually uniformly sculptured and setose (Fig. 67), but sometimes with at least dorsal half smooth, shiny, and bare or with very few scattered setae (Fig. 68).

Wings. Forewing with postmarginal vein usually longer than marginal vein; uniformly setose or rarely almost or entirely bare behind costal cell; female with disc hyaline to slightly infuscate behind marginal vein. Hind wing with costal cell broad and evenly attenuated to apex.

Legs. Metacoxa with variably distinct carina along dorsal length; metafemur ventrally serrate (Fig. 75) or with several long teeth separated by gaps (Figs 77, 79); metatibia without tibial spurs (Fig. 80) or with 1 (Fig. 78) or 2 spurs (Fig. 80), with tibial comb (Figs 76, 78) unless without spurs (Fig. 80), and with apical margin truncate with ventroapical angle reflexed as small lobe over base of tibial spurs (Fig. 76) or more evenly attenuated into elongate, acutely angled projection (Figs 77–80).

Metasoma. Female gaster with posterior margin of Gt_1 emarginate to slightly produced medially; with terga variable, more or less homonomous (Fig. 81) or with one or more of Gt_2–Gt_4 distinctly shorter than subsequent terga and sometimes mostly or entirely concealed under Gt_1; syntergum without transverse furrow anterior to cerci (Figs 81, 82); cercus platelike (Fig. 82). Petiole of male an entirely sclerotized tube or membranous ventrally.

Remarks. Grissell (1991) differentiated *Dryadochalcis* from *Amotura* based on four features. *Dryadochalcis* was stated to have: 1) the apex of the metatibia more or less evenly attenuated into a pointed projection and without tibial spurs; 2) the inner apical margin of the metatibia without a tibial comb; 3) the apical segment of the maxillary palpus right-angled in relation to its point of attachment; and 4) the syntergum of females laterally compressed and many times longer than wide. *Amotura* was stated to have: 1) an essentially concave metatibial apex, with the apical margin being somewhat truncate dorsally but more or less abruptly recurved into a short projection ventroapically, plus two tibial spurs; 2) a tibial comb along the inner apical margin of the metatibia; 3) the apical segment of the maxillary palpus only slightly curved; and 4) the syntergum of females not laterally compressed and as wide or wider than long. I discovered that the two species assigned to *Dryadochalcis* also differ from other Chalcedectini by having the upper mesepimeron setose posteriorly and initially thought absence of setae from the eyes might further distinguish members. The eyes are bare in the two described species that were classified in *Dryadochalcis*, whereas in other described Chalcedectini the eyes are distinctly and usually densely setose. However, I saw a single female of an undescribed species from Costa Rica (MUCR) with bare eyes and a metatibia that tapers into a sclerotized projection, but which has a tibial comb and a single tibial spur (Fig. 78). The mesoscutum is reticulate-alveolate without a differentiated triangular strigose region posteriorly, similar to the two species assigned to *Dryadochalcis*, the apical two gastral terga are distinctly compressed though only slightly elongated, and the apical maxillary segment is curved rather than right-angled. Individuals of *C. septemdentatus* are also intermediate in structure between the two species that were classified in *Dryadochalcis* and species assigned to *Amotura*. Mesoscutal sculpture and metatibial structure are the same in *C. septemdentatus* and the undescribed species from Costa Rica, but the eyes are densely setose and the apical maxillary segment is virtually right-angled relative to its point of attachment. Females of *C. septemdentatus* also have the penultimate gastral tergum at least twice as long as wide; the syntergum is somewhat compressed and about 2–2.5 times as long as wide. Based on these character distributions, I believe the metatibial structure of *Dryadochalcis* represents the culmination of a transformation series in which the metatibial apex was progressively elongated into an acutely angled sclerotized lobe, with the initial loss of one spur (Fig. 78), and then the loss of the remaining spur and tibial comb (Fig. 80). The tibial transformations appear to have occurred in conjunction with the apical two gastral terga becoming somewhat compressed prior to conspicuous elongation. Species of this lineage also have a few lobelike teeth on the metafemur (Figs 77, 79) rather than having numerous tiny teeth, a partly bright metallic and more distinctly punctate-alveolate mesoscutum without a differentiated strigose region, and a scutellum that is entirely carinately margined (Figs 63, 64). I consider all of these features to be secondarily derived within *Chalcedectus*. *Chalcedectus septemdentatus* and the undescribed species also have the callus densely setose lateral to a strong paraspiracular carina (Fig. 63), a feature also shared with the two species previously assigned to *Dryadochalcis* as well as some other *Chalcedectus*. Finally, females of *C. septemdentatus*, and particularly the female of the undescribed species from Costa Rica, have a flagellum with numerous multiporous plate sensilla similar to the species assigned to *Dryadochalcis*. A posteriorly setose upper mesepimeron and absence of any tibial spurs or a tibial comb certainly support monophyly of *C. texanus* + *C. superbus*, but all the other features discussed above indicate these two species represent only the most highly modified members of a larger clade within '*Amotura*'. For these reasons, I do not recognize *Dryadochalcis* as a separate genus.

Grissell (1991) differentiated *C. texanus* from *C. superbus* based on a slight difference in setal pattern of the propodeum. I saw one female and four males from Nicaragua and one female from Costa Rica with the propodeal setal pattern as described and illustrated for *C. texanus*. The two females differ from other females of *C. texanus* by not having the basal cell uniformly setose (with setae apically in the angle formed between the submarginal vein and basal fold, but otherwise with only a few scattered setae). All males have an entirely setose basal cell and I tentatively identify the specimens from Nicaragua as *C. texanus*. I also saw one female (CNCI) and male (USNM) from Brazil, a female from Venezuela (USNM), and a male from Trinidad (BMNH), with the gaster partly orange in the basal half. These specimens may represent a third species within what I differentiate as the *texanus* species-group of *Chalcedectus*.

Bouček (1988*a*: 265) recognized the monotypic genus *Chalcedectus* as distinct from *Amotura*. He stated that the type species, *C. maculicornis*, "is rather outstanding", but did not give features to differentiate the two genera. Metafemoral dentition was previously used by Ashmead (1899) to differentiate *Chalcedectus* from *Amotura*, *Chalcedectus* having a metafemur with several large teeth and *Amotura* having a minutely denticulate metafemur. As discussed above, a metafemur with several long teeth separated by distinct gaps is shared also with species of the *texanus* species-group plus some other Neotropical species of *Chalcedectus*. Individuals of *Agrilocida* and known *Chalcedectus* from all other biogeographic regions have a metafemur with numerous tiny teeth (Fig. 75), which I hypothesize as the groundplan structure for Chalcedectini. Grissell (1991) differentiated *Chalcedectus* from *Amotura* based on a single feature, the temple expanded into a vertical crest with transverse ridges behind the eye (Fig. 55). The head of *C. maculicornis* (Fig. 56) also differs more subtly in three other respects from species assigned to Chalcedectini: 1) the anterior ocellus lies slightly within the scrobal channel because the carinate scrobal margin intercepts the anterior ocellus at about midheight instead of terminating at or below the ventral margin of the ocellus; 2) the very narrow vertex has a longitudinal carina between the inner orbit and posterior ocellus; and 3) the upper parascrobal region has a ∨-like complex of carinae on either side of the anterior ocellus. The mesonotum also has very distinct notauli because the medial lobe is raised abruptly above the level of the flat lateral lobes (Fig. 61), the scutellum is not carinately margined posterior to the axillula (Fig. 62), and the propodeal plical region has a series of radiating crenulae between the strong paraspiracular carinae (Fig. 71), lacking the distinctly differentiated medial region characteristic of most *Chalcedectus*. The flagellum of *C. maculicornis* has dense multiporous plate sensilla and the mesonotum is partly bright metallic and reticulate-alveolate, similar to *texanus*-group species, but there is a distinct triangular strigose region in the angle formed between the notaulus and posterior margin of the mesoscutal lateral lobe (Fig. 62). The inner angle of the axilla is also finely coriaceous adjacent to the scutoscutellar suture. The pronotum is comparatively long in dorsal view, with the dorsal surface concave or obliquely angled and transversely strigose without a median line (Fig. 61). This pronotal structure might be intermediate between the horizontal pronotum of *Agrilocida* and the more vertical pronotum of other *Chalcedectus*, which would indicate *C. maculicornis* as the sister taxon of all other *Chalcedectus*. However, a metafemur with lobelike teeth, a flagellum with dense multiporous plate sensilla, and brightly colored and strongly reticulate-alveolate mesonotum all indicate *C. maculicornis* as nothing more than a derived Neotropical species that is conspicuous mostly because of an unusual head. Females of *C. maculicornis* also have the syntergum distinctly margined basolaterally by an impunctate line extending about half the distance to the cercus (Fig. 82). Females of some species assigned to *Amotura*, though not *texanus*-group species, have a similar but much less conspicuous impunctate line on the syntergum. I have no doubt *C. maculicornis* + other *Chalcedectus* comprise a monophyletic group based on presence of an articulated claval spicule, similar modified sculpture of the mesoscutum and axilla, and presence of an axillar carina. It is possible that *C. maculicornis* is the sister species of all other species assigned to the genus, though most features discussed above suggest it is most closely related to some derived group of Neotropical species. For these reasons I synonymize *Amotura* under *Chalcedectus*.

In discussing the value of monotypic genera within Chalcedectini, Grissell (1991) stated that two of the species included in his study (*C. caelatus* and *C. maculipennis*) might just as easily be placed into monotypic genera based upon autapomorphies. *Chalcedectus caelatus* is distinctive primarily because Gt_2–Gt_4 are highly reduced and concealed under Gt_1. *Chalcedectus maculipennis* is distinctive in several features and along with other undescribed species represents a highly modified species group at least as distinctive as the *texanus*-group or *C. maculicornis*. Several features differentiate species of what I recognize as the *maculipennis* species-group from other *Chalcedectus*, including: 1) a dorsally smooth and shiny, mostly or entirely bare metapleuron (Fig. 68); 2) highly reduced forewing setation basal to the marginal vein; 3) carinately margined pronotum having a transverse-linear collar (Figs 65, 68); and 4) head with a distinct frontovertex (Fig. 54). A shiny axilla and axillula (Figs 65, 66) also characterize *maculipennis*-group species, though sculpture of the axilla and axillula is quite variable in other *Chalcedectus*. The axillulae are unusually conspicuous in *maculipennis*-group species partly because of their large size (Fig. 66). In other species of *Chalcedectus* the axillular carina intercepts the axilla in its ventral rather than dorsal half and even if the axilla is quite shiny it is less conspicuous because of its smaller size. A postmarginal vein that is shorter than the marginal vein also differentiates *maculipennis*-group species from other New World Chalcedectini. Presumably, this feature is independently derived relative to the similar state possessed by *Agrilocida*. In addition to *C. maculipennis*, I have seen one female from Brazil (USNM) that represents an undescribed species based on a very different scrobal structure and other more subtle features, such as a more densely micropunctate frontovertex. A series of four females and four males from Brazil (USNM) may represent a second undescribed species based on specimens having the metatarsus white except for the apical segment and often all or part of the basal segment. Different sculpture patterns of the mesoscutal medial lobe, forewing setal patterns, and forewing and mesosomal color patterns also indicate at least two species of the *maculipennis*-group may be present in southern USA.

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Description. *Head* with or without deep and distinct scrobes (Figs 83–90), but with concave scrobal channel above interantennal region only in female *Dasycleonymus* (Figs 89, 90), usually with separate shallow scrobe above each torulus or shallowly obscure scrobal depression (Figs 83–86). Interantennal region variable in shape depending on depth of scrobes, only about 1.7 times as wide as torulus (Fig. 90) to distinctly more than twice width of torulus (Fig. 84). Occiput without occipital carina. Gena without carina extending from mouth corner. Eye variably setose.

Antenna inserted near lower margin of eyes, female with dorsal to ventral margin of torulus about level with lower margin of eyes (Figs 84, 90), male sometimes with ventral margin of torulus above lower margin of eye by distance up to diameter of torulus (Fig. 88); flagellum with 8 segments; preclaval segment of female with apical margin at least indistinctly angulate and usually with more conspicuous attenuated (Figs 91, 92) or spinelike projection (Figs 93, 94) extending along side of clava; clava of female sometimes also with apical or subapical spinelike or short lobelike projection; flagellum of male variable, clavate with large micropilose sensory region on clava (Fig. 95), to compact-filiform (Fig. 96) or with segments slightly separated by pedicel, to lobate (Fig. 97) if pedicel nearer one side than other, or with long rami (Fig. 98); clava 1-segmented in female, but sometimes obscurely 3-segmented in male (Fig. 96).

Mesosoma. Pronotum campanulate (Figs 109, 111) with convex collar and inclined neck lacking median line. Mesonotum with notauli not evident or obscure posteriorly, not extending to transscutal articulation. Scutellum sometimes with an entire, flat (Fig. 114) or reflexed (Fig. 112) crenulate rim, but at least with marginal rim differentiated laterally, where more or less distinctly crenulate and flat or curved down and attenuated posteriorly (Figs 117, 118); without axillular carina or distinctly differentiated axillula (Figs 110, 114); often with marginal fringe of posteriorly directed setae (Fig. 118). Dorsellum bare except in female *Dasycleonymus* (Fig. 115). Prepectus triangular in lateral view. Mesopleuron often with line or band of setae posteriorly on lower mesepimeron and/or with line or patch of setae on upper mesepimeron (Figs 108, 110). Metapleuron variable, uniformly sculptured and setose (Figs 108, 110) to bare (Fig. 112) and sometimes smooth and shiny. Propodeum with crenulate furrow along anterior margin continuous to and, more or less distinctly, along either side of median carina (Figs 109–119*a*); plical region often narrowed posteriorly and projecting between metacoxae so as to be more or less V-like or pentagonal in shape with posterior margin of nucha obviously posterior to posterior margin of callus (Figs 111, 113, 119*a*), but at least with strongly carinate and more or less distinctly crenulate margins; with postspiracular furrow or longitudinal paraspiracular carina differentiating setose callus and bare plical region, the furrow continuous with crenulate posterolateral margin of propodeum.

Wings. Forewing with humeral plate extensively setose dorsally (Fig. 18); female rarely brachypterous, macropterous female with variable setation, color pattern and relative length of venation, but marginal vein at least slightly longer than postmarginal vein; male always fully winged and uniformly setose. Hind wing with narrow costal cell, the vein recurved and closely paralleling wing margin over most of length beyond subbasal angulation.

Legs. Profemur neither conspicuously enlarged nor with teeth ventrally; protibia without dorsal or dorsoapical spicules (Fig. 99). Metacoxa not carinate along dorsal length except in male *Dasycleonymus* (Fig. 117); metafemur sometimes denticulate or toothed ventrally (Figs 101–106); metatibia not conspicuously curved, often with row of longer or otherwise differentiated spines along dorsal margin and on outer surface medially to ventrally (Figs 100, 102), and apically truncate with 2 tibial spurs.

Metasoma. Gaster sessile (Figs 115, 116) to variably distinctly petiolate (Figs 111, 113, 119*a*), usually with 7 distinct terga in female but Gt_2 sometimes almost or entirely concealed under Gt_1 in dorsal view, and with terga not margined laterally (Fig. 121) except in one known species of *Cleonymus* and males of *Dasycleonymus*; Gt_1 and Gt_2 of female often almost or entirely smooth and shiny and conspicuously smaller than subsequent terga, with Gt_5 or Gt_5 and Gt_4 the largest terga (Fig. 121); syntergum with platelike cerci and without carina across tergum anterior to cerci (Fig. 122). Male petiole an entirely sclerotized tube (Figs 119*b*, 120*b*).

Remarks. My treatment of Cleonymini does not include the fossil taxon *Bruesisca submersus* (Brues 1910: 27). This species was originally described in *Cleonymus*, but Hedqvist (1961: 93) subsequently established the monotypic genus *Bruesisca* for it. Brues (1910) intimated that the first two gastral terga might be of a different length than the subsequent terga, which is characteristic of Cleonymini, but it is uncertain whether the specimen actually is a cleonymine much less a member of Cleonymini.

Bouček (1958) established Cleonymini based on females having an asymmetrical preclava in combination with incomplete or posteriorly vague notauli (Bouček 1988*a*), but both of these features are possessed by female *Agrilocida* (Chalcedectini). Individuals of *Grooca* and *Solenura* (Lyciscini) also share obscure or posteriorly obsolete notauli with Cleonymini and *Agrilocida*. Additional features shared between *Agrilocida* and at least some Cleonymini are discussed under 'Remarks' for Chalcedectini. Cleonymini might even render Lyciscini paraphyletic if absence of a pronotal median line results from secondary loss. Several features possessed by *Dasycleonymus* are quite possibly groundplan features of Cleonymini. Females of *Dasycleonymus* have a setose dorsellum (26:1; Fig. 115) and males have a dorsally carinate metacoxa (45:1; Fig. 117). Both of these features are unique to *Dasycleonymus* within Cleonymini; either they were derived independently in *Dasycleonymus* or they represent uniquely retained symplesiomorphies inherited from a common ancestor with some other cleonymine group. Except for one species of *Cleonymus* (see Remarks for *Cleonymus*), males of *Dasycleonymus* are also the only Cleonymini to have the gaster margined laterally (54:1; Fig. 123). Only *Dasycleonymus*, *Solenura* and some species of *Grooca* have the gaster unmargined in females and margined in males. Both sexes of *D. bakeri* and some *Cleonymus* and *Zolotarewskya* also have deep scrobes (Figs 87–90). Females of *D. bakeri* have a short but distinct bell-shaped scrobal depression above the interantennal region (Fig. 89). Other Cleonymini with deep scrobes have the region above the interantennal region flat (Fig. 87), though the difference between this structure and that of *D. bakeri* is slight. I interpret the scrobal structure of female *D. bakeri* (Figs 89, 90) as the groundplan structure for Cleonymini and absence of a distinct scrobal depression from almost all Cleonymini as resulting from secondary loss. Many Cleonymini also share a distinct scutellar marginal rim (Figs 112, 114, 119*a*) with most Lyciscini. The groundplan structure for Cleonymini is uncertain, but the structure possessed by *Dasycleonymus* may be the most likely groundplan structure based on association with other putative groundplan features of this genus. The marginal rim is comparatively obscure because it is slender, curved down laterally, and attenuated posteriorly toward the midline of the scutellum (Figs 115–117), but it does project slightly into a reflexed rim at the extreme posteromedial margin of the scutellum in females (Figs 108, 115). A similar structure is shared with *Agrilocida* (Fig. 46) and may be similar to the groundplan structure of Lyciscini + Chalcedectini + Cleonymini, and perhaps of even a more inclusive group (see character 23).

Parsimony analysis did not resolve relationships among the genera recognized in Cleonyminae and only one of the genera, *Callocleonymus*, is demonstrably monophyletic. Monophyly of *Callocleonymus* is supported by a bare metapleuron with a unique sculptural pattern, a very regular netlike or meshlike pattern delineated by impressed lines (31:3; Fig. 112). Female *Callocleonymus* are also unique within Cleonymini because they have a spinelike process projecting from the apical margin of the preclaval segment and from the clava subapically (Figs 93, 94) (see discussions of characters 15 and 16), and some longer, lanceolate to slightly spatulate trichoid sensilla projecting from the ventral surface of the clava and the ventroapical surfaces of 3–5 apical funicular segments (best observed in profile) (Figs 93, 94). Though undoubtedly monophyletic, *Callocleonymus* very likely renders *Cleonymus* and/or *Notanisus* paraphyletic. Monophyly of *Cleonymus*, *Dasycleonymus*, *Notanisus* and *Zolotarewskya* is not established. As discussed above, those features distinguishing *Dasycleonymus* may represent retained symplesiomorphies rather than synapomorphies. The other genera very possibly represent paraphyletic grades of structure. *Notanisus* and *Zolotarewskya* are both differentiated from *Cleonymus* by just single features, *Notanisus* by females having a quadrate to elongate petiole (Fig. 113) and *Zolotarewskya* by individuals having a toothed metafemur with a slightly different pattern of teeth than for those *Cleonymus* with a toothed metafemur (see Remarks for *Zolotarewskya*). A petiolate gaster does not support monophyly of *Notanisus* because most female *Callocleonymus* also have the gaster variably distinctly petiolate (Fig. 111). The particular pattern of metafemoral teeth characteristic of *Zolotarewskya* may support monophyly of the genus; however, recognition of this genus likely renders *Cleonymus* paraphyletic even if the slightly different pattern of metafemoral teeth characteristic of some *Cleonymus* was derived independently. Some species of both genera exhibit comparatively plesiomorphic structures for one or more other features. A few species have relatively deep scrobes (*cf*. Figs 87, 88), a transverse propodeum (*cf*. Fig. 118), and a preclaval segment with the apical margin angulate rather than distinctly lobate, and most species have uniformly setose forewings, a uniformly setose and sculptured metapleuron, and a line of setae along the posterior margin of the lower mesopleuron. I consider all of these features to be groundplan states of both *Cleonymus* and *Zolotarewskya*. The toothed metafemur of all *Zolotarewskya* is intuitively apomorphic relative to the simple (non-toothed) metafemur of most *Cleonymus*, and suggests *Cleonymus* is paraphyletic relative to *Zolotarewskya*. Monophyly of both *Cleonymus* and *Zolotarewskya* is supported only if some sort of toothed metafemur was the groundplan structure for the tribe. Such a structure might be represented by the metafemoral structures of female (Fig. 105) and/or male (Fig. 106) *Dasycleonymus*. Females of *D. bakeri* have the metafemur ventrally expanded to its widest point, a denticulate lobe, near its middle, and there are several evenly spaced small teeth or denticles along the margin apical to the denticulate lobe (Fig. 105). This is similar to the structure of most *Cleonymus* with a toothed metafemur except the basal-most tooth or lobe is near the apical quarter of the femur in *Cleonymus*. It is possible the dentate metafemoral structures of both *Cleonymus* and *Zolotarewskya* evolved from this structure. Alternatively, both structures might have evolved from a structure similar to that of male *Dasycleonymus*, which have the metafemur much less conspicuously enlarged than for females and minutely denticulate ventrally (Fig. 106). If some sort of enlarged and ventrally tooth metafemur was the groundplan structure for Cleonymini, then the superficially plesiomorphic non-toothed metafemoral structure of most *Cleonymus* and other Cleonymini is apomorphic through reversal. If so, *Cleonymus* might render *Zolotarewskya* paraphyletic.

It is very possible that all the genera currently recognized in Cleonymini represent grade-level taxa. The simplest solution would be to synonymize all generic names in Cleonymini under *Cleonymus*, but this would not solve the problem of establishing the evolutionary history of the group and would tend to conceal patterns of character-state distribution requiring study. I prefer to be conservative and not transfer all described species into a single genus until such time as the Oriental fauna is more completely known and species relationships can be established more accurately. Unfortunately, this necessitates establishing a new genus that may eventually be synonymized along with the other generic names.

Bouček (1988*a*) stated that the flagellum of known males of *Notanisus* have "long branches" (Fig. 98), whereas males of *Zolotarewskya* have "branched antennae" (Fig. 97) and the males of *Callocleonymus* and *Cleonymus* always have a "simple" flagellum (Figs 95, 96). Most males I assign to *Zolotarewskya* have the flagellar projections varying from short thick lobes to long slender rami; however, males of two species I assign to *Zolotarewskya* because of a strongly toothed metafemur have a filiform flagellum or one in which the segments are separated by a pedicel that is slightly to distinctly off center. Males with a robust-filiform flagellum and the metafemur toothed only ventroapically I assign to *Cleonymus*. I also saw a single male of *Callocleonymus* from South Africa (CNCI) with a long ramus on each of the basal four funicular segments. Other known *Callocleonymus* males have a clavate flagellum and like females have variably distinct, differentiated trichoid sensilla ventrally on the clava and apical 3–5 funicular segments (Fig. 95). This flagellar structure helps differentiate male *Callocleonymus* from male *Cleonymus*, which have more of a filiform flagellum, the clava tapered symmetrically, and the flagellum uniformly setose. At least three species of *Notanisus* are known from the Australasian region based on females, but without associated males (Bouček 1988*a*). The lack of associated males probably indicates they have non-branched antennae and remain unrecognized within *Cleonymus* (see further under *Notanisus*). Males collected at the same time and place as females of an unidentified species I assign to *Notanisus* have robust-filiform antennae or one in which the segments are only slightly lobate because the pedicel of each segment is closer to one edge than the other. Although the sexes have yet to be reliably associated for most species of all the genera, it appears flagellar structure of males is highly labile and characterization of 'simple' *versus* 'branched' probably is not of generic value. Male flagellar structure appears to be partly correlated with position of the toruli on the head. Males with a ramose or branched antennae have these inserted comparatively high on the head, conspicuously above the lower margin of the eyes, whereas the antennae are inserted about in line with, to distinctly below, the lower margin of the eyes when the flagellum is simple or lobate.

Key to world genera of Cleonymini

1 Female **2**
– Male **6**

2(1) Dorsellum setose (Fig. 115) . . . . ***Dasycleonymus* new genus**
– Dorsellum bare **3**

3(2) Metapleuron bare and with very distinct, multisided, meshlike sculpture defined by impressed lines (Fig. 112); preclaval segment with slender spinelike process, and clava with similar process projecting subapically on opposite side from preclaval process (Figs 93, 94) (both processes sometimes appressed to segments and difficult to see); mesepimeron entirely bare posteriorly (Fig. 112) . . . . ***Callocleonymus* Masi**
– Metapleuron not as described above, usually with at least a few setae and/or surface partly to entirely reticulate (Figs 110, 114), though rarely entirely bare, smooth and shiny; preclaval segment with apical margin angulate or attenuated into fingerlike process along side of clava, and clava at most with

attenuated process (Figs 91, 92); mesepimeron often with row of setae along posterior margin and/or with patch of setae dorsally near wing base (Fig. 110) **4**

4(3) Gaster petiolate, the petiole at least subquadrate and without setae projecting from sides (Figs 113, 114); metafemur slender, not toothed ventrally; metapleuron not entirely and uniformly reticulate . . . . ***Notanisus* Walker**

– Gaster sessile (Fig. 118), the petiole strongly transverse, or if longer than wide then with setae projecting from side; metafemur sometimes toothed ventrally (Figs 101–104); metapleuron often uniformly reticulate (Fig. 110) **5**

5(4) Metafemur ventrally with at least 2 and often several well-separated lobelike teeth, with basal-most tooth (often not the longest tooth) near middle or within at least apical third of femur (Figs 103, 104) . . . . ***Zolotarewskya* Risbec**

– Metafemur ventrally often finely denticulate, serrate (Fig. 100) or with subapical lobe or angulation (Fig. 101), but if with strong tooth within about apical quarter then also with more apical, much smaller, closely approximated teeth or denticles (Fig. 102) . . . . ***Cleonymus* Latreille**

6(1) Flagellum ramose, with 4–6 funicular segments each having slender projection much longer than length of segment (Fig. 98) **7**

– Flagellum clavate (Fig. 95) to robust-filiform (Fig. 96) or more or less lobate (Fig. 97) **9**

7(6) Metafemur toothed ventrally . . . . ***Zolotarewskya* Risbec** (in part)

– Metafemur not toothed ventrally **8**

8(7) Metapleuron bare and with very distinct, uniform, netlike sculpture defined by impressed lines (Fig. 112); flagellum with well separated rami, the respective funicular segments elongate . . . . ***Callocleonymus* Masi** (in part)

– Metapleuron setose or, if bare, then dorsally smooth and shiny; flagellum with subcontiguous rami, the respective funicular segments ringlike (Fig. 98) . . . . ***Notanisus* Walker**

9(6) Metacoxa dorsally with longitudinal carina (Fig. 117); petiole transverse (Figs 116, 120*a*); gaster margined laterally; head and body dark . . . . ***Dasycleonymus* new genus**

– Metacoxa not carinate dorsally; petiole subquadrate to longer than wide (Fig. 119*a*); gaster only extremely rarely margined laterally (one known species of *Cleonymus*); head and body usually with distinct metallic luster **10**

10(9) Metapleuron bare and with very distinct, uniform, netlike sculpture defined by impressed lines (Fig. 112); flagellum clavate to robust-filiform, but with large, flat or collapsed micropilose sensory region ventrally on clava and with variably distinct regions of differentiated trichoid sensilla ventroapically on at least apical 3 funicular segments (Fig. 95) . . . . ***Callocleonymus* Masi** (in part)

– Metapleuron with at least some setae or, if bare, then smooth and shiny dorsally or partly reticulate; flagellum gracile to robust-filiform (Fig. 96) or lobate (Fig. 97), but with clava tapered symmetrically to apex, without conspicuous micropilose sensory region, and flagellum with trichoid sensilla uniformly hairlike **11**

11(10) Metafemur ventrally with at least 3 well-separated and more or less lobelike teeth over almost apical half or more of ventral margin (Figs 103, 104) . . . . ***Zolotarewskya* Risbec** (in part)

– Metafemur ventrally usually finely denticulate (Fig. 100) or with at most 1 robust lobe (Fig. 101) or long tooth within apical quarter, though often also with distinctly smaller teeth or denticles ventroapically (Fig. 102) . . . . ***Cleonymus* Latreille**

***Callocleonymus* Masi**

Figs 93–95, 111, 112, 126

Callocleonymus Masi, 1940: 289–290. Type species: *Callocleonymus pulcher* Masi; by original designation.

Diversity. Eight described and an unknown number of undescribed species from the Old World. I have seen several males and females of an undescribed species from California (UCRC) and a female of second species from Mississippi (UCDC) in the United States.

***Callocleonymus beijingensis* Yang**, 1996: 76–77, 307; ♀ holotype (NWCF). DISTRIBUTION: China (Beijing).

***Callocleonymus bimaculae* Yang**, 1996: 77–78, 307; ♀ holotype (NWCF). DISTRIBUTION: China (Beijing, Shaanxi).

***Callocleonymus chuxiongensis* Yang**, 1996: 79, 307; ♀ holotype (NWCF). DISTRIBUTION: China (Yunnan).

✓ ***Callocleonymus ferrierei* Kerrich**, 1957: 270–272; ♀ holotype (BMNH: 5.2126). DISTRIBUTION: China, Papua New Guinea?.

✓ ***Callocleonymus ianthinus* Yang**, 1996: 72–75, 306–307; ♀ holotype (NWCF). DISTRIBUTION: China (Beijing, Shaanxi).

***Callocleonymus pulcher* Masi**, 1940: 291–294; 3♀ syntypes (DEZA). DISTRIBUTION: Somalia, Turkmenistan.

***Callocleonymus swezeyi* (Yoshimoto and Ishii)**. *Ptinobius swezeyi* Yoshimoto and Ishii, 1965: 177–178; ♀ holotype (BPBM: 3618). Combination by Bouček (1988*a*: 263). DISTRIBUTION: Australia (QLD), Guam, Micronesia.

***Callocleonymus xinjiangensis* Yang**, 1996: 75–76, 307; ♀ holotype (NWCF). DISTRIBUTION: China (Xinjiang).

Biology. Reared as parasitoids of wood-boring beetle larvae of the families Buprestidae and Scolytidae; Bouček (1988*a*) also listed Curculionidae as a host family.

Description. *Head* (*cf*. Fig. 83) with distinct metallic luster; without distinct scrobal depression, the scrobe only slightly depressed dorsal to each torulus and with interantennal region and lower parascrobal region weakly convex; face and frontovertex reticulate to coriaceous, female face often transverse-reticulate and frontovertex often coriaceous; vertex rounded into occiput.

Antenna inserted at least slightly below level of lower margin of eyes in female, but either above or below level of lower margin of eyes in male. Female flagellum with apical margin of preclaval segment extending as slender spinelike process along side of clava and clava with similar spinelike process extending subapically from side opposite to that of preclaval process; clava ventrally, and apical 3–5 funicular segments ventroapically, with at least a few longer, lanceolate to slightly spatulate trichoid sensilla (usually most obvious when flagellum viewed in profile) (Figs 93, 94). Male flagellum rarely ramose, usually clavate to robust-filiform; if clavate to robust-filiform then with large micropilose sensory region ventrally on clava and with variably distinct ventroapical regions of differentiated trichoid sensilla on at least 3 apical funicular segments (Fig. 95), and if ramose then with 4 long, slender, well separated rami on fl_2–fl_5, with fl_2 ringlike, but fl_3–fl_5 long with each ramus apical.

Mesosoma. Mesonotum with distinct metallic luster; mesoscutum reticulate to reticulate-punctate (Fig. 111). Scutellar-axillar complex variable in structure and sculpture, virtually flat and in same plane or with scutellum variably convex and with axilla abruptly inclined; scutellum with complete, crenulate marginal rim; axilla almost uniformly reticulate or variably extensively, sometimes entirely, smooth and shiny. Dorsellum bare, smooth and shiny. Propodeum (Fig. 111) projecting posteriorly between metacoxae, with longitudinal crenulate postspiracular furrow continuous with obliquely angled, crenulate, posterolateral margin; plical region variable in sculpture, uniformly reticulate to smooth and shiny, excluding median carina. Mesepimeron entirely bare. Metapleuron bare with uniform pattern of distinct netlike sculpture defined by impressed lines (Fig. 112).

Forewing. Female forewing variably distinctly infuscate behind marginal and stigmal veins; usually largely to entirely bare basal to level of marginal vein, but rarely uniformly setose; postmarginal vein much shorter than marginal vein and only slightly longer than stigmal vein.

Legs. Metacoxa not dorsally carinate; metafemur neither conspicuously enlarged nor toothed ventrally.

Metasoma. Petiole usually distinct (Fig. 111) and yellowish in female, and often longer than wide in both sexes. Gaster with terga unmargined in either sex; Gt_1 and Gt_2 of female comparatively small, smooth and shiny, but subsequent terga netlike-coriaceous to transverse-strigose (Fig. 126).

Remarks. Males of *Callocleonymus* lack the preclaval and claval processes of females, but sculpture of the metapleuron is sufficient to distinguish both sexes from those of other genera. A single male from South Africa (CNCI) with this metapleural sculpture has a ramose flagellum; four rami are present with all but the first projecting apically from a relatively long segment so that the rami are well separated. All other known *Callocleonymus* males have a clavate flagellum, with the clava and three or more apical funicular segments having variably distinctly differentiated sensillar regions ventrally or ventroapically (Fig. 95), similar to females (Figs 93, 94).

Callocleonymus is the only genus of Cleonymini supported as monophyletic and recognition of the genus likely renders *Notanisus* and/or *Cleonymus* paraphyletic. Most female *Callocleonymus* have a distinct petiole and further resemble *Notanisus* females because of often similar structures and sculpture patterns of the head and mesonotum, always a very finely sculptured gaster, and often basally bare forewings. These features are variable in both genera, which indicates multiple reversals or convergences in at least some of the features. Females of two species of *Notanisus* from Ethiopia (BMNH) and Uganda (CNCI) have the metapleuron partly netlike-coriaceous, similar to species of *Callocleonymus*. Both species also have the mesopleuron bare posteriorly as in *Callocleonymus*, though the upper mesopleuron is partly setose in one of the species. The metapleural sculpture pattern of these two species might represent antecedent states that indicate *Notanisus* is paraphyletic relative to *Callocleonymus*.

Exact distribution of *Callocleonymus* remains unknown, but presence of two species from southern United States indicates a natural rather than accidentally introduced presence in the New World. The female from Mississippi differs from all other observed females of the genus by having the scutellum virtually flat rather than low to high convex. The Californian species was collected as far south as San Diego County and therefore likely is also present in Mexico.

***Cleonymus* Latreille**

Figs 84–86, 91, 96, 100–102, 109, 118, 119, 121, 122, 127

Cleonymus Latreille, 1809: 29. Type species: *Diplolepis depressa* Fabricius; subsequently designated by Latreille (1810: 436).

Ptinobius Ashmead, 1896*b*: 11. Type species: *Charitopus magnificus* Ashmead; by original designation. Synonymy by Bouček (1988*a*: 263).

Aplatygerrhus Girault, 1913[175]: 77–78. Type species: *Aplatygerrhus magnificus* Girault; by original designation. Synonymy by Bouček (1988*a*: 263).

Systolomorphella Girault, 1915[240]: 222. Type species: *Systolomorphella trifasciatipennis* Girault; by original designation. Synonymy by Bouček (1988*a*: 460).

Megormyrus Cockerell, 1926: 36–37. Type species: *Megormyrus amabilis* Cockerell; by monotypy. Synonymy with *Ptinobius* by Burks (1958: 74); synonymy with *Cleonymus* by implication through transfer of type species by Heydon and Bouček (1992: 472).

Paracleonymus Masi, 1927: 340. Type species: *Paracleonymus angustatus* Masi; by monotypy. Synonymy by Kamijo (1996: 746).

Beharella Risbec, 1952: 361. Type species: *Beharella viridicyanea* Risbec; by monotypy. Synonymy by Bouček (1976*a*: 10).

Diversity. Forty-two nominal and an unknown number of undescribed species known from all biogeographic regions.

✓ ***Cleonymus agrili* (Rohwer)**. *Ptinobius agrili* Rohwer, 1919: 5–6; ♀ holotype (USNM: 21994). Combination by Heydon and Bouček (1992: 472). DISTRIBUTION: USA (CA).

***Cleonymus albomaculatus* Hedqvist**, 1960: 415; ♀ holotype (MZLU). DISTRIBUTION: South Africa.

✓ ***Cleonymus amabilis* (Cockerell)**. *Megormyrus amabilis* Cockerell, 1926: 37–38; ♀ holotype (MCZC: 15668). Combination by Heydon and Bouček (1992: 472). DISTRIBUTION: USA (CO).

***Cleonymus angustatus* (Masi)**. *Paracleonymus angustatus* Masi, 1927: 340–343; ♀ holotype (DEIC). Combination by Kamijo (1996: 756). DISTRIBUTION: Japan (Ryukyu Islands), Taiwan.

***Cleonymus apicalis* Förster**, 1841: 34; (NMWA?). DISTRIBUTION: Germany.

***Cleonymus balcanicus* Bouček**, 1972: 270–271; ♀ holotype (HNHM). DISTRIBUTION: Bulgaria, Greece.

✓ ***Cleonymus brevis* Bouček**, 1972: 272–273; ♀ holotype (BMNH: 5.2174). DISTRIBUTION: Croatia, France, *Greece (BMNH), Italy, Slovakia.

✓ ***Cleonymus californicus* (Crawford)**. *Ptinobius californicus* Crawford, 1916: 142; ♀ holotype (USNM: 20820). Combination by Heydon and Bouček (1992: 472). DISTRIBUTION: USA (CA).

✓ ***Cleonymus californicus* Girault**, 1917[310]: 11–12; ♀ holotype (USNM: 20348). Preoccupied by *C. californicus* (Crawford 1916); a replacement name is not provided at this time until synonymy is clarified. DISTRIBUTION: USA (CA).

✓ ***Cleonymus canariensis* Hedqvist**, 1983: 129–130; ♀ holotype (NHRS). DISTRIBUTION: Canary Islands.

***Cleonymus ceratinae* Kamijo**, 1996: 750–751; ♀ holotype (EIHU). DISTRIBUTION: Japan.

***Cleonymus collaris* Spinola**, 1851: 46; ♀ holotype (MRSN). DISTRIBUTION: Brazil.

***Cleonymus cyaneus* Förster**, 1841: 34; (NMWA?). DISTRIBUTION: Germany.

✓ ***Cleonymus dendatifemur* (Girault)**. *Aplatygerrhus dendatifemur* Girault, 1926[399]: 60. Combination by Bouček (1988*a*: 263). DISTRIBUTION: Australia (TAS).

***Cleonymus elongatus* Förster**, 1841: 33; ♀ (NMWA?). DISTRIBUTION: Germany.

***Cleonymus eximius* Förster**, 1841: 33; ♀, ♂ (NMWA?). DISTRIBUTION: Germany.

✓ ***Cleonymus laticinctus* (Girault)**. *Systolomorphella laticincta* Girault, 1926[399]: 59. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (NSW).

***Cleonymus laticornis* Walker**, 1837: 351; ♂ holotype (NMID). DISTRIBUTION: China, Europe (Noyes 1998).

= *Ichneumon depressus* Fabricius, 1798: 231; ♀ (MNHN); primary homonym of *I. depressus* Gmelin *in* Linnaeus (1790: 2687, 2706), discovered by Graham (1969: 38). Transferred to *Cleonymus* by Westwood (1828: 16). Synonymy by Kerrich and Graham (1957: 268).

? = ✓ *Cleonymus obscurus* Walker, 1837: 352; ♂ lectotype (BMNH: 5.1627) designated by Kerrich and Graham (1957: 270). Tentative synonymy by Bouček (1972: 273). DISTRIBUTION: Europe (Noyes 1998).

= *Cleonymus thomsoni* Erdös, 1957: 361, replacement name for *Cleonymus depressus* Thomson 1878: 5–6 (♀ holotype, MZLU), preoccupied by *C. depressus* (Fabricius 1798). Synonymy by Kerrich and Graham (1957: 269).

***Cleonymus longinervus* Kamijo**, 1983: 298–300; ♀ holotype (EIHU). DISTRIBUTION: Japan, Korea.

✓ ***Cleonymus magnificus* (Ashmead)**. *Charitopus magnificus* Ashmead, 1888*a*: iv; ♀ holotype (USNM: 27278). Combination by Bouček (1988*a*: 264). *Ptinobius magnificus* (Ashmead 1896*b*: 11). DISTRIBUTION: Canada, USA.

= ✓ *Ptinobius dysphagae* Girault, 1915[236]: 130; ♂ holotype (USNM: 61836). Synonymy by Peck (1951: 567).

✓ ***Cleonymus magnus* Bouček**, 1988*a*: 264. Replacement name and combination for *Aplatygerrhus magnificus* Girault, 1913[175]: 77 (♀ holotype, SAMA), preoccupied by *C. magnificus* (Ashmead, 1888*a*). DISTRIBUTION: Australia (TAS).

***Cleonymus malaicus* Narendran and Mini**, 1997: 9–11; ♀ holotype (DZUC). DISTRIBUTION: Malaysia.

***Cleonymus nigriclavus* Girault**, 1917[317]: 6–7; ♀ (USNM: 21400; lost, label in type collection reads "missing, March 1968, det. Burks"). DISTRIBUTION: USA(FL).

✓ ***Cleonymus pentlandi* (Girault)**. *Systolomorphella pentlandi* Girault, 1922[365]: 149–150. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

***Cleonymus pini* Yang**, 1996: 80–83, 307–308; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

✓ ***Cleonymus regalis* (Dodd)**. *Aplatygerrhus regalis* Dodd, 1924: 164; ♀ holotype (SAMA). Combination by Bouček (1988*a*: 264). DISTRIBUTION: Solomon Islands.

✓ ***Cleonymus reticulatus* (Howard), new combination**. *Eupelmus reticulatus* Howard, 1897: 146; ♂ syntype (USNM: 6547), ♂ syntype (BMNH: 5.1003). DISTRIBUTION: Grenada.

✓ ***Cleonymus rufiscapus* (Girault)**. *Aplatygerrhus rufiscapus* Girault, 1925[381]: 3. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

***Cleonymus ryukyuensis* Kamijo**, 1996: 748–750; ♀ holotype (EIHU). DISTRIBUTION: Japan (Ryukyu Islands).

***Cleonymus serrulatus* Kamijo**, 1996: 752–754; ♀ holotype (EIHU). DISTRIBUTION: Japan.

✓ ***Cleonymus silvifilia* (Girault)**. *Systolomorphella silvifilia* Girault, 1927[416]: 316. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (TAS).

✓ ***Cleonymus texanus* (Crawford)**. *Ptinobius texanus* Crawford, 1916: 142–144; ♀ holotype (USNM: 20821). Combination by Heydon and Bouček (1992: 472). DISTRIBUTION: Argentina, Brazil, USA (TX).

***Cleonymus togashii* Kamijo**, 1996: 748; ♀ holotype (EIHU). DISTRIBUTION: Japan.

✓ ***Cleonymus trifasciatipennis* (Girault)**. *Systolomorphella trifasciatipennis* Girault, 1915[240]: 222. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

✓ ***Cleonymus ulmi* Yang**, 1996: 83, 308; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

✓ ***Cleonymus unfasciatipennis* (Dodd and Girault)**. *Systolomorphella unfasciatipennis* Dodd and Girault *in* Girault, 1915[240]: 223. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

***Cleonymus viridicyaneus* (Risbec)**. *Beharella viridicyanea* Risbec, 1952: 361–363; ♀ holotype (MNHN). Combination by Bouček (1976*a*: 10). DISTRIBUTION: Madagascar.

***Cleonymus viridinitens* Förster**, 1841: 33; ♀ (NMWA?). DISTRIBUTION: Germany.

Excluded species:

Cleonymus imperialis (Dodd). Transferred to *Notanisus*.
Cleonymus unnotipennis (Girault). Transferred to *Zolotarewskya*.

Biology. Most species for which hosts are known appear to be primary parasitoids of wood-boring beetles of the families Anobiidae, Anthribidae, Bostrichidae, Buprestidae, Cerambycidae, Curculionidae and Scolytidae, but *C. amabilis* is a parasitoid of Megachilidae (Apoidea) (Cockerell 1926, Hicks 1926) and *C. ceratinae* is a parasitoid of *Ceratina japonica* Cockerell (Apidae) (Kamijo 1996). It is likely species can be primary or secondary parasitoids because Kamijo (1996) reared *C. serrulatus* as a primary parasitoid of *Monochamus saltuarius* (Gebler) (Cerambycidae) and as a hyperparasitoid of *Semanotus japonicus* (Cerambycidae) through *Ischnoceros sapporensis* Uchida (Ichneumonidae).

Description. *Head* usually with distinct metallic luster; scrobes variable, usually as shallow depression above each torulus (Figs 84–86) but sometimes deep with abruptly raised interantennal region and with lower parascrobal region abruptly raised and sinuate near torulus (Fig. 88), and with face flat or only slightly depressed above interantennal region (Fig. 87); face and frontovertex reticulate to scabrous or with frontovertex very rarely coriaceous; vertex usually rounded into occiput though rarely carinately margined.

Antenna inserted at least slightly below level of lower margin of eyes in female (Fig. 84), but below (Fig. 86) or above (Fig. 88) level of lower margin of eyes in male. Female flagellum with apical margin of preclaval segment at least slightly angulate and usually extending more conspicuously as attenuated process along side of clava; clava attenuated apically into short digitlike or somewhat spinelike process and with at most a small ventroapical region of differentiated trichoid sensilla (Figs 91, 92); funicular segments with trichoid sensilla uniformly hairlike when flagellum viewed in profile. Male flagellum filiform to robust-filiform with segments usually at least slightly separated by variably long pedicel (Fig. 96) or lobate if pedicel of respective segment closer to one side than other side, but clava tapered to point without distinct micropilose sensory region and funicular segments with trichoid sensilla uniformly hairlike.

Mesosoma. Mesonotum (Fig. 109) with or without distinct metallic luster; mesoscutum reticulate to scabrous. Scutellar-axillar complex variable in structure and sculpture, almost flat and in same plane or with scutellum variably convex and with axilla abruptly inclined, both scutellum and axilla usually almost uniformly reticulate; scutellum with complete, crenulate marginal rim, or with rim evident laterally but either attenuated to carina or obsolete posteromedially. Dorsellum bare, shiny, and either smooth or at most with fine coriaceous sculpture. Propodeum variable, sometimes transverse-rectangular with posterior margins of nucha and callus almost at same level (Fig. 118), but usually plical region more or less distinctly narrowed and projecting posteriorly between base of metacoxae (Fig. 109), with longitudinal, crenulate, postspiracular furrow continuous with obliquely angled, crenulate, posterolateral margin (Fig. 118); plical region variable in sculpture, uniformly reticulate to smooth and shiny, excluding median carina or lamina. Mesepimeron often with line or narrow band of setae along posterior margin and/or with patch of setae on upper mesepimeron. Metapleuron variable in sculpture and setation, but extensively setose if finely coriaceous, and often uniformly reticulate and setose.

Forewing. Female forewing hyaline to variably extensively infuscate behind marginal and stigmal veins; usually entirely setose basal to level of marginal vein, but sometimes with reduced setation and very rarely entirely bare; postmarginal vein varying from subequal in length with, to much shorter than, marginal vein.

Legs. Metacoxa not dorsally carinate; metafemur variable, sometimes finely denticulate ventrally (Fig. 100) or with subapical lobe (Fig. 101), but if with distinct teeth then basal-most tooth the longest and within about apical quarter, with any more apical teeth smaller and usually closely approximated (Fig. 102).

Metasoma. Petiole transverse or at most subquadrate in female (Fig. 118), transverse to longer than wide (Fig. 119) in male. Gaster with terga unmargined except for both sexes of one undescribed species; Gt_1 and Gt_2 of female comparatively small, smooth and shiny, with subsequent terga variably sculptured.

Remarks. As discussed under 'Remarks' for the tribe, monophyly of *Cleonymus* is not supported and the genus likely represents a grade-level taxon that is paraphyletic relative to *Callocleonymus*, *Notanisus* and possibly *Zolotarewskya*. Some species from the Oriental region have deep scrobes (Figs 87, 88), a transverse-rectangular propodeum (Fig. 118), and an only slightly angulate preclaval segment, which I consider to be similar to the groundplan structures for the tribe. Females of *Callocleonymus* and *Notanisus* always lack distinct scrobes, have the propodeal plical region extending posteriorly between the base of the metacoxae, have a distinct preclaval process, and have a finely sculptured gaster, the sculpture defined by impressed lines. These features indicate members of *Callocleonymus* and *Notanisus* likely are most closely related to some group of species currently classified in *Cleonymus*. Gastral sculpture in *Cleonymus* encompasses the variation found in the other genera.

I have seen females of one species from Vietnam (CNCI) and China (Fujian) (CASB) having the comparatively plesiomorphic suite of features discussed above, but with a conspicuously modified gaster. The gaster is comparatively elongate and narrowed between Gt_4 and Gt_5 so that it is somewhat pedunculate. I have also seen males and females of one species from Florida (CNCI) with the gaster margined laterally.

***Dasycleonymus* new genus**

Figs 89, 90, 105–108, 115, 116, 120, 123–125

Etymology. Combination of the Greek word *dasys* (hairy, shaggy) and *Cleonymus*, in reference to the setose dorsellum, which differentiates females from other Cleonymini.

Type species. *Dasycleonymus bakeri* Gibson, by present designation.

Diversity. At least two species known from the Oriental region.

Biology. Unknown, but undoubtedly parasitoids of wood-boring beetles.

Description. *Head* black or with dull metallic luster in some females; scrobal depression variable, with (Fig. 90) or without (*cf*. Fig. 84) distinct scrobe above each torulus and with or without common scrobal channel above abruptly raised (Fig. 87) or weakly convex (*cf*. Fig. 85) interantennal region; face and frontovertex reticulate; vertex rounded into occiput, in female sometimes abruptly so.

Antenna inserted above lower level of eyes in both sexes. Female flagellum with apical margin of preclaval segment variable, only slightly angulate or extending more conspicuously as attenuated process along side of clava; clava attenuated apically but without distinct spinelike process. Male flagellum robust-filiform to somewhat clavate, but clava tapered to point without distinctly differentiated micropilose sensory region, the clava and funicular segments with trichoid sensilla uniformly hairlike.

Mesosoma. Mesonotum black or with dull metallic luster in some females; mesoscutum reticulate. Scutellar-axillar complex variable in structure, in female almost flat and in same plane or with scutellum convex and axilla abruptly inclined (Fig. 108); scutellum and axilla similarly reticulate or axilla with much shallower sculpture than on scutellum; scutellum with marginal rim complete but comparatively inconspicuous (Figs 115, 116), the rim slender, curved down at least laterally, and attenuated posteriorly so as to be most distinct in lateral view (Fig. 117). Dorsellum setose in female (Fig. 115), but bare, smooth and shiny in male (Fig. 116). Propodeum strongly transverse-rectangular (Figs 115, 116) or with plical region projecting slightly between metacoxae posterior to level of callus (*cf*. Fig. 118); plical region smooth and shiny or with only very obscure coriaceous sculpture, excluding median carina. Mesepimeron with line or narrow band of setae along posterior margin and with patch of setae on upper mesepimeron (Fig. 108). Metapleuron uniformly reticulate and setose (Fig. 108).

Forewing. Female forewing infuscate behind stigmal and postmarginal veins, and sometimes behind parastigma; uniformly setose; postmarginal vein subequal in length to marginal vein.

Legs. Metacoxa with dorsal carina in male (Fig. 117) but not in female; metafemur variably distinctly enlarged and denticulate over about ventroapical half (Figs 105, 106).

Metasoma. Petiole transverse in dorsal view in both sexes (Figs 115, 116), in male smooth and shiny (Fig. 120*a*). Gaster with terga margined laterally in male but unmargined in female; terga partly transversely strigose or with more or less separated transverse pits in female (Fig. 125) and punctate or with scalloped sculpture formed by ∩-like impressed lines in male (Figs 120*a*, 123, 124).

Remarks. It remains to be proven whether the males I classify in *Dasycleonymus* are congeneric with females assigned to the genus because they differ significantly by having a bare dorsellum, dorsally carinate metacoxa, and laterally margined gaster. Males are superficially similar to males of *Solenura* and *Grooca* (Lyciscini), but are distinguished by the absence of three features (protibial dorsoapical pegs, a pronotal median line and a deep scrobal channel) as well as by the propodeum being crenulate along its entire anterior margin and the plical region being quite smooth and shiny rather than reticulate (*cf*. Fig. 116 with 202, 269).

I recognize two morphospecies based on females or males, though the males quite possibly belong to a single morphologically variable species (see Remarks for *D. bakeri*). Except for sharing a setose dorsellum and similar transverse punctate-strigose sculpture on some gastral terga, the two known females differ substantially in structure. The single *D. bakeri* female has a conspicuous scrobal depression, comparatively narrowly separated toruli (Figs 89, 90), apparently a long projection from the preclaval segment along side of the clava (*cf*. Fig. 91), the propodeum strongly transverse (Fig. 115), and the metafemur enlarged and ventrally dentate (Fig. 105). Metafemoral structure is unknown for *Dasycleonymus* n. sp. #1 because both hind legs are missing from the single broken female, but the preclaval segment has only a slight angulation, the scrobal depression is very shallow, the toruli are widely separated (*cf*. Fig. 84), and the propodeum is intermediate in structure (*cf*. Fig. 118) between the strongly transverse propodeum of *D. bakeri* and the posteriorly projecting propodeum of most Cleonymini (Figs 111, 113, 119*a*). Of these features, I hypothesize scrobal and propodeal structure as apomorphic, but preclaval structure as plesiomorphic relative to *D. bakeri*. The single broken female of *D. bakeri* is described out of necessity in order to formalize the genus. The second known female and species is not described at this time because it is incomplete, lacking the hind legs. It is unfortunate that the hind legs are missing. If the metafemur is not enlarged and lacks teeth, then the species would be readily classified in *Cleonymus* except for the setose dorsellum. The only features that would remain to distinguish *Dasycleonymus* from other Cleonymini are the dorsally carinate metacoxa and laterally margined gaster of males.

Key to species of *Dasycleonymus* new genus

1 Female **2**
– Male **3**

2(1) Head with abruptly raised interantennal region and deep, bell-shaped scrobal depression (Figs 89, 90); preclaval segment of flagellum with apical margin projecting into long fingerlike process along side of clava (*cf*. Fig. 91);

scutellum highly convex, posteriorly obviously curved down onto dorsellum (Fig. 108); gaster elongate-lanceolate, about 3 times as long as wide; ovipositor sheaths unmodified; postmarginal vein slightly less than length of marginal vein and less than twice length of stigmal vein . . . ***Dasycleonymus bakeri*** **n. sp.**

– Head with weakly convex interantennal region and very shallow, obscure scrobal depression (*cf*. Figs 83, 84); preclaval segment of flagellum with apical margin only slightly angulate; scutellum almost flat; gaster ovate, only about twice as long as wide; ovipositor sheaths terminating apically in several sharp, toothlike denticles; postmarginal vein very slightly longer than length of marginal vein and about 3 times length of stigmal vein [Sulawesi (1♀ RMNH)] . . . . ***Dasycleonymus*** **n. sp. #1**

3(1) Gt$_5$ punctate [Vietnam (1♂ ROMT), Thailand (1♂ CNCI)] . . ***Dasycleonymus*** **sp. M#1**

– Gt$_5$ with more or less scalloped sculpture formed from series of ∩-like marks or impressions (Figs 123, 124) . . . . ***Dasycleonymus bakeri*** **n. sp.**

Dasycleonymus bakeri **new species**

Figs 89, 90, 105–108, 115, 116, 123–125

Type-material. *Holotype* ♀ (BMNH) — Sandakan, Borneo, Baker / ♀ Systelomorphella [crossed out] Zolotarewskya bakeri sp. n. Z. Bouček det. 1973. *Allotype* ♂ (BMNH) — SARAWAK: Gunong Mulu Nat. Park, R.G.S. Exped. X.1977. *Paratypes* — BORNEO: SARAWAK, sw. Gunung Buda, 64 km s. Limbang, 3°13'N 114°56E', 16–21.XI.1996, MT, SL Heydon & S Fung (1♂ UCDC). INDONESIA: Borneo, West Kalimantan, Gunung Palung Nat. Pk., 15 JUN - 15 AUG 1991, Darling, Rosichon, Sutrisno, IIS 910131 (1♂ ROMT). INDONESIA: Sumatra, Aceh Gunung Leuser Nat. Pk., Ketambe Res. Sta., 1-31 MAR 1990, per DC Darling, IIS 900019 (1♂ ROMT).

Etymology. Named after the collector, which was the desire of Z. Bouček when he recognized it as an undescribed species.

Description. FEMALE. Head and body dark with obscure metallic blue luster, most conspicuously on propodeum; antenna uniformly yellowish brown; legs dark brown beyond coxae except tarsi white; forewing hyaline with brownish region behind stigmal and postmarginal veins over about anterior two-thirds of wing.

Head (Figs 89, 90) with lower face reticulate, upper face with much smaller reticulations; toruli separated by distance equal to about 1.7 times width of torulus; scrobal depression with deep scrobes and short, shallow, bell-shaped scrobal channel above abruptly inclined interantennal region; vertex rounded into occiput; eye densely but inconspicuously microsetose. Antenna with scape elongate, about 6 times as long as medial width, cylindrical basally but expanded apically; apex of preclaval segment projecting as angulate extension appressed to and superficially part of clava.

Mesosoma with mesonotum reticulate, the reticulations largest on scutellum and posterior of mesoscutum, becoming reticulate-punctate anteriorly on mesoscutum and reticulate-scabrous on axilla. Scutellar-axillar complex with scutellum highly convex and axilla subvertical; scutellum with entire marginal rim differentiated by crenulate sulcus, the rim slender, flat, shiny, and vertical laterally, but posteriorly projecting slightly beyond apex of scutellum at midline (Figs 108, 115). Propodeum strongly transverse (Fig. 15); panel shiny, but very finely coriaceous. Forewing hyaline behind parastigma, but with brownish region behind stigma and postmarginal veins over about anterior two-thirds wing; smv:mv:pmv:sv = 10:4.5:3.5:2.1. Hind leg with femur expanded ventrally to widest point, a denticulate lobe, near its middle, and with several small denticles evenly spaced along margin apical to lobe (Fig. 106); metatibia slightly curved basally.

Gaster elongate-lanceolate, about 3 times as long as wide; Gt_1 smooth and shiny; Gt_2 a narrow shiny strip between Gt_1 and Gt_3; Gt_3 transversely punctate-strigose basally and smooth and shiny apically; Gt_4 with similar sculpture to Gt_3 except basal sculptured region about twice as long as apical smooth band; Gt_5 with basal smooth band (Fig. 125) (artifact?, see Remarks), otherwise punctate-scabrous to coriaceous posteriorly; Gt_6 and Gt_7 coriaceous-scabrous. Ovipositor sheaths unmodified.

MALE. Color similar to female except scape yellowish and flagellum dark brown; legs with knees and apex of tibiae to entire metatibia yellowish brown; forewing entirely hyaline. Head similar to female except region above interantennal region flat, without obviously differentiated scrobal channel, and toruli separated by about twice width of torulus. Antenna with short scape only about 3 times as long as medial width, flagellum clavate to robust filiform. Mesosoma (Fig. 107) similar to female except for bare dorsellum (Fig. 116). Legs similar to female except metacoxa dorsally carinate and metafemur not as conspicuously enlarged, with about apical half of ventral margin denticulate (Fig. 106). Gaster ovate (Fig. 123); Gt_1 and Gt_2 meshlike coriaceous; Gt_3–Gt_5 with distinctive sculpture formed by ∩-like impressed lines (Fig. 124).

Remarks. I suspect the basal smooth band on Gt_5 of the female is normally covered by Gt_4, and is exposed only because the gaster is abnormally distended between Gt_4 and Gt_5. The holotype is disarticulated; the various parts are glued to a card, but surprisingly complete. The meso- and metasoma are together on the card, with the head separated and mounted on the card face up. The two antennae are separated from the head and glued to the card separately, one by the scape and the other by the clava. Both middle legs are disarticulated beyond the coxae and glued to the card, as is the left hind leg and right hind wing. The only part missing is the left foretibia and tarsus (apical three tarsal segments of foretarsus glued to card). Because of the condition of the antennae I am not entirely confident of the structure of the preclaval segment. The apex of the preclaval segment appears to be angulate, but because it is closely appressed to the clava and does not project above the surface of the clava I am unsure of its exact length. I doubt whether the two males designated as *Dasycleonymus* sp. M#1 are the opposite sex of the female designated as *Dasycleonymus* n. sp. #1. The difference in gastral sculpture between these males and those described as *D. bakeri* males more likely represents infraspecific variation. The male from Vietnam has the gastral terga distinctly punctate, but the male from Thailand has sculpture somewhat intermediate between distinct punctures and ∩-like marks (Fig. 120*a*).

Notanisus Walker
Figs 83, 113, 114, 129

Notanisus Walker, 1837: 352. Type species: *Notanisus versicolor* Walker; by monotypy.

Pannonica Erdös, 1946: 131; primary homonym of *Pannonica* Loerenthey (1895). Type species: *Pannonica sexramosa* Erdös; by original designation. Synonymy by Bouček (1991: 204).

Antsingia Risbec, 1952: 372. Type species: *Antsingia sylvatica* Risbec; by monotypy. Synonymy by Rasplus *in* Bouček (1991: 204).

Pannoniella Erdös, 1960: 306. Replacement name for *Pannonica* Erdös. Synonymy by Bouček (1991: 204).

Amarisca Delucchi, 1962: 11. Type species: *Amarisca oulmesiensis* Delucchi; by original designation. Synonymy by Bouček (1991: 204).

Anacallocleonymus Yang, 1996. Type species: *Anacallocleonymus gracilis* Yang; by original designation. **New synonymy**.

Diversity. Eleven nominal and an unknown number of undescribed species in the Old World. I have also seen a single male collected in 1982 from Middlesex Co., Massachusetts (USA) (CNCI), which may represent an accidental introduction into North America.

***Notanisus clavatus* Bouček**, 1961: 471–474; ♀ holotype (NMPC). DISTRIBUTION: *Cyprus (BMNH), Georgia, *Greece (BMNH).

✓ ***Notanisus gracilis* (Yang), new combination**. *Anacallocleonymus gracilis* Yang, 1996: 85–86, 308–309; ♀ holotype (NWCF). DISTRIBUTION: China: (Shaanxi).

***Notanisus grandis* Senatos**, 1996: 93–94; ♀ holotype (ZIKU). DISTRIBUTION: Tadjikistan.

✓ ***Notanisus imperialis* (Dodd), new combination**. *Aplatygerrhus imperialis* Dodd, 1924: 163; ♀ holotype (SAMA). *Cleonymus imperialis* (Bouček 1988*a*: 263). DISTRIBUTION: Norfolk Island.

Note: Dodd stated in the original description that the unique female had “a very short petiole.” Examination of the holotype shows the gaster is distinctly petiolate rather than sessile. The apical flagellar segments are missing so that the exact structure of the claval and preclaval segments is not evident from the type, but Dodd also stated “apical funicle joint with a long lateral extension, or sinuous process, that embraces the conical club.” Additional females from Norfolk Island and Philip Island (ANIC) I identify as conspecific with *A. imperialis* have the clava sinuately attenuated to an acute tip and the preclaval segment with a long, narrow but attenuated process extending almost to the apex of the clava. The forewing has four infuscate regions, as described by Dodd, including a distinct cross-band near midlength of the submarginal vein. This cross band and the basal cell have longer black setae than apical to the infuscate band. I assign this species to *Notanisus* because of these features.

***Notanisus oulmesiensis* (Delucchi)**. *Amarisca oulmesiensis* Delucchi, 1962: 12–13; ♀ holotype (location uncertain). Combination by Bouček (1991: 204). DISTRIBUTION: *Cyprus (BMNH), *Greece (BMNH), Morocco.

✓ ***Notanisus richteri* (Girault)**. *Systolomorphella richteri* Girault, 1922[365]: 154. Combination by Bouček (1988*a*: 262). DISTRIBUTION: Australia (ACT, QLD).

= ✓ *Systolomorphella dinotipennis* Girault, 1922[365]: 154. Synonymy by Bouček (1988*a*: 262).

***Notanisus sexramosus* (Erdös)**. *Pannonica sexramosa* Erdös, 1946: 132–133; ♂ holotype (HNHM). Combination by Bouček (1991: 204). *Pannoniella sexramosa* (Erdös, 1960: 306). DISTRIBUTION: Europe (Noyes 1998).

***Notanisus sylvaticus* (Risbec)**. *Antsingia sylvatica* Risbec, 1952: 373–374; ♀ holotype (MNHN). Combination by Bouček (1991: 204). DISTRIBUTION: Madagascar.

✓ ***Notanisus versicolor* Walker**, 1837: 352–353; ♀ type (BMNH: 5.1628). DISTRIBUTION: Algeria, Europe (Noyes 1998), India.

✓ ***Notanisus zebra* Bouček**, 1988*a*: 262; ♀ holotype (BMNH: 5.3246). DISTRIBUTION: Papua New Guinea.

Biology. The type material of *N. oulmesiensis* was reared from wood infested with *Scolytus mediterraneus* Eggers (Scolytidae) and *Anthaxia* sp. (Buprestidae) (Delucchi 1962), whereas both *N. sexramosus* and *N. versicolor* have been reared from species of *Tetramesa* (Eurytomidae) in grass stems (Bouček 1958, 1988*a*).

Description. *Head* (Fig. 83) with metallic luster unless brown; without distinct scrobal depression, the scrobe only slightly depressed dorsal to torulus, and with interantennal region and lower parascrobal region weakly convex; female face and frontovertex reticulate to coriaceous, face often transverse-reticulate and frontovertex often coriaceous; vertex rounded into occiput though sometimes very narrowly so.

Antenna inserted at least slightly below level of lower margin of eyes in female, but either below or above level of lower margin of eyes in male. Female flagellum with apical margin of preclaval segment angulate or extending more conspicuously as attenuated fingerlike process along side of clava; clava with variably distinct digitlike process apically and with at most a small ventroapical region of differentiated trichoid sensilla (*cf*. Fig. 92); funicular segments with trichoid sensilla uniformly hairlike when flagellum viewed in profile (*cf*. Fig. 91). Male flagellum ramose, with 4–6 long, slender rami originating from ringlike segments, hence rami closely approximated (*cf*. Fig. 98).

Mesosoma. Mesonotum with metallic luster unless brown; mesoscutum reticulate to scabrous. Scutellar-axillar complex with scutellum convex and axilla inclined at steep angle relative to scutellum; scutellum with complete, shiny, crenulate marginal rim (Fig. 114); axilla usually with obviously shallower sculpture than on mesoscutum and/or scutellum, sometimes entirely smooth and shiny (Fig. 113). Dorsellum bare, smooth and shiny. Propodeum (Figs 113, 114) projecting posteriorly between metacoxae, with longitudinal, crenulate, postspiracular furrow continuous with obliquely angled, crenulate, posterolateral margin; plical region variable in sculpture, uniformly reticulate to smooth and shiny, excluding median carina. Mesepimeron bare or with setae along extreme posterior margin. Metapleuron often partly reticulate ventrally but smoother dorsally, to entirely smooth and shiny or with only obscure coriaceous sculpture, and variably setose or bare (Fig. 114).

Forewing. Female sometimes micropterous or brachypterous; forewing of macropterous forms with variable infuscate pattern; usually largely to entirely bare basal to level of marginal vein, but rarely uniformly setose; postmarginal vein much shorter than marginal vein and only slightly longer than stigmal vein.

Legs. Metacoxa not dorsally carinate; metafemur neither conspicuously enlarged nor toothed ventrally.

Metasoma. Petiole distinct (Figs 113, 114), often yellowish in female, and at least quadrate in both sexes. Gaster with terga unmargined in either sex; Gt_1 and Gt_2 of female comparatively small, smooth and shiny, but subsequent terga transverse-strigose to netlike-coriaceous or with slightly ∩-like scalloped sculpture (Fig. 129).

Remarks. Considerable variation occurs in structure and sculpture of *Notanisus* females. I suspect male flagellar structure is also variable. Known males of currently described species have a ramose flagellum, but I suspect males of some species have a filiform flagellum or one with only lobate rather than ramose segments. The characteristic long petiole of female *Notanisus* may have evolved several times within Cleonymini and the ramose flagellum of known males may only characterize one of the lineages. *Notanisus* probably is a grade-level taxon that renders *Cleonymus* paraphyletic and likely should be synonymized with *Cleonymus*. However, *Notanisus* may itself be rendered paraphyletic by *Callocleonymus*, a demonstrably monophyletic taxon, and I prefer not to make nomenclatural changes until limits of variation in male antennal structure and species relationships are more confidently known.

The male from Massachusetts has a flagellum with seven long branches; six of the branches are comprised of a long ramus on each of fl_2–fl_7 and the seventh branch is composed of fl_8 plus the clava. This is the same flagellar structure possessed by males of a species from South Africa (CNCI) I assign to *Zolotarewskya* because of a toothed metafemur.

Females of one species I assign to *Zolotarewskya* based on metafemoral structure have a long but laterally setose petiole. Two females from Brunei (BMNH) and Borneo (UCDC) of another species I assign to *Cleonymus* have a distinct but only subquadrate, dark petiole. These females also have the metapleuron uniformly reticulate and setose, Gt_4 and Gt_5 with a netlike pattern of sculpture formed by very slightly raised ridges, the marginal rim of the scutellum vertical laterally and attenuated to just a carina posteriorly, the axillae virtually as strongly reticulate as the mesoscutum, and the vertex carinately margined. A carinately margined vertex is known for some *Cleonymus* as well as some *Zolotarewskya* females, some of which also have a reticulate gaster with the sculpture formed by raised ridges (Fig. 128). A revision and phylogenetic analysis of the world species of Cleonymini is necessary to establish whether this species represents a basal lineage of *Notanisus* or whether its comparatively long petiole evolved independently, in which case the species is more likely more closely related to some species classified in *Cleonymus*. Because I suspect the latter, I restrict *Notanisus* to species in which the metapleuron of females is smooth to finely coriaceous, at least dorsally, though often uniformly setose.

***Zolotarewskya* Risbec**

Figs 92, 97–99, 103, 104, 110, 128, 130

Zolotarewskya Risbec, 1955: 180. Type species: *Zolotarewskya seyrigi* Risbec; by original designation. Synonymy with *Systolomorphella* Girault by Bouček (1976*a*: 10); reestablished as valid by Bouček *et al.* (1979: 460).

Pseudocleonymus Hedqvist, 1967*b*: 184. Type species: *Pseudocleonymus spinifer* Hedqvist; by original designation. Synonymy by Bouček *et al.* (1979: 460).

Diversity. Eight described and an unknown number of undescribed species; all specimens I have seen are from the Old World except for a female and male of an unidentified species from Hawaii (BPBM).

***Zolotarewskya indica* (Mani & Kaul)**. *Chalcedectus indicus* Mani and Kaul *in* Mani *et al.*, 1973: 50–53; ♂ holotype (USNM?). Combination by Bouček *et al.* (1979: 460). DISTRIBUTION: India.

***Zolotarewskya longicostalia* Yang**, 1996: 90, 309; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

✓ ***Zolotarewskya lyra* (Girault)**. *Systolomorphella lyra* Girault 1919[347]: 167–168; ♀ lectotype (BMNH: 5.734). Combination by Bouček *et al.* (1979: 460). DISTRIBUTION: Singapore.

✓ ***Zolotarewskya robusta* Yang**, 1996: 87–90, 309; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

***Zolotarewskya seyrigi* Risbec**, 1956: 180–182; 2♀ syntypes (MNHN). Combination reestablished by Bouček (1988*a*: 264). *Systolomorphella seyrigi* (Bouček 1976*a*: 10). DISTRIBUTION: Madagascar.

✓ ***Zolotarewskya shakespearei* (Girault)**. *Systolomorphella shakespearei* Girault, 1926[400]: 2. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

✓ ***Zolotarewskya spinifera* (Hedqvist)**. *Pseudocleonymus spinifer* Hedqvist, 1967*b*: 184–186; ♀ holotype (MHNG). Combination by Bouček *et al.* (1979: 460). *Systolomorphella spinifera* (Bouček 1976: 10). DISTRIBUTION: Algeria.

✓ ***Zolotarewskya unnotipennis* (Girault), new combination**. *Systolomorphella unnotipennis* Girault, 1915[240]: 222–223. *Cleonymus unnotipennis* (Bouček 1988*a*: 264). DISTRIBUTION: Australia (QLD).

Note: All that remains of the unique female holotype is a slide containing one foreleg and hind leg, antenna, and apical tarsal segment of a leg (Dahms 1986). Girault originally described the "hind femur beneath with three large and one small teeth", which matches the structure of the remaining metafemur. For this reason I assign the species to *Zolotarewskya*.

Biology. Species of *Zolotarewskya* have yet to be reared for definitive host records, but Yang (1996) collected the type material of *Z. longicostalia* and *Z. robusta* on branches and twigs infested with species of Anobiidae, Buprestidae, Curculionidae and Scolytidae (Coleoptera).

Description. *Head* usually with distinct metallic luster; scrobes variable, usually as shallow depression above each torulus (*cf*. Fig. 84) but sometimes distinct ventrally with abruptly raised interantennal region and with lower parascrobal region abruptly raised near torulus, with face flat or only slightly depressed above interantennal region, without distinct scrobal channel (*cf*. Figs 87, 88); face and frontovertex reticulate to scabrous; vertex usually rounded into occiput though rarely carinately margined.

Antenna. Female flagellum with apical margin of preclaval segment angulate or more conspicuously attenuated into fingerlike process along side of clava; clava attenuated apically into short digitlike process and with at most a small ventroapical region of differentiated trichoid sensilla when flagellum viewed in profile (Fig. 92). Male flagellum robust-filiform to lobate (Fig. 97) or ramose (Fig. 98), and if filiform then clava tapered to point without distinctly differentiated micropilose sensory region and funicular segments with trichoid sensilla uniformly hairlike.

Mesosoma. Mesonotum with or without distinct metallic luster; mesoscutum reticulate to punctate-reticulate. Scutellar-axillar complex with scutellum variably convex but with axilla abruptly inclined (Fig. 110), both scutellum and axilla usually almost uniformly reticulate; scutellum with entire, uniform marginal rim, or with rim evident laterally but either attenuated to carina or obsolete posteromedially. Dorsellum bare, usually shiny but sometimes punctulate. Propodeum variable, sometimes transverse-rectangular with posterior margin of nucha and callus almost at same level (*cf*. Fig. 118), but usually plical region more or less distinctly narrowed and projecting posteriorly between base of metacoxae, with longitudinal, crenulate, postspiracular furrow continuous with obliquely angled, crenulate, posterolateral margin (*cf*. Fig. 114); plical region variable in sculpture, coriaceous-reticulate to smooth and shiny, excluding median carina. Mesepimeron usually with line or narrow band of setae along posterior margin, and except very rarely with patch of setae on upper mesepimeron. Metapleuron uniformly setose and usually distinctly though sometimes very finely sculptured (Fig. 110).

Forewing. Female forewing hyaline to variably extensively infuscate behind marginal and stigmal veins; usually entirely setose basal to level of marginal vein, but sometimes with distinct speculum and with basal cell partly bare; postmarginal vein subequal in length with, to much shorter than, marginal vein.

Legs. Metacoxa not dorsally carinate; metafemur ventrally with at least 2 and often several well-separated lobelike teeth, with basal-most tooth (sometimes very small and denticlelike) near middle or within at least apical third of femur, and usually with longest tooth not the basal-most tooth (Figs 103, 104).

Metasoma. Petiole transverse in female or if rarely elongate then setose laterally, and quadrate to longer than wide in male. Gaster with terga unmargined in either sex; Gt_1 and Gt_2 of female comparatively small, smooth and shiny, with subsequent terga transversely strigose or with netlike pattern of sculpture formed by slightly raised ridges (Fig. 128).

Remarks. As discussed under Remarks for Cleonymini, *Zolotarewskya* is likely paraphyletic relative to *Cleonymus*, or *vice versa* depending on the groundplan structure of the metafemur. All *Zolotarewskya* and some *Cleonymus* have a toothed metafemur, though the structure is slightly different in the two genera. Individuals of *Zolotarewskya* have the basal-most tooth between about the middle (Fig. 104) and apical third of the metafemur (Fig. 103), and if near the apical third then it is not the longest tooth, there is a small but distinct tooth or denticle basal to the longest tooth (Fig. 103). Those *Cleonymus* with distinct metafemoral teeth have the basal-most tooth somewhat more apical, within about the apical quarter, and the basal-most tooth is the longest tooth (Fig. 102). *Zolotarewskya* is at least indicated to be quite a basal lineage in Cleonymini as compared with *Notanisus, Callocleonymus* and some species of *Cleonymus* (see Remarks for Cleonymini). Known females have a netlike-reticulate gastral sculpture formed by slightly raised ridges (Fig. 128), which otherwise is possessed only by females of some species of *Cleonymus*.

HEYDENIINI

Remarks. Hedqvist (1961) established Heydeniini for the genus *Heydeniopsis,* which he described from Baltic amber, and genera now considered to be synonymous with *Heydenia*. He did not state explicitly why he distinguished the tribe or included *Heydeniopsis* in it, but in his key to tribes of Cleonyminae he differentiated Heydeniini based on the clava being distinctly 3-segmented compared with other cleonymines. *Heydeniopsis* was illustrated as having a distinctly 3-segmented clava. Although *Heydenia* has a 3-segmented clava, so does *Oodera* and most other non-cleonymine Pteromalidae (see characters 12, 13). A 3-segmented clava is undoubtedly symplesiomorphic for Heydeniini and does not support monophyly of the tribe. The only known apomorphic state that may support monophyly of Heydeniini in Cleonyminae is a forewing that is comparatively bare basally. *Heydenia* at least has a large speculum and the basal cell partly bare (Fig. 149) rather than the forewing being entirely or almost entirely setose basally as for most other Cleonyminae, though the feature is homoplastic (see character 37). Whether the forewings of *Heydeniopsis cleonymoides* were more extensively setose or also largely bare basally is unknown because the wings were not preserved (Hedqvist 1961). Furthermore, the unique female type specimen was damaged when received on loan from NHRS in 2001. The remaining inclusion differed from the published illustration by lacking the frontal surface of the head and the dorsal surface of the mesothorax. The posterior, central part of the gaster is also missing and this portion of the gaster was not illustrated originally by Hedqvist. This suggests the inclusion was very near the surface and part of the gaster was already missing at the time of the description. It seems likely the upper surface of the specimen was further abraded some time subsequent to the description, quite likely during shipment because fragments that look like cuticle and fossilized thoracic musculature were found with the amber block.

Based on the excellent illustrations provided by Hedqvist (1961, figs 2A, 2B) and the parts of the type remaining, I concur that *H. cleonymoides* is closely related to extant *Heydenia*. The illustration shows a distinctive propodeal sculpture pattern, including a somewhat Y-like median carina and longitudinal paramedial carinae, which is very similar to some extant *Heydenia* (Fig. 140). Also, the ventral surface of the prepectus is now visible because the dorsal surface of the thorax was destroyed. The prepectus is large and it has a longitudinal medial region and a posteromedial, convex oval region, much like that illustrated in Fig. 138. The pronotum appears to be similar to some species of *Heydenia* that have a transverse, reticulate collar distinctly differentiated from an inclined neck. Hedqvist (1961) did not state what features of *Heydeniopsis* he thought differentiated it from other genera he recognized in Heydeniini (*Heydenia* and *Paraheydenia*), though he did describe the clava as having an “appendage as in the genus *Cleonymus*.” I am uncertain whether this referred to the tiny apical spicule or the differentiated lateral region of the clava illustrated by Hedqvist (1961, fig. 2B), but the elongate lateral region most likely represents a collapsed or more membranous area rather than an elongation of the preclaval segment as in Cleonymini. Morphologically, *Heydenia* is quite a diverse genus (see below) and *Heydeniopsis* might be a synonym, but a more complete specimen with forewings is needed to confirm this possibility.

Putative relationships of *Heydenia* within Pteromalidae differ within the phylogenetic parsimony analysis depending on outgroup selection (see phylogenetic analysis, Figs 1*b*, 1*d*). Monophyly and relationships of *Heydenia* are uncertain, in part because of uncertainty concerning the groundplan states of the genus. Individuals of *Oodera* and some species of *Heydenia* share a functionally correlated suite of three features of the pronotum, prepectus and forelegs, which might be synapomorphic for *Oodera* + *Heydenia*. However, an undescribed species from Malaysia exhibits a suite of features (see Remarks for *Heydenia*) I believe likely closely resemble the groundplan features of *Heydenia*. If so, the conspicuous modifications shared between *Oodera* and some *Heydenia* result from convergence. Structure of the scutellum of the undescribed species is most similar to *Grooca* + *Solenura* within Lyciscini. Individuals of *Heydenia* also have a row of spicules on the dorsal surface of the protibia (Figs 144, 146), which is shared with *Parepistenia* + *Marxiana* within Lyciscini. However, spicules on the dorsal surface of the protibia are present in several groups of parasitoids of wood-boring beetles and likely evolved as one modification to help the adult exit the host tunnel (see character 41). There is no substantial evidence that *Heydenia* and *Oodera* comprise sister taxa and because of this I retain both as tribes *sensu* Bouček (1988*a*).

***Heydenia* Förster**

Figs 131–150

Heydenia Förster, 1856: 46, 48–49. Type species: *Heydenia pretiosa* Förster; by monotypy.

Paraheydenia Cameron, 1912*a*: 653–654. Type species: *Paraheydenia longicollis* Cameron; by monotypy. Synonymy by Bouček (1988*a*: 266).

Pterooderella Risbec, 1952: 84. Type species: *Pterooderella ornata* Risbec; by original designation. Synonymy by Bouček (1988*a*: 266).

Risbecisca Hedqvist, 1960: 418. Type species: *Lycisca burgeoni* Risbec; by original designation. Synonymy by Bouček (1988*a*: 266).

Heydenisca Hedqvist, 1967*a*: 142–143. Type species: *Heydenisca mateui* Hedqvist; by original designation. Synonymy by Bouček (1988*a*: 266).

Diversity. Nineteen nominal and several undescribed species present in the Nearctic, Palearctic, Afrotropical, Oriental and Australasian regions. The genus is not yet known from South America, but I have seen one female from Chiapas, Mexico (CNCI). This female may represent an undescribed species, but more likely is a very dark specimen of *H. unica*. Two females from Texas (CASC) and one male from Arizona (CNCI) definitely represent a second species for North America based on several features (see Remarks).

***Heydenia angularicoxa* Yang**, 1966: 94–95, 310; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi, Beijing).

***Heydenia burgeoni* (Risbec)**. *Lycisca Burgeoni* Risbec, 1955: 541; ♀ holotype (MNHN). Combination by Bouček (1988*a*: 266). *Risbecisca burgeoni* (Hedqvist 1960: 418). DISTRIBUTION: Zaire.

✓ ***Heydenia coomoni* Xiao and Huang**, 2002: 145–148; ♀ holotype (CASB). DISTRIBUTION: China (Beijing), Vietnam.

✓ ***Heydenia cristatipennis* (Girault)**. *Paraheydenia cristatipennis* Girault, 1924[373]: 3. Combination by Bouček (1988*a*: 266). DISTRIBUTION: Australia (QLD).

***Heydenia indica* Narendran** *in* Narendran *et al.*, 2001: 150–152; ♀ holotype (DZUC). DISTRIBUTION: India (Kashmir).

✓ ***Heydenia longicollis* (Cameron)**. *Paraheydenia longicollis* Cameron, 1912*a*: 654–655; ♂ holotype (BMNH: 5.892). Combination by Bouček (1988*a*: 266). DISTRIBUTION: Australia (NSW, QLD).

***Heydenia madagascariensis* (Hedqvist)**, **new combination**. *Paraheydenia madagascariensis* Hedqvist, 1961: 96; ♀ holotype (BMNH). DISTRIBUTION: Madagascar.

***Heydenia mateui* (Hedqvist)**. *Heydenisca mateui* Hedqvist, 1967*a*: 144–145; ♀ holotype (MNHN). Combination by Bouček (1988*a*: 266). DISTRIBUTION: Chad.

✓ ***Heydenia natalensis* (Westwood)**. *Lycisca natalensis* Westwood, 1874: 149; ♂ holotype (OXUM: T. 672). Combination by Hedqvist (1959: 177). DISTRIBUTION: South Africa.

***Heydenia ornata* (Risbec)**. *Pterooderella ornata* Risbec, 1952: 84–87; 4♀ syntypes (MNHN). Combination by Bouček (1988*a*: 266). DISTRIBUTION: Madagascar.

***Heydenia pretiosa* Förster**, 1856: 46, 48–49; ♀, ♂ syntypes (NMWA). DISTRIBUTION: Europe (Noyes 1998).

= *Heydenia excellens* Wachtl, 1889: 89–91; ♀, ♂ syntypes (NMWA). Synonymy by Hedqvist (1957: 39, 40).

= *Lycisca silvestrii* Russo, 1938: 195–205; 2♀, 1♂ syntypes (DEZA). Synonymy by Hedqvist (1961: 94).

✓ ***Heydenia scolyti* Yang**, 1966: 92–94, 309–310; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi, Beijing).

***Heydenia seyrigi* (Risbec)**. *Lycisca Seyrigi* Risbec, 1952: 387–390; ♀ holotype (MNHN). Combination by Hedqvist (1959: 177). DISTRIBUTION: Madagascar.

✓ ***Heydenia testacea* Yang**, 1966: 95–96, 310; ♀ holotype (NWCF). DISTRIBUTION: China (Jiangsu, Shaanxi).

✓ ***Heydenia trinodis* Bouček**, 1988*a*: 266–267; ♀ holotype (BMNH: 5.3247). DISTRIBUTION: Papua New Guinea.

***Heydenia tuberculata* Sureshan**, 2000: 197–198; ♀ holotype (ZSIK). DISTRIBUTION: India (Karnataka).

✓ ***Heydenia unica* Cook & Davis**, 1891: 15–16; ♀ holotype (USNM: 1850). DISTRIBUTION: USA (Noyes 1998).

Biology. Parasitoids of the larvae and pupae of wood-boring beetles of the families Buprestidae, Cerambycidae, Curculionidae, and Scolytidae (Noyes 1998). Dix and Franklin (1983) investigated the biology of *H. unica*.

Description. *Head* (Fig. 131) with bell-shaped scrobal depression extending at least half distance to anterior ocellus but not attaining ocellus, the depression carinately margined laterally and smoothly merging with vertex below ocellus; vertex variable in width; upper parascrobal region sometimes with somewhat cristate sculpture, but not raised above plane of eye or vertex; interantennal region and parascrobal region with translucent lanceolate or spatulate setae; without occipital carina. Eye superficially bare to very sparsely and inconspicuously microsetose.

Antenna inserted about in line with lower margin of eyes, with about dorsal (Fig. 131) to ventral margin of torulus in line with lower orbits; flagellum (Fig. 132) with first segment transverse or only about as long as wide and much shorter than pedicel; funicle 8-segmented; preclaval segment and clava without processes; clava 3-segmented.

Mesosoma. Pronotum without median line but otherwise variable in structure, sometimes with transverse, horizontal collar differentiated from abruptly inclined neck, and with lateral panel bent at about 90° relative to dorsal surface (Figs 133, 134), or longer and more tentlike, with variably narrow dorsal surface and flat or slightly concave lateral panel angled at about 45° relative to dorsal surface (Figs 135–137); reticulate, on similar plane as, and broadly attached to mesonotum when collar differentiated from neck, but often smoother and shinier, on distinctly lower plane and narrowly articulated with mesonotum when more tentlike. Mesoscutum with transscutal articulation, uniformly reticulate, and with notauli sometimes evident only anteriorly (Fig. 135) but distinctly separated posteriorly if entire (Fig. 133). Scutellum posteriorly evenly curved down to dorsellum, without marginal rim (Figs 140–142); with or without distinct axillular carina or differentiated axillula (Figs 134, 136); and without differentiated frenum, but with frenal line usually evident posterolaterally as smooth line distinguishing posterior margin of axillula. Axilla with anterolateral angle advanced only moderately, variable in sculpture but without abruptly differentiated anterior and posterior regions of sculpture as found in *Oodera*. Dorsellum bare, subvertical, and extending dorsally at least slightly over apex of scutellum (Figs 134, 136, 140–142). Prepectus triangular in lateral view, with posterior margin usually about level with apex of procoxa (Figs 134, 136); in ventral view relatively long with convex, triangular anteromedial region, and posteromedial depression (Fig. 138). Mesopleuron (Figs 134, 136) with distinctly differentiated, slightly convex acropleuron below base of forewing; mesepimeron entirely bare, with upper and lower mesepimeron sometimes differentiated by difference in sculpture or by sulcus. Mesosternum carinate anterior to mesocoxae, without membranous area (Fig. 139), and coxa unable to rotate out of fossa. Metapleuron uniformly sculptured and setose, or less setose to entirely bare and with finer sculpture to smooth and shiny dorsally. Propodeum with crenulate furrow along anterior margin lateral to dorsellum, but otherwise variable in degree of setation and sculpture, sometimes with fine radiating carinae medially (Fig. 141) or with strong, sometimes anteriorly divergent median carina, often with partial (Fig. 142) to entire (Fig. 140) carina extending anteriorly from foramen between median carina and spiracle, and sometimes with transverse, arcuate carina posterior to spiracle.

Wings. Forewing with humeral plate setose along leading margin, but bare dorsally except often for variably large and distinct seta near apical margin (Fig. 143); membrane sometimes with reduced discal setae and without marginal fringe, but at least entirely or partly bare basal to marginal vein, sometimes with line of setae on basal and/or cubital folds and with some setae in basal cell, but then with distinct bare band separating basal setal line from discal setae (Fig. 149); disc with variably large and distinct brownish region adjacent to stigmal vein; vein complex often with tuft of black setae on submarginal vein apically and/or on basal fold near juncture with parastigma (Fig. 150); postmarginal vein at least slightly shorter than marginal vein, often only as long as or only slightly longer than stigmal vein. Hind wing with costal cell narrow, the vein closely paralleling wing margin over most of its length beyond subbasal angulation.

Legs. Profemur relatively slender (Fig. 144) or variably enlarged and with variably denticulate or dentate ventral margin when enlarged (Fig. 145), but without arrangement of spicules and spinelike setae as described for *Oodera*; protibia variable, distinctly curved basally and with inner and outer ventral margins carinate when profemur conspicuously enlarged, and/or with line of two or more pegs on dorsal surface and with one or more dorsoapical pegs (Fig. 146). Middle leg with setae along anteroapical margin of mesotibia and ventrally on mesotarsus not stronger than those on hind leg. Metacoxa rounded to carinately margined dorsally, with outer surface setose or bare; metafemur sometimes denticulate ventrally, but not conspicuously enlarged; metatibia truncate apically, with 1 (*H. mateui*) or 2 tibial spurs.

Metasoma. Petiole varying from a transverse strip to a short tube (Fig. 140) in dorsal view, and entirely sclerotized to variably broadly membranous medially in ventral view. Gaster with Gt_7 and Gt_8 fused into syntergum, with terga not strongly sclerotized or margined laterally, and distinctly exposed and usually of similar length; one or more of Gt_1–Gt_3 usually emarginate; cerci platelike (Figs 147, 148); and with short and broad anal filament extending only over base of ovipositor sheaths (Figs 147, 148). Ovipositor sheaths only about as long as hind basitarsus to as long as rest of gaster.

Remarks. Structures of the foreleg, pronotum, propodeum and petiole, as well as setal patterns of the forewing and metapleuron are highly variable in *Heydenia*. The different states occur in different combinations and seem to intergrade in a continuum. An enlarged and at least ventroapically denticulate profemur appears to be correlated with a longer tentlike pronotum having flared lateral panels, or at least one that is quite smooth and shiny, whereas a slender profemur is correlated with a shorter pronotum that is at least sculptured and sometimes has a more or less distinctly differentiated collar. The two extremes of structure do not seem to be correlated with presence or absence of setal tufts or setal lines on the basal or cubital folds of the forewing. Although the groundplan features of *Heydenia* are uncertain, three females (AEIC) of an undescribed species from Malaysia exhibit features that likely are similar to the groundplan states. These include: 1) pronotum with abruptly inclined neck and transverse-quadrangular, reticulate collar broadly attached to mesothorax; 2) prepectus short ventrally, in lateral view with posterior margin extending to level about equal with half length of procoxa; 3) profemur not enlarged; 4) protibia neither curved nor carinate ventrally, but with pegs along dorsal margin; 5) basal cell distinguished by setae along basal and cubital folds, but largely bare (line of setae within basal cell); 6) parastigma and cubital fold without distinct tufts of setae; 7) forewing disc with large speculum and with only small infuscate region around stigma; 8) mesonotum punctate-reticulate; 9) scutellum with distinct, smooth and shiny frenal arm laterally, but posteromedially uniformly punctate-reticulate and setose to posterior margin; 10) metapleuron uniformly punctate and setose; 11) propodeum with arcuate paramedial carina in addition to median carina, and entirely setose posterior of spiracle to paramedial carina (Fig. 140); 12) metacoxa subcircular in cross-section, without dorsal carina; 13) petiole tubelike; and 14) filamentous ovipositor sheaths longer than gaster. Some other species from the Oriental and other regions, including the unidentified species from southern USA, share some or most of these states with the undescribed Malaysian species. Females of the southern USA species differ most conspicuously from the undescribed Malaysian species by having distinct setal tufts on the parastigma and basal fold, but the wing otherwise bare basally, and by having a large infuscate region behind the stigma and a smaller region behind the parastigma. Presence of *Heydeniopsis cleonymoides* in Europe during the Eocene proves members of the tribe were present at least 40 million years ago. It is possible *Heydeniopsis* is a synonym of *Heydenia* and the morphological diversity of extant *Heydenia* may reflect such an old date of origin for the genus.

The only described species of *Heydenia* in North America, *H. unica*, is very similar to *H. pretiosa* from Europe. Both species are characterized by what I consider to be derived features within the genus, including: 1) a tentlike pronotum (Fig. 135); 2) long prepectus (Figs 136, 138); 3) modified forelegs (Fig. 145); 4) derived forewing setal (Fig. 150) and color patterns; and 5) only a single median carina on the propodeum (Fig. 142). It is not possible to state with certainty when the putative ancestor of *H. unica* + *H. pretiosa* originated, but I interpret distribution of these two species to represent a comparatively recent, possibly Pleistocene, disruption of an originally Holarctic distribution of the common ancestor. An hypothesis that *Heydenia* has a relatively recent history in the New World would not be supported by the presence of the unidentified species of *Heydenia* from southern USA, which possesses many of the hypothesized groundplan states of the genus, unless it is proven this species was accidentally introduced by man from the Old World.

***Heydeniopsis* Hedqvist**

Heydeniopsis Hedqvist, 1961: 94. Type species: †*Heydeniopsis cleonymoides* Hedqvist, 1961: 95–96; by original designation.

Diversity. Monotypic.

Description. See Remarks for Heydeniini and Hedqvist (1961, figs 2A, 2B).

LYCISCINI

Description. *Head* with scrobal depression variable in structure, sides carinately margined or not, but usually convergent dorsally (Figs 151, 195, 219) or at least with distinct scrobes (Figs 168, 180) and common scrobal channel. Interantennal region variable in shape, usually triangular with distance between toruli at least twice width of torulus. Face with parascrobal region variable, sometimes raised above plane of eye as convex, cristate region (Figs 211, 388, 389). Vertex with posterior ocellus contiguous with or variably separated from inner orbit. Occiput often without occipital carina, but sometimes with longitudinal carina on either side of occipital foramen (Fig. 304) or with complete ∩-like carina (Figs 282, 305). Gena sometimes (only New World fauna) with genal carina or more distinct flange extending from mouth corner at ventrobasal angle of mandible (Figs 308, 346, 357). Eye bare to conspicuously microsetose.

Antenna. Flagellum usually with 8, sometimes 7 segments; preclaval and claval segments with spinelike process only in *Nepistenia* (*Anepistenia*), with process of clava a prolongation of the cuticle and not articulated (Fig. 246); one or more preclaval segments and/or clava sometimes with large and collapsing or otherwise differentiated sensory regions (Figs 164, 175, 188); clava usually 1-segmented (Figs 164, 224, 246), but rarely 2-segmented in some males (Fig. 254) or 3-segmented (Fig. 264).

Mesosoma. Pronotum visible in dorsal view but variable in structure, usually with smooth and shiny median line extending for variable distance from anterior margin of neck (line sometimes concealed by posterior of head if neck abruptly inclined) (Fig. 197). Mesoscutum often with coriaceous subsculpture on interstices (Fig. 161); notauli variable, usually evident posteriorly and then widely separated at transscutal articulation. Scutellum dorsally setose to posterior margin or marginal rim, with (Figs 171, 185, 223, 243) or without (Figs 199–202, 268) reflexed marginal rim, though usually with band of aligned crenulae along posterior margin if not obviously reflexed (Figs 214, 251); with or without distinct axillular carina or axillula; and with frenum not differentiated dorsally, at most indicated by frenal arms posterolaterally (Fig. 199). Dorsellum bare to setose (Figs 160, 214) and exposed or variably concealed under apex of scutellum. Mesepimeron bare or variably setose. Metapleuron uniformly setose and sculptured (Figs 156, 184) or partly bare and smoother and shinier dorsally (Figs 186, 312). Propodeum variable, with or without distinct postspiracular furrow or median carina, though with crenulate furrow along anterior margin at least to level about equal with lateral limit of dorsellum (Figs 200–202) and often with crenulate furrow along entire anterior margin and on either side of median carina when median carina present (Fig. 160).

Wings. Forewing usually entirely setose except often with variably distinct bare region immediately beyond basal cell; hyaline or with variable infuscate pattern. Hind wing with costal cell narrow and usually with vein closely paralleling wing margin over much of its length beyond subbasal angulation.

Legs. Profemur ventrally with (Figs 317, 375) or without preapical angulation, but denticulate only in *Neboissia* (Fig. 236); protibia with one or more dorsoapical pegs (Figs 178, 225). Metacoxa with or without dorsal carina and exterior surface bare or variably setose; metafemur sometimes distinctly enlarged (Figs 165, 166, 190), but only rarely denticulate ventrally; metatibia truncate apically, with 2 metatibial spurs.

Metasoma. Petiole variable. Gaster with Gt_7 and Gt_8 fused into syntergum, with or without suture entirely across tergum delineating presumptive line of fusion; terga sometimes margined laterally; cerci low tubercles, platelike. Ovipositor sheaths either not projecting or projecting for variable distance beyond apical tergum, and sometimes comprising part of differentiated 'tail' along with 1 or 2 elongated apical terga.

Remarks. Bouček (1958) established Lyciscini for those cleonymines with a strongly sclerotized gaster having coarse, deep punctures. He also established Thaumasurini for a subset of remaining cleonymines and pteromalids now assigned to other subfamilies having a less strongly sclerotized and sculptured gaster. After more comprehensive study Bouček (1988*a*) considered this differentiating feature as unreliable and synonymized Thaumasurini under Lyciscini. Bouček's (1988*a*) concept of Lyciscini is followed here except that *Chalcidiscelis* is transferred to Boucekiini. Lyciscini is postulated as a monophyletic group based on a single putative synapomorphy, the presence of a smooth and shiny median line on the pronotum (18:1), though some *Chalcedectus* have a similar line on the pronotum and a median line is missing from *Chadwickia* (Fig. 169) and some small-bodied *Proshizonotus* (see character 18 and phylogenetic analysis). Parsimony and intuitive analyses of basal relationships of Lyciscini and of the evolution of the New World fauna are discussed under 'Biogeography of Lyciscini' within the phylogenetic analysis. Any evidence for monophyly of the genera or for sister-group relationships among the genera are discussed under 'Remarks' for the respective genus.

Key to world genera and subgenera of Lyciscini

1 Old world **2**
– New world **17**

2(1) Profemur conspicuously enlarged and ventrally with teeth or serrations over at least apical third (Fig. 236) . . . . ***Neboissia* Bouček**
– Profemur sometimes with distinct preapical ventral angulation, but oblique ventroapical edge not toothed or serrate (Fig. 317) **3**

3(2) Head with upper parascrobal region cristate and raised distinctly above plane of eye to posterior ocellus, the anterior ocellus superficially within scrobal depression (Fig. 211); propodeum setose medially (Figs 214, 215); protibia with spicules along dorsal edge (Fig. 217) . . . . ***Marxiana* Girault**
– Head neither with transversely ridged sculpture nor with upper parascrobal region raised distinctly above plane of eye, the anterior ocellus dorsal to scrobal depression; propodeum only very rarely setose medially; protibia only very rarely with spicules along dorsal edge **4**

4(3) Metatibia compressed, foliaceously (paddlelike), over at least apical half (Fig. 226); upper and lower mesepimeron uniformly setose (Fig. 222); female with syntergum and ovipositor sheaths forming 'tail' as long as or longer than body . . . . ***Mesamotura* Girault**
– Metatibia not conspicuously compressed though sometimes with acutely angled dorsal margin; upper mesepimeron often extensively setose, but lower mesepimeron bare or only rarely narrowly setose along posterior margin; female often without or with much shorter 'tail' **5**

5(4) Flagellum with 7 funicular segments (Fig. 245); specimen small, about 3 mm in length or shorter; head with Λ-like scrobal depression extending about half distance to anterior ocellus, level with angulation of inner orbit (Fig. 239); frontovertex coriaceous, the sculpture formed by impressed lines (Fig. 240); dorsellum bare (Fig. 243) . . . . ***Nepistenia* Bouček** . . . **6**

– Flagellum with 8 funicular segments; specimen often much larger; head often with scrobal depression structured differently, but if similar to above then frontovertex reticulate to rugulose (Fig. 301); dorsellum sometimes partly setose **7**

6(5) Female with spinelike process extending from apical margin of preclaval segment and from clava (Fig. 246); male with oval clava having large sensory region over about apical two-thirds or, if sensory region collapsed, then clava with straight, oblique dorsoapical margin; pedicel longer than clava . . . . ***Nepistenia* (*Anepistenia*) Bouček**

– Female without spinelike process on preclaval or claval segments, though clava attenuated and whitish apically (Fig. 245, bottom); male with clava similar to female, attenuated and whitish apically (Fig. 245, top); pedicel shorter than clava . . . . ***N.* (*Nepistenia*) Bouček**

7(5) Eye elongate-reniform, at least twice as high as wide (Fig. 168); mesonotum covered with mixture of long black and much shorter, mostly black setae; metafemur of female distinctly longer than metatibia and with transverse crenulae dorsally (Fig. 174) so in lateral view margin appears serrate (Fig. 173); metatibia of male with transverse crenulae dorsally . . . . ***Chadwickia* Bouček**

– Eye variable in shape, but distinctly less than twice as high as wide; mesonotum without setal pattern as described above, usually uniformly setose; metafemur of female at least slightly shorter than metatibia and not crenulate dorsally; metatibia of male without transverse crenulae **8**

8(7) Scutellum without reflexed marginal rim, evenly curved down to dorsellum even if band of aligned crenulae evident along posterior margin (Figs 199–202, 250, 251, 266–269); metapleuron entirely punctate and setose (Figs 203, 250, 267) **9**

– Scutellum with posterior margin reflexed into marginal rim (Figs 156, 184, 276, 285, 312); metapleuron sometimes bare as well as much smoother and shinier dorsally than ventrally (Figs 158, 186, 312) **11**

9(8) Gt_3–Gt_5 transversely strigose-coriaceous (Fig. 253), in male relatively lightly sclerotized, collapsing, and not margined laterally; propodeum, at least in female, with basomedial crenulae enlarged to form raised triangular or semicircular basal region (Figs 250, 251); lower mesepimeron entirely bare (Fig. 250); clava 1-segmented in female and 2-segmented in male (Fig. 254) [Australasian] . . . . ***Parepistenia* Dodd**

– Gt$_3$–Gt$_5$ reticulate (Figs 205, 209) to punctate (Figs 270, 271), in male heavily sclerotized and margined laterally (Figs 209, 210, 271); propodeum not modified as described above (Figs 198–202, 268, 269); lower mesepimeron usually setose along posterior margin (Figs 203, 267); clava usually 3-segmented in both sexes (Fig. 264) [Afrotropical, Oriental and Palearctic] **10**

10(9) Gaster with at least Gt$_3$–Gt$_5$ punctate (Figs 270, 271); female with syntergum and abruptly narrowed Gt$_5$ and Gt$_6$ forming elongate ‘tail’, and with at least Gt$_5$ and Gt$_6$ carinate mediolongitudinally (Fig. 270); male with Gt$_1$ having ∨-like or even parallel-sided basal declivity (Fig. 271) . . . . ***Solenura* Westwood**

– Gaster with at least Gt$_3$–Gt$_5$ reticulate (Figs 205–207, 209, 210); female gaster lanceolate, with apical 2 or 3 terga not modified into ‘tail’ (Figs 205–207) and at most Gt$_6$ angulate mediolongitudinally (Fig. 206); male with Gt$_1$ often having broadly ∪-like basal declivity (Fig. 210) . . . . ***Grooca* Sureshan and Narendran**

11(8) Clava and preclaval segment with large, often whitish, flat or collapsing sensory region (Figs 164, 188); upper mesepimeron entirely bare (Figs 156–159, 183–187); dorsellum partly to entirely setose (Figs 160, 185) even if under overhanging scutellum (Fig. 157); propodeum usually extensively setose behind spiracle to level of lateral margin of foramen (Figs 160, 185, 186) **12**

– Clava sometimes with large sensory region, but if preclaval segment with distinctly differentiated sensory region (Fig. 297) then upper mesepimeron with at least a few setae dorsally within subalar pit (Figs 285, 290) and dorsellum bare (Figs 288, 290); propodeum often setose only near margins or laterally to level about equal with inner margin of spiracle **13**

12(11) Head (Figs 151–154) with elongate parascrobal region differentiated by ∧-like to ∩-like scrobal depression extending to or within about 2 OD of anterior ocellus; interantennal region distinctly ∧-like dorsally (often with dorsal and ventral halves differentiated by a difference in convexity or sculpture); female with gaster (Fig. 162) non-collapsing and with posterior margin of Gt$_1$ not emarginate . . . . ***Agamerion* Haliday**

– Head (Figs 179–181) often without elongate parascrobal region because scrobal depression occupies entire or almost entire region between inner orbits, or with depression separated from anterior ocellus by at least 3 OD; interantennal region not distinctly ∧-like because surface gradually slopes dorsally; female with gaster collapsing (Figs 191, 192) or compressed (Fig. 194), at least in air-dried specimens, and usually with posterior margin of Gt$_1$ distinctly emarginate (Fig. 191) . . . . . ***Eupelmophotismus* Girault**

13(11) Metacoxa with exterior surface extensively setose at least apically (often almost entirely setose); propodeum usually extensively and often densely setose behind spiracle to or near level of lateral margin of foramen (Figs 286, 288, 289); head usually with transversely aligned strigose or cristate sculpture on interantennal region and on parascrobal region above dorsal margin of toruli (Fig. 281), and always with elongate parascrobal region smoothly merging with vertex (Figs 280, 281); dorsellum bare (except some *Thaumasura fera* females) (Figs 285–290); pedicel usually obviously elongate, distinctly longer than clava (Fig. 296) **14**

– Metacoxa with external surface bare at least mediolongitudinally (extreme basal margin sometimes setose); propodeum usually setose only near margins or laterally to level about equal with inner margin of spiracle; head without transversely aligned sculpture as described above unless scrobal depression broadly ∩-like with frontovertex delimited by transverse ridge between eyes and dorsellum setose; pedicel usually short, only about as long as clava or shorter **15**

14(13) Body dorsally with dense, somewhat yellowish setae forming triangular setose region over posterior of head, pronotum, medial mesoscutal lobe, and posteriorly convergent anteromedial region of scutellum; propodeum in dorsal view with double posterolateral angulation, and only very sparsely setose laterally to level about equal with inner margin of spiracle . . . . ***Westwoodiana* Girault**

– Body evenly setose dorsally; propodeum in dorsal view with at most a single posterolateral angulation (tooth) and, except very rarely, extensively and often densely setose behind spiracle to level about equal with lateral margin of foramen (Figs 286, 288, 289) . . . . ***Thaumasura* Westwood**

15(13) Metapleuron uniformly sculptured and setose at least dorsally, but ventrally with variably obvious, smooth and shiny, convex marginal rim (at least posteriorly above constricted portion of metacoxa) (Figs 261, 262); dorsellum bare; upper mesepimeron setose dorsally (Fig. 261); gaster non-collapsing, broadest very near base and attenuated posteriorly over most of its length (Fig. 261), the terga sculptured basally and smooth apically (Gt_1 also with basal smooth band), and in female very broadly attached to mesosoma (Figs 260–263) . . . . ***Riekisura* Bouček**

– Metapleuron usually bare and smoother and shinier dorsally than ventrally, but at least setose and sculptured ventrally; dorsellum sometimes setose; upper mesepimeron sometimes bare; gaster often more or less flattened or ovate to elongate-lanceolate, often with different sculpture pattern than described above, and in female not as broadly attached to mesosoma **16**

16(15) Scutellum with transversely striate, flat marginal rim (Figs 275, 276); metacoxa dorsally bare and carinately margined except basally (Fig. 278); propodeum either with flat basomedial shelf (Fig. 273) or with posteriorly convergent rugulose region (Figs 275, 276); metatibia with inner spur conspicuously longer than apical width of tibia . . . ***Striatacanthus* Gibson new genus**

– Scutellum with smooth, reflexed marginal rim (Figs 310–314, 318–323); metacoxa usually at least sparsely setose dorsobasally and only very rarely carinately margined along dorsal length; propodeum variable, but not as described above; metatibia with both spurs at most about as long as apical width of tibia . . . . ***Proshizonotus*** **Girault**

17(1) Parascrobal region raised above plane of eye and cristate (Figs 388, 389) . . . . ***Paralycisca*** **Hedqvist**

– Parascrobal region not raised distinctly above plane of eye and punctate to rugulose **18**

18(17) Metapleuron densely setose ventrally, but bare, smooth and shiny over about dorsal half (*cf*. Fig. 312); mesoscutal medial lobe with a triangular punctate region anteromedially, but otherwise shiny and almost smooth, with fine engraved lines and widely spaced setiferous punctures; forewing with basal cell bare . . . . ***Proshizonotus*** **Girault** (in part)

– Metapleuron uniformly setose and punctate (Figs 315, 341, 352); mesoscutal medial lobe uniformly punctulate to alveolate-punctate; forewing with basal cell setose **19**

19(18) Dorsellum with at least a few setae (Figs 320–323, 359); Gt_1 at least partly punctate to reticulate (Figs 322, 327, 359); Gt_2 exposed for distance equal to at least half length of Gt_3 and/or subequal in length to median length of Gt_1, and partly punctate to reticulate (Figs 322, 327, 330) **20**

– Dorsellum entirely bare (Figs 361, 411); Gt_1 sometimes smooth and shiny (Figs 342, 343, 353, 411); Gt_2 sometimes mostly or entirely concealed under Gt_1 (Figs 409, 352) or smooth and shiny if exposed (Fig. 353) **21**

20(19) Mesonotum with bicolored pattern; dorsellum with only a very few long setae (Fig. 359); metacoxa with carina along dorsal length and bare exterior to carina; female syntergum about 6 times as long as penultimate tergum, with cerci positioned almost midway between posterior margin of penultimate tergum and posterior margin of syntergum . . . . ***Hadroepistenia*** **new genus** (in part)

– Mesonotum variably blue or green to rufous, but without cupreous/dark bicolored pattern; dorsellum densely setose, though often concealed in dorsal view under scutellum (Figs 320–323); metacoxa not carinate, though sometimes acutely angled dorsally, and with setae along dorsal length; female syntergum shorter than or only about as long as penultimate tergum, with posterior margin of penultimate tergum extending to or almost to level of cerci . . . . ***Proshizonotus*** **Girault** (most)

21(19) Propodeal plical region with setae medially, the setae sometimes sparse in smaller individuals (Figs 376–379); scrobal depression extending to anterior ocellus (outer margin of channel extending to level of anterior ocellus even if slightly separated from ocellus), with channel uniformly sculptured and in single flat plane (Figs 372, 373); Gt_2 exposed and distinctly sculptured (Figs 376–379) . . . . ***Lycisca*** **Spinola**

– Propodeal plical region bare or at most setose laterally near paraspiracular carina; scrobal depression often not extending to level of anterior ocellus or with channel smooth and shiny (Figs 344, 345) and/or noticeably depressed or undulating dorsally (Figs 336–339, 432); Gt_2 sometimes concealed under Gt_1 (Figs 409, 352) or smooth and shiny (Figs 342, 343) **22**

22(21) Head with scrobal depression extending to level of posterior ocellus, hence anterior ocellus within depression, and in frontodorsal view depression somewhat hourglass in shape because narrowest below ocellus (Figs 412, 413); gaster with Gt_1 smooth and shiny, and Gt_2 extensively exposed and punctate-reticulate (Figs 418, 419) . . . . ***Romanisca*** **Hedqvist**

– Head with scrobal depression extending at most to anterior margin of anterior ocellus and Λ- to ∩-like; gaster sometimes with Gt_1 distinctly sculptured or with Gt_2 entirely or mostly concealed and with finer sculpture **23**

23(22) Gt_1 usually extensively and conspicuously sculptured (Figs 351, 361, 400, 446), but at least finely reticulate to punctate medially and if almost entirely smooth then Gt_1 and Gt_2 yellowish-brown to orange in distinct contrast to dark/metallic subsequent terga **24**

– Gt_1 smooth and shiny (Figs 342, 343, 370) or at most obscurely coriaceous under some angles of light (Fig. 386) and Gt_1 and Gt_2 always dark, similar to subsequent terga **32**

24(23) Propodeal plical region delineated by distinct sulcate paraspiracular furrows, with panels uniformly convex and punctate-reticulate excluding median carina (Figs 386, 387); head with eye distinctively large relative to malar space, the malar space at most slightly greater than half width of eye (Fig. 380); female and male with Gt_2 both extensively exposed and distinctly punctate-reticulate (Figs 386, 387) . . . ***Neoepistenia*** **Hedqvist** (in part)

– Propodeal plical region usually more extensively longitudinally carinate and/or with panels smooth to coriaceous (Figs 351, 361, 400, 447), but at least more irregularly carinate and not delineated by distinct sulcate paraspiracular furrows (Figs 400, 401); head with eye not distinctively large relative to malar space, the malar space obviously longer than half width of eye; female sometimes and male usually with Gt_2 almost or entirely concealed under Gt_1 in dorsal view, visible in lateral view as triangular tergum (Figs 352, 403, 447) **25**

25(24) Female **26**

– Male **29**

26(25) Gt_2 in dorsal view either entirely concealed under Gt_1 or with only sublinear smooth and shiny apical margin exposed, visible in lateral view as triangular tergum (Fig. 352) (if Gt_2 more extensively exposed due to telescoping of terga then exposed dorsal surface smooth and shiny, and sculptured/setose region of laterotergite attenuated dorsally to acute angle at posterior margin of tergum, Fig. 353); head with genal flange extending height of propleuron (Fig. 346) . . . . . ***Epistenia* (*Punctepistenia*) new subgenus**

– Gt$_2$ in dorsal view at least narrowly exposed and at least partly reticulate to punctate (Figs 361, 400, 446); head often without genal flange **27**

27(26) Head with genal flange evident in lateral view when head appressed to prothorax (Fig. 357); forewing hyaline or only very faintly infuscate behind parastigma; gaster ovate-lanceolate, less than 3 times as long as greatest width and less than twice as long as mesosoma; mesonotum with distinct cupreous/black bicolored pattern and metacoxa bare dorsally exterior to dorsal carina . . . . ***Hadroepistenia* new genus** (in part)

– Head without genal flange, though sometimes with fine occipital carina (Fig. 399) or denticle evident on postocciput (Fig. 442) if head separated from prothorax; forewing with distinct infuscate region touching parastigma, and either extensively infuscate behind stigmal vein or at least with r-m fold brown; gaster elongate-lanceolate, at least 4 times as long as greatest width and twice as long as mesosoma; mesonotum either without distinct bicolored pattern or metacoxa setose dorsally **28**

28(27) Pronotum and mesonotum with large punctures (Fig. 443) and with abruptly delineated and distinctly contrasting regions of bright cupreous/black and metallic green or blue; eye sparsely microsetose (Fig. 442) . . . .
. . . . ***Urolycisca* Roman**

– Pronotum and mesonotum punctulate (Figs 398, 399) and more or less evenly greenish to entirely reddish or cupreous, but without abruptly delineated and contrasting regions of bright metallic luster; eye densely microsetose (Figs 396, 397) . . . . ***Proglochin* Philippi** (in part)

29(25) Gt$_2$ in dorsal view exposed for distance equal to at least half length of Gt$_3$, and finely coriaceous with transverse row of punctures near posterior margin (Fig. 361) . . . . ***Hadroepistenia* new genus**

– Gt$_2$ in dorsal view concealed under Gt$_1$ or at most with sublinear smooth and shiny apical margin exposed (Figs 352, 402, 403, 447) **30**

30(29) Head with distinct genal flange (Fig. 346); forewing hyaline . . . .
. . . . ***Epistenia* (*Punctepistenia*) new subgenus**

– Head without genal flange (at most very short rim adjacent to mandible); forewing often bimaculate or with ∪-like infuscate region touching parastigma and stigmal vein **31**

31(30) Pronotum and mesonotum with large punctures (Fig. 443) and with abruptly delineated and distinctly contrasting regions of bright cupreous and metallic green or blue; eye sparsely microsetose (Fig. 442) . . . .
. . . . ***Urolycisca* Roman** (in part)

– Pronotum and mesonotum punctulate (Figs 398, 399) and more or less evenly greenish to entirely reddish or cupreous, but without abruptly delineated and contrasting regions of bright metallic luster; eye densely microsetose (Figs 396, 397) . . . . ***Proglochin* Philippi**

32(23) Specimen with following combination of features: Gt_2 in dorsal view entirely concealed under Gt_1 or with only smooth, sublinear apical margin exposed (Fig. 352) (if Gt_2 more extensively exposed due to telescoping of terga then sculptured/setose region of laterotergite attenuated dorsally to acute angle at posterior margin of tergum, Fig. 353); head with genal flange extending height of propleuron (Fig. 346); scutellum in lateral view with marginal rim extending as flange or spine at least to level of base of gaster (Fig. 348); metacoxa bare dorsally exterior to distinct longitudinal carina, except often basally (Fig. 348); prepectal panel flat (Fig. 348) . . . . ***E.* (*Epistenia*) Westwood**

– Specimen either with Gt_2 in dorsal view more extensively exposed and often partly coriaceous to punctate-reticulate (Figs 342, 343, 370, 386, 392, 428) (in lateral view with setose/sculptured region dorsally truncate, Fig. 430), and/or with one or more of following features: head without genal flange, scutellum in lateral view extending only about half distance or less to base of gaster, metacoxa setose along dorsal length (with or without dorsal carina), prepectus concave ventrally or mediolongitudinally (Figs 425, 426) **33**

33(32) Prepectal panel variably distinctly concave over ventral half to two-thirds (Figs 425–427) (if concavity comparatively shallow then smoother than surrounding cuticle, dark, and bare) **and** metacoxa bare dorsally exterior to distinct dorsal carina **34**

– Prepectal panel either not distinctly concave or at least uniformly sculptured and setose, and/**or** metacoxa distinctly setose dorsally (exterior to carina if with distinct dorsal carina) (Figs 341, 369, 409) **35**

34(33) *Male only*: Gt_2 in dorsal view exposed and partly punctate-reticulate (*cf*. Fig. 437) . . . . ? ***Shedoepistenia* new genus** (in part)

– *Female and male*: Gt_2 in dorsal view concealed under Gt_1 or, if exposed, then smooth (Fig. 430), coriaceous (Fig. 431) or transversely aciculate (Fig. 428) . . . . ***Scaphepistenia* new genus** (in part)

35(33) Face with dense band of white setae over about ventral half of interantennal region, the band often continued laterally on parascrobal region to inner orbit of eye (Figs 337, 339); propodeal plical region with inverted Y-like (Fig. 343) or sinuately ∧-like (Fig. 342) median carinal complex, but otherwise mostly smooth to finely coriaceous; scrobal depression with distinct ∩- or m-like dorsal margin separated from anterior ocellus, the margin formed by shiny, abruptly recurved channel surface (Figs 336–339) . . . . ***Amazonisca* Hedqvist** (in part)

– Face sometimes with conspicuous white lanceolate setae, but only rarely with relatively obscure setal band as described above and then propodeal plical region punctate except for median carina (Fig. 370); scrobal depression variable, but often outer margin carinate and continued to or almost to anterior ocellus, and channel dorsally rounded to ocellus or into vertex **36**

36(35) Gt_2 in dorsal view exposed and at least partly punctate-reticulate (Figs 370, 436–439, 446) **37**

– Gt_2 in dorsal view concealed under Gt_1 (Fig. 409) or, if very narrowly exposed, at most coriaceous to transversely aciculate (Figs 342, 343, 410, 411) **41**

37(36) Propodeal plical region variably longitudinally carinate (Figs 436–438, 445) to rugose (Fig. 439), with surface otherwise quite smooth and shiny; mesonotum often with conspicuous bicolored pattern; forewing at most with faint mediolongitudinal infuscate band **38**

– Propodeal plical region uniformly strongly coriaceous to punctate-reticulate, excluding any median carina (Figs 370, 386, 401, 402); mesonotum without abruptly delineated and distinctly contrasting metallic/dark regions; forewing sometimes conspicuously bimaculate or with anterior and posterior hyaline spots having white setae **39**

38(37) Gt_1 entirely smooth and shiny (Figs 436–439); propodeum of female with carina that parallels foramen recurved toward anterior of propodeum paramedially, differentiating a variably wide and distinct median smooth band (Figs 436, 438) . . . . ***Shedoepistenia*** **new genus** (in part)

– Gt_1 with some reticulations or punctures (Fig. 446), sometimes only in narrow longitudinal or transverse medial band; propodeum of female with carina that parallels foramen merging into single median carina (usually as sinuate, ∧-like carina, Fig. 445) . . . . ***Urolycisca*** **Roman** (in part)

39(37) Propodeal plical region strongly coriaceous to punctate and often with some longitudinal or oblique crenulae, but not differentiated from callus by distinct paraspiracular furrows (Figs 401, 402); forewing conspicuously infuscate, either with a dark brown ∪-like band connecting parastigma and stigma or with dark brown regions behind parastigma and stigma . . . . ***Proglochin*** **Philippi** (in part)

– Propodeal plical region uniformly punctate-reticulate excluding median carina, and differentiated from callus by distinct, sulcate paraspiracular furrows (Figs 370, 387); forewing at most with faint mediolongitudinal infuscate band or with anterior and posterior hyaline spots having white setae **40**

40(39) Head in dorsal view with upper inner orbits of eyes slightly divergent from about level of posterior ocelli (Fig. 381); scrobal channel with outer margins carinate, but smoothly rounded into vertex dorsally (Figs 380, 381); Gt_1 partly coriaceous to slightly reticulate (Figs 385–386) . . . . *Neoepistenia* **Hedqvist** (in part)

– Head in dorsal view with upper inner orbits of eyes parallel to slightly incurved behind posterior ocellus (Fig. 365), hence distance between upper orbits at level of posterior ocelli slightly greater than minimum distance between eyes posterior to ocelli; scrobal channel with distinct m-like or recurved, carinate, ∩-like dorsal margin (Fig. 364); Gt_1 smooth and shiny or at most extremely obscurely coriaceous (Fig. 370) . . . . . ***Hedqvistia* new genus**

41(36) Scrobal depression with distinct ∩- or m-like dorsal margin separated from anterior ocellus, the margin resulting from abruptly recurved channel surface forming shiny carina or even more distinct shiny vertical wall (Figs 336–339); propodeal plical region of female with inverted Y-like or sinuately Λ-like carinal complex, hence with at least very short median carina behind dorsellum, and with surface otherwise mostly shiny or coriaceous (Figs 342, 343); female flagellum sometimes with some funicular segments yellowish . . . . ***Amazonisca* Hedqvist** (in part)

– Scrobal depression with outer margins often carinate or extending to anterior ocellus, but dorsally rounded into vertex without distinct dorsal margin (Figs 404, 420, 421); propodeal plical region of female variably extensively longitudinally carinate (Figs 408, 428, 431); female flagellum always uniformly dark **42**

42(41) Metacoxa bare dorsally exterior to distinct dorsal carina (note: setae arising from inner dorsal surface of coxa may be present) (Fig. 430) . . . . ***Scaphepistenia* new genus** (in part)

– Metacoxa distinctly setose but without distinct carina dorsally (Fig. 409) . . . . ***Protoepistenia* new genus**

LYCISCINI: Genera restricted to the Old World

Agamerion Haliday
Figs 151–166

Agamerion Haliday, 1844: 298. Type species: *Miscogaster gelo* Walker; by monotypy.

Euchrysia Westwood, 1874: 139. Type species: *Euchrysia cleptidea* Westwood; subsequent designation by Ashmead (1904: 281). Synonymy by Bouček (1988*a*: 252).

Diversity. Thirteen nominal species and probably about 20 undescribed species known from the Australasian region [Australia, Indonesia (Irian Jaya), *Papua New Guinea].

✓ ***Agamerion cleptideum* (Westwood)**. *Euchrysia cleptidea* Westwood, 1874: 139, pl. 26; ♀ lectotype (OXUM: T. 657/1) designated by Bouček (1988*a*: 253). Combination by Bouček (1988*a*: 253). DISTRIBUTION: Australia (ACT, NSW, SA).

✓ ***Agamerion coeruleiventre* Ashmead**, 1900*b*: 340; ♀ syntype (USNM: 4890) (described as a male, but in the USNM type book the type material is listed as two females). Justified emendation from *A. coeruleiventris* by Bouček (1988*a*: 253). DISTRIBUTION: Australia (*QLD).

✓ ***Agamerion eupelmoideum* Girault**, 1925[381]: 1. Justified emendation from *A. eupelmoideus* by Bouček (1989: 86); *Agamerion eupelmoides* (!) (Bouček 1988*a*: 253). DISTRIBUTION: Australia (QLD).

Note: Only the metasoma, metafemur and metatibia (separated), mesotibia and mesotarsus, and four yellowish funicular segments remain of the unique holotype. Bouček (1988*a*) stated that the species is close to *A. cleptideum*. The primary features included in the key provided below are based on Girault's original description; the description of the interantennal region between square brackets is based on inference. I have not seen any female that matches the description and the remaining parts of *A. eupelmoideum* exactly, but have seen females of at least one species with the flagellum entirely or almost entirely yellowish-orange (often darker are fl$_1$, fl$_2$ basally, and the clava). Flagellar color is likely not reliable to distinguish this species, but a revision is necessary to establish the identity and limits of *A. eupelmoideum*.

✓ ***Agamerion gelo* (Walker)**. *Miscogaster gelo* Walker, 1839: 27; ♂ lectotype (BMNH: 5.3281) designated by Bouček (1988*a*: 253). Combination by Haliday (1844: 299). DISTRIBUTION: Australia (NSW, SA).

= ✓ *Euchrysia gemmea* Westwood, 1874: 139–140, pl. 26; ♀ lectotype (OXUM: T. 658 ½) designated by Bouček (1988*a*: 253). Synonymy by Bouček (1988*a*: 253).

✓ ***Agamerion metallicum* Girault**, 1915[240]: 216–217. Justified emendation from *A. metallica* by Bouček (1988*a*: 253). DISTRIBUTION: Australia (QLD).

✓ ***Agamerion mirum* Girault**, 1927[407]: 3. DISTRIBUTION: Australia (QLD).

Note: Although the ovipositor sheaths were missing from the unique holotype when examined in 1999, conspicuously projecting ovipositor stylets were present.

✓ ***Agamerion monodon* Bouček**, 1988*a*: 253–254; ♀ holotype (BMNH: 5.3251). DISTRIBUTION: Indonesia (Irian Jaya).

✓ ***Agamerion prasinum* (Westwood)**. *Euchrysia prasina*, Westwood 1874: 170; ♂ lectotype (OXUM: T. 659) designated by Bouček (1988*a*: 254). Combination by Bouček (1988*a*: 254). DISTRIBUTION: Australia (NSW, NT, QLD).

= ✓ *Agamerion nonstylatum* (Girault). *Thaumasura nonstylata*, Girault 1922[360]: 49. Combination by Bouček (1988*a*: 254). **New synonymy**.

= ✓ *Agamerion io* Girault, 1935[445]: 3. **New synonymy**.

✓ ***Agamerion semialbicorne* Girault**, 1927[407]: 3. Justified emendation from *A. semialbicornis* by Bouček (1988*a*: 254). DISTRIBUTION: Australia (QLD, WA?).

✓ ***Agamerion variflagellum* Girault**, 1925[381]: 1. DISTRIBUTION: Australia (SA, TAS).

Excluded species:

Agamerion omnicyaneum (Girault). Transferred to *Thaumasura*.

Biology. At least some species are parasitoids of cockroach egg masses (Bouček 1988*a*) and can be caught running on smooth-bark gum trees. The long ovipositor of *A. mirum* might indicate some mining or otherwise more concealed host.

Description. *Head* (Figs 151–154). Scrobal depression extending to anterior ocellus or within about 2 OD of ocellus, abruptly declivous ventrally and at least with outer margin carinate, sometimes with dorsal margin also carinate, the edge slightly reflexed as a smooth shiny rim; scrobes and channel with transversely aligned reticulate to strigose sculpture. Face with parascrobal region subequally wide and with sculpture usually not obviously differentiated from that of frontovertex. Interantennal region triangular, often with dorsal and ventral halves differentiated by difference in convexity and/or sculpture (Figs 151, 152), and with abruptly inclined sides, but dorsal angle not expanded into process. Vertex with posterior ocellus contiguous with inner orbit or separated from orbit by distance up to about 1 OD; sometimes abruptly angled to carinately margined relative to occiput; without mediolongitudinal sulcus. Occiput without any indication of occipital carina. Gena entirely sculptured. Eye superficially bare to densely microsetose, and less than twice as high as broad; inner orbits in frontal view variably distinctly convergent dorsally, sometimes evenly convergent onto vertex behind ocelli so minimum distance between eyes behind ocelli less than distance between eyes measured at posterior ocelli.

Antenna inserted below level of lower orbits, with dorsal margin of torulus at or below level of lower margin of eye. Pedicel usually only about as long as clava; funicle 8-segmented; flagellum with large, flat or collapsing sensory region on clava and on preclaval segment (Figs 163, 164); clava 1-segmented.

Mesosoma. Pronotum with or without distinct, transverse collar, but with conspicuously inclined neck (Fig. 156) having variably long and distinct median line. Mesoscutum punctulate or reticulate with variably distinct rosetteform subsculpture (Fig. 161), to reticulate-alveolate without subsculpture. Scutellum with crenulate marginal rim usually projecting posteriorly over base of dorsellum; with distinct axillula delimited dorsally by axillular carina (Figs 156, 157); and with frenal arm at most evident only as curved posterior limit of axillula. Dorsellum setose and extending at least slightly into thin lamina or flange, either vertically behind scutellum (Figs 156, 160) or inclined posterodorsally under scutellar lip (Fig. 157), and then sometimes projecting as lobe beyond apex of scutellum. Prepectus triangular in lateral view. Upper and lower mesepimeron entirely punctate-reticulate to more finely coriaceous, or with upper mesepimeron partly smooth and shiny but entirely bare, including subalar pit (Figs 156–159). Metapleuron uniformly sculptured and setose (Figs 156, 157) or much more finely sculptured to smooth and bare dorsally (Figs 158, 159). Propodeum (Figs 155, 160) without distinct paraspiracular furrow or carina, crenulate along anterior margin and with median carina but only very rarely with crenulae obviously recurved from anterior margin along either side of median carina; extensively and usually densely setose over callus and most or entire plical region posterior of spiracle to level equal with lateral limit of foramen (Fig. 160), and with non-setose surface of plical region smooth and shiny to coriaceous or rugulose.

Forewing often uniformly setose, but sometimes with small bare spot or angulate region beyond basal cell and, in one undescribed species, wing entirely bare behind costal cell; hyaline or infuscate mediolongitudinally.

Legs. Profemur without distinct preapical ventral angulation; protibia without carinate ventral margin and without dorsal spicules. Metacoxa setose but not carinate dorsally and with exterior surface bare (Fig. 158) to entirely setose (Figs 157, 159); metafemur variable, sometimes conspicuously enlarged with broad, low subapical lobe on outer ventral surface, and/or serrate along outer and inner ventral margins at least apically (Figs 165, 166); metatibial spurs robust, with at least inner spur obviously longer than apical width of tibia.

Metasoma. Petiole of male in dorsal view transverse-rectangular to lunate, and smooth and shiny (Fig. 160); in ventral view broadly membranous. Gaster (Fig. 162) not margined laterally, in female non-collapsing and apically subconical; Gt_1 and subsequent terga usually smooth and shiny to variably distinctly coriaceous, only rarely reticulate-strigose, with posterior margins at most only very slightly emarginate; and with Gt_2 exposed. Syntergum of female short, shorter than hind basitarsus, and usually subtriangular in dorsal view; at most with slight sulcus or ridge across tergum between cerci. Ovipositor sheaths only very rarely extending conspicuously beyond apex of syntergum. Hypopygium of female extending to level about equal with posterior margin of Gt_3 or Gt_4.

Remarks. A bare upper mesepimeron (29:0) either supports monophyly of *Chadwickia* + *Agamerion* + *Eupelmophotismus*, and possibly part of *Proshizonotus*, or represents a retained symplesiomorphy that indicates a basal position for the taxa in Lyciscini. Monophyly of at least *Agamerion* + *Eupelmophotismus* is indicated by common presence of a large, flat or collapsing, micropilose sensory region on the clava and on the preclaval segment (17:2; Figs 163, 164, 188). More comprehensive and detailed study is necessary to determine if the different sensory regions possessed by the two known species of *Chadwickia* (Figs 175–177) comprise part of a single transformation series with *Agamerion* + *Eupelmophotismus* or are only superficially similar and are independently derived (see Remarks for *Chadwickia*). A very few species of *Thaumasura* have a large and collapsing sensory region on the clava. Furthermore, *Mesamotura* and some species of *Thaumasura* have an elongate-slender, though non-collapsing sensory region on one or more apical funicular segments as well as the clava (17:1; Figs 224, 297). If these latter structures form a single transformation series with those of *Chadwickia* + *Agamerion* + *Eupelmophotismus,* then *Mesamotura* + *Thaumasura* are indicated as comprising a monophyletic group with the three genera. Monophyly of (*Chadwickia* + *Agamerion* + *Eupelmophotismus*) + (*Mesamotura* + *Thaumasura* + *Westwoodiana*) may also be supported by a metacoxa whose external surface is extensively setose (43:1), though such an hypothesis requires secondary loss of the setae from some *Agamerion* and *Eupelmophotismus*. Both of these features contradict the parsimony analysis, which indicates *Chadwickia* + (*Agamerion* + *Eupelmophotismus*) as the sister group of all other Lyciscini.

Agamerion, *Eupelmophotismus*, *Mesamotura* and *Thaumasura* additionally share an extensively setose propodeum (33:1), though this feature is also shared with some other Old World Lyciscini and polarity is uncertain. Structure of the scutellar-dorsellar complex may provide additional evidence for relationships. The scutellum extends at least slightly over the base of the dorsellum in *Chadwickia*, *Agamerion* and *Eupelmophotismus*. In *Chadwickia*, the dorsellum has a slightly concave, lunate depression anteromedially (Fig. 171). The apex of the scutellum normally fits into this depression so that it is not visible (Fig. 172). The apparent dorsal margin of the dorsellum is slightly convex, usually very thin or carinately margined, and extends either to the posterior margin of the scutellar rim (Fig. 172) or even slightly over it. This likely represents the groundplan structure for the three genera. Species of *Agamerion* and most species of *Eupelmophotismus* have the dorsellar region extending into a more conspicuous flange or lamina posterodorsally under (Figs 157, 158) or behind (Figs 156, 183, 186) the scutellar lip. This structure appears to be unique for Lyciscini, though the more apomorphic structures in *Agamerion* and *Eupelmophotismus* may have evolved convergently because at least some *Eupelmophotismus* have a structure similar to that of *Chadwickia*, i.e., the putative groundplan structure (Fig. 185). In contrast, in

Mesamotura, *Thaumasura* and *Westwoodiana* the vertical scutellar lip lies on the dorsellum if this is an exposed convex lobe (Figs 222, 223, 287, 288, 290) or, in apparently more derived species, the scutellar lip extends slightly beyond and over the dorsal edge of the dorsellum (Figs 285, 286, 289) rather than *vice versa*. A more thorough analysis of the exact structure of the dorsellum possessed by different species of *Proshizonotus* and other Lyciscini is required before an accurate assessment of structural transformation can be made. Such a study holds significant promise for providing valuable phylogenetic information, but the analysis will require disarticulating the dorsellum and scutellum, which is not possible at present because of insufficient specimens for many taxa.

In addition to having different structural relationships of the scutellar-dorsellar complex, *Chadwickia* + *Agamerion* + *Eupelmophotismus* also differ from *Mesamotura* + *Thaumasura* + *Westwoodiana* by having a setose dorsellum. A setose dorsellum (26:1, 27:1) is certainly a derived feature within Cleonyminae, but I suspect it may be a groundplan feature of Lyciscini. This hypothesis is based on the wide distribution of a setose dorsellum in all but the New World Clade. The two groups of genera also differ in whether or not the outer margins of the scrobal depression are carinately margined. The depression is carinately margined laterally in *Agamerion* (Fig. 151), at least ventrolaterally in *Eupelmophotismus* (Figs 179–181), and lateral to the torulus in *Chadwickia* (Figs 167, 168). These structures may form a single transformation series. In contrast, *Mesamotura*, *Westwoodiana* and *Thaumasura* have the scrobal margin abruptly declivous with a rounded rather than carinate margin (Figs 219, 280, 281) so the sculpture of the parascrobal region extends slightly over the edge into the scrobe.

Monophyly of *Agamerion* is uncertain and it or *Eupelmophotismus* may render the other genus paraphyletic depending on character polarity. As noted by Bouček (1988*a*), the gastral terga appear to be more strongly sclerotized in *Agamerion* so that in females the gaster is non-collapsing and subconical (Fig. 162). However, this difference is not always evident in critical-point dried *Eupelmophotismus*. The extent to which the scrobal depression is separated from the anterior ocellus is unreliable to distinguish all *Agamerion* from *Eupelmophotismus*, though the structure of the scrobal depression is different in the two genera as is discussed under *Eupelmophotismus*. Relative length of the ovipositor sheaths, metafemoral structure, and other features are also not entirely reliable to separate species of the two genera. Female *Agamerion* usually have the ovipositor sheaths only just projecting beyond the syntergum, whereas the sheaths often project conspicuously in *Eupelmophotismus*, but the ovipositor protrudes for a distance about equal to half the length of the gaster in *A. mirum*. I classify this species in *Agamerion* because the scrobal depression extends to the anterior ocellus and because it has a dorsellar flange projecting under and beyond the apex of the scutellum as in *gelo*-group species (see below). Species of *Eupelmophotismus* usually have a relatively slender metafemur, but I have seen one undescribed species with a greatly enlarged and ventrally denticulate metafemur, similar to most *cleptideum*-group species (see further under *Eupelmophotismus*). Most *Eupelmophotismus* also have at least Gt_1 distinctly emarginate (Fig. 191), whereas the terga are at most inconspicuously emarginate in *Agamerion*, though this feature too is variable. Species of *Agamerion* always have a weakly convex scutellum with the marginal rim almost at the same level as the dorsal surface of the scutellum (Fig. 156), whereas in *Eupelmophotismus* the scutellum either is somewhat conical or, if weakly convex, usually with the apex abruptly curved down so that the scutellar rim is at a distinctly lower level than the dorsal surface in lateral view (Fig. 184). This difference is variable and only helps to differentiate some species. Synonymy of *Agamerion* and *Eupelmophotismus* may be inevitable in the future, but the species should first be revised.

Bouček (1988*a*) discussed four species groups in *Agamerion*. The *cleptideum*-group was defined by having the interantennal region abruptly differentiated into a more sparsely punctured, convex ventral region, and a transverse-reticulate to imbricate, flat dorsal region (Fig. 152). Also, *cleptideum*-group species have the metafemur enlarged with the outer ventral margin expanded slightly into a broad, minutely serrate lobe over the apical half (Fig. 166), and the dorsellar flange not extending beyond the apex of the scutellum (Fig. 157). Some species have the metapleuron uniformly sculptured and setose as for species of all other species groups (Fig. 157), whereas others have the metapleuron bare and shiny dorsally (Fig. 158) similar to most Old World species of *Proshizonotus*. Some species also have the exterior surface of the metacoxa setose only ventrally (Fig. 158) similar to the hypothesized groundplan state for Lyciscini or *metallicum*-group species, whereas others have the metacoxa extensively setose (Fig. 157) similar to *gelo*-group species. *Agamerion cleptideum* and likely *A. eupelmoideum* are the only currently described species of this group.

The *metallicum-group* is composed of species similar to *cleptideum*-group species, except that the interantennal region is not so distinctly subdivided (Fig. 153). Furthermore, all species of this group have the mesepimeron and metapleuron entirely sculptured and the outer surface of the metacoxa is setose only ventrally so that most of the flat or concave surface is bare. *Agamerion metallicum*, *A. coeruleiventre* and *A. monodon* are the only currently described species of this group.

The *gelo*-group is composed of species with the dorsellum projecting as a lobe beyond the scutellum (Fig. 156); they also have the head and mesosoma dark bluish to green, the metapleuron entirely sculptured (Fig. 156) similar to *metallicum*-group species, and the exterior surface of the metacoxa extensively setose. This group includes most of the currently described species: *A. gelo*, *A. mirum*, *A. prasinum* and *A. variflagellum*.

The *semialbicorne* group is differentiated by its distinctive facial sculpture (see couplet 3) (Fig. 154), though I have seen at least one undescribed *cleptideum*-group species in which about the ventral half of the parascrobal region has a noticeably different sculpture from that of the frontovertex and dorsal half of the parascrobal region. Species of the *semialbicorne*-group also have the upper mesepimeron grossly rugose or pitted compared with the lower mesepimeron (Fig. 159). Individuals are similar to *gelo*-group species because they have a small dorsellar flange extending beyond the marginal rim of the scutellum (Fig. 159) and the outer surface of the metacoxa is setose, though more sparsely so than in the *gelo*-group. I have seen one undescribed species of this group in addition to *A. semialbicorne*. The unique type of *A. semialbicorne* has relatively strongly sculptured, rugulose-punctate terga. The terga of the undescribed species are much more finely sculptured with pinhole-like punctures from which setae arise.

Key to females of described species of *Agamerion* Haliday

1 Flagellum with some segments white or yellowish **2**

– Flagellum uniformly dark excluding often lighter-colored sensory regions on clava and preclaval segments **5**

2(1) Front and middle legs yellowish-orange beyond coxae, and hind leg brown except basal half of hind basitarsus white; antenna with scape and fl_2–fl_6 yellowish (based on description, see species checklist) [interantennal region composed of convex, moderately sparsely punctulate and setose ventral half, and abruptly and conspicuously differentiated flat, bare, transversely reticulate to cristate dorsal half (Fig. 152)] . . . . ***Agamerion eupelmoideum* Girault**

– Front and middle legs dark with metallic luster, similar to hind leg; antenna with scape dark but flagellum with variable color pattern [interantennal region sometimes with similar sculpture pattern as described above, but then almost in same plane and never abruptly differentiated] **3**

3(2) Mesonotum umbilicate-punctate with nonmetallic (black) spot anteromedially on mesoscutal medial lobe and anteriorly on scutellum; gastral terga rugulose-punctate; upper mesepimeron composed of several irregular pits (coarsely rugose) and lower mesepimeron transversely reticulate-strigose (Fig. 159); head with smooth, convex bar (Fig. 154) separating rugulose-punctate dorsal half of parascrobal region from alveolate-punctate lower half of parascrobal region; basitarsi white except along extreme apical margins; flagellum with at least clava and ventral surface of apical 4 funicular segments white; metatibia entirely dark [head with vertex smoothly rounded into occiput, not carinately margined] . . . . ***Agamerion semialbicorne* Girault**

– Mesonotum very finely punctulate and entirely metallic; gastral terga very finely coriaceous; upper and lower mesepimeron both punctulate-reticulate (Fig. 156); head with parascrobal region uniformly convex and punctulate-granular; tarsi uniformly yellowish-brown to dark brown; flagellum either entirely white or with clava and preclaval segment entirely white; metatibia with dorsoapical white spot **4**

4(3) Flagellum entirely white beyond pedicel . . . ***Agamerion variflagellum* Girault**

– Flagellum with only clava and preclaval segment white . . . . ***Agamerion gelo* (Walker)**

5(1) Metatibia dark with dorsal margin white apically to entirely white dorsally except for knee; interantennal region essentially flat and more or less evenly punctate (Fig. 153) or only gradually changing from coriaceous-punctulate ventrally to punctulate or cristate dorsally; mesoscutum uniformly greenish to bluish or at least without spot of different color anterior to axilla **6**

– Metatibia entirely dark, or white basally and dorsoapically, or with just knee white; interantennal region sometimes with abruptly and conspicuously differentiated ventral and dorsal portions, the ventral portion more or less distinctly convex and more finely sculptured relative to flat and more coarsely punctate to transversely reticulate or cristate dorsal portion (Fig. 152) **9**

6(5) Ovipositor sheaths projecting beyond syntergum by distance about equal to length of metafemur or two-thirds length of gaster; gaster very distinctly coriaceous; dorsellum produced beyond apex of scutellum as large, triangular, basally rugulose flange; metatibia only linearly white dorsally; speculum open posteriorly; head with OOL at least half ocellar diameter and almost as long as LOL [metafemur not strongly expanded (about 3 times as long as wide) and not distinctly serrate ventrally] . . . . ***Agamerion mirum*** **Girault**

– Ovipositor sheaths projecting only very slightly beyond apex of syntergum; gaster shiny and virtually smooth, at most only very finely and obscurely coriaceous; dorsellum not produced beyond apex of scutellum (Fig. 157); metatibia distinctly white dorsally; speculum closed posteriorly by at least 2 lines of setae; head with posterior ocellus contiguous with or only linearly separated from inner orbit **7**

7(6) Basitarsus of hind leg white except along extreme apical margin; mesotibia with dorsal edge white over at least apical half; head with upper inner orbits less distinctly convergent so that posterior ocellus narrowly but obviously separated from inner orbit, and length of frontovertex only about 1.25 times minimal width; metapleuron coarsely punctate (pits much larger than on metacoxa) and setose over at least ventral two-thirds (Fig. 156) . . . . ***Agamerion metallicum*** **Girault**

– Basitarsus of hind leg dark; mesotibia dark; head with upper inner orbits strongly convergent so that posterior ocellus contiguous with inner orbit, and length of frontovertex at least twice as long as minimal width; metapleuron uniformly punctulate and setose over only about ventral third **8**

8(7) Metafemur almost evenly serrate along both outer and inner ventral margins; forewing hyaline; mesonotum uniformly bright metallic green [propodeal plical region conspicuously sculptured, reticulate-coriaceous] . . . . ***Agamerion coeruleiventre*** **Ashmead**

– Metafemur with distinct tooth near middle of outer ventral margin (Bouček 1988*a*, fig. 363); forewing infuscate between parastigma and apex of postmarginal vein; mesonotum dark (bronze to purple) except about posterior half of mesoscutum and narrow anteromedial line on scutellum green . . . . ***Agamerion monodon*** **Bouček**

9(5) Dorsellum conspicuously produced beyond apex of scutellum as posteriorly narrowed but truncate flange; mesonotum uniformly bluish-green; front and middle legs dark with metallic luster similar to hind leg; interantennal region only slightly convex and strongly coriaceous-punctulate ventrally, somewhat flatter and transversely reticulate to cristate dorsally [gastral terga distinctly coriaceous; mesotarsus with at least basal half of basitarsus white; tegula with metallic luster rather than black] . . . . . ***Agamerion prasinum*** **(Westwood)**

– Dorsellum not extending beyond apex of scutellum; mesonotum reddish-yellow with large blue spot on mesoscutal lateral lobe anterior to axilla; front and middle legs yellowish-orange beyond coxae; interantennal region with ventral half convex, shiny, and punctate with obscure coriaceous subsculpture, abruptly and conspicuously differentiated from flat, transversely reticulate-strigose dorsal half (Fig. 152) [metafemur dark violaceous; metapleuron entirely punctate-rugulose and setose; frontovertex with interstices less than diameter of punctures (Fig. 151)] . . . . ***Agamerion cleptideum* (Westwood)**

***Chadwickia* Bouček**

Figs 167–178

Chadwickia Bouček, 1988*a*: 250–251. Type species: *Chadwickia longiceps* Bouček; by original designation and monotypy.

Diversity. One described and one undescribed species known from Australia.

✓ ***Chadwickia longiceps* Bouček**, 1988*a*: 251; ♀ holotype (BMNH: 5. 3245). DISTRIBUTION: Australia (NSW).

Biology. Unknown, but the long ovipositor indicates a concealed host.

Description. *Head* (Figs 167, 168). Scrobal depression with outer margin carinate from torulus to level about equal with lower orbit (Fig. 168), otherwise with sculpture of parascrobal region extending slightly over rounded margin of dorsally shallowed depression, without differentiated dorsal margin but channel extending obscurely to or within about 1 OD of anterior ocellus; scrobes and channel transversely strigose to granular-cristate. Face in frontal view at least slightly and sometimes distinctly higher than wide (Fig. 167); parascrobal region uniformly punctate-reticulate. Interantennal region triangular, ventrally with abruptly inclined sides, but evenly to quite abruptly sloped dorsally. Vertex with posterior ocellus separated from inner orbit by distance slightly less than 1 OD; without mediolongitudinal sulcus. Occiput without any indication of occipital carina. Gena entirely sculptured. Eye sparsely microsetose, about 2.2–2.5 times higher than broad and reniform (Fig. 168); inner orbits in frontal view comparatively inconspicuously convergent dorsally (Fig. 167), with minimum distance between eyes about 1.4 times distance between outer margins of posterior ocelli, and in dorsal view with orbits slightly divergent behind ocelli.

Antenna inserted below level of lower orbits, with dorsal margin of torulus obviously below level of lower margin of eye (Fig. 167). Pedicel longer than clava; funicle 8-segmented; flagellum with large but otherwise variable sensory region on clava and preclaval segment (Figs 175–177, see Remarks); clava 1-segmented.

Mesosoma. Pronotum with distinct quadrangular collar and abruptly inclined, uniformly rugulose neck lacking median line (Fig. 169). Mesoscutum punctate-rugose to punctate-alveolate, without or with only very indistinct coriaceous subsculpture on interstices, and covered with mixture of long dark setae and shorter white setae (Fig. 170). Scutellum punctate and with short median sulcus anteriorly, at least in female; with long white setae posteriorly and elsewhere with mixture of long black and short, mostly black setae; with crenulate marginal rim (Figs 171, 172); with distinct axillular carina dorsally delimiting small, smooth and shiny axillula (Fig. 172); and without evident frenal arm. Dorsellum dorsally with transverse, slightly concave crenulate rim under scutellar lip (Fig. 171) at right angle to exposed, punctate, setose dorsellar region between scutellar rim and propodeum (Fig. 172). Prepectus triangular in lateral view. Upper mesepimeron smooth, shiny and bare, including subalar pit (Fig. 170); lower mesepimeron entirely punctulate to punctate-reticulate, but with setae along posterior margin (Figs 170, 172). Metapleuron entirely punctate and setose (Fig. 172). Propodeum (Figs 171, 172) with transversely crenulate paraspiracular furrow differentiating callus from plical region, with or without median carina, but with band of crenulae along anterior margin recurved to posterior margin medially; with callar region sparsely setose lateral to paraspiracular furrow; and with plical region reticulate-rugulose.

Forewing with basal cell entirely setose, but at least dorsal surface of wing with conspicuous bare region behind parastigma; infuscate behind parastigma and stigmal vein, the regions sometimes continuous as ∪-like band.

Legs. Profemur without distinct preapical ventral angulation; protibia without carinate ventral margin and without dorsal spicules. Metacoxa setose and carinately margined dorsally, and with exterior surface entirely setose; metafemur unmodified in male, but in female with dorsal margin serrate in lateral view (Fig. 173) and in dorsal view with crenulae either on inner or dorsal surface (Fig. 174); metatibia with ventroapical margin emarginate so as to appear bidentate over base of tibial spurs, the tibia distinctly shorter than metafemur (Fig. 174) in female but as long as metafemur in male; metatibial spurs short and stubby in female (Figs 173, 174), but about as long as apical width of tibia in male.

Metasoma. Petiole of male in dorsal view longer than wide, smooth and shiny, and with median carina and reflexed lateral rim (Fig. 172); in ventral view tubelike, with curved ventral margins meeting at midline. Gaster not margined laterally, the terga collapsing in air-dried specimens; Gt_1 and Gt_2 smooth and shiny to finely coriaceous, with subsequent terga distinctly coriaceous or granular; Gt_1 not emarginate but Gt_2–Gt_5 slightly to distinctly emarginate; and with Gt_2 distinctly exposed. Syntergum of female very short, dorsally transverse with cercus adjacent to posterior margin; without (?) complete suture across syntergum between cerci. Ovipositor sheaths extending for distance slightly greater than length of gaster. Hypopygium in female extending to apex of gaster.

Remarks. Autapomorphic features that support monophyly of *Chadwickia* include: 1) head at least as high as wide (Fig. 167); 2) eyes at least twice as high as broad (Fig. 168); 3) mesonotum with a mixture of long black and short white or black setae; 4) metafemur with dorsal surface serrate in lateral view (Fig. 173); and 5) metatibia with ventroapical margin bidentate (more conspicuously so in female) over base of tibial spurs. *Chadwickia* is also the only large-bodied member of Lyciscini lacing a median line from the pronotal neck (Fig. 169), which I hypothesize as autapomorphic through secondary loss. Individuals also have the lower mesepimeron setose posteriorly (Fig. 170), which otherwise is possessed only by *Grooca* + *Solenura* in Lyciscini. This feature could be symplesiomorphic for *Chadwickia* if *Grooca* + *Solenura* represent the basal lineage of Lyciscini and if setae on the lower mesepimeron were inherited from a common ancestor with Cleonymini (see Biogeography of Lyciscini). However, the setal pattern is associated with an unusual structure of the mesepimeron in *Chadwickia*. In other Lyciscini, a medial pit or more distinct sulcus extends across the mesepimeron distinctly below the level of the dorsal angle of the metapleuron. The pit or sulcus subdivides the mesepimeron into more or less equally sized upper and lower mesepimera posteroventral to the acropleuron (e.g., Figs 156, 285). In *Chadwickia*, the sulcus extends diagonally to or even slightly above the level of the dorsal angle of the metapleuron. Consequently, the punctate lower mesepimeron extends dorsally almost to the base of the hind wing. There is quite a large, smooth and shiny upper mesepimeral region anteriorly, but only a very slender smooth region posterodorsally (Fig. 170). Males of at least *C. longiceps* have a comparatively long petiole, which is otherwise possessed only by *Marxiana*, *Parepistenia* and some species of *Proshizonotus*. I suspect that a comparatively long petiole is independently derived in *Chadwickia* because the petiole has a different structure from those of *Marxiana* + *Parepistenia* and known *Proshizonotus* (see character 51). I am uncertain whether a complete suture extends across the syntergum in females based on available specimens. The syntergum is concealed in the female of the undescribed species and although there appears to be an extensive suture laterally in one female of *C. longiceps*, I am uncertain whether it is continuous medially.

Chadwickia likely forms a monophyletic group with *Agamerion* and *Eupelmophotismus*, as discussed under 'Remarks' for *Agamerion* and suggested by both the parsimony (Fig. 1*a*) and intuitive phylogenetic analyses. Both known species have a large sensory region on the clava and preclaval segment, though structure of the regions differ between the two species. Individuals of *C. longiceps* have a large, collapsing micropilose sensory region on both segments (Fig. 177). The female of the undescribed species has the sensory regions differentiated into a row of dense sensilla laterally on either side of a central region that has scattered, peglike sensilla (Figs 175, 176). Structure and setal pattern of the propodeum do not support a sister-group relationship with *Agamerion* and *Eupelmophotismus* because the propodeum of *Chadwickia* has a distinct paraspiracular furrow and it is not extensively setose behind the spiracle. Propodeal sculpture pattern (Fig. 171) is somewhat similar to that of *Mesamotura* (Fig. 223) and the hypothesized groundplan propodeal structure for *Thaumasura* (Fig. 287).

Individuals of *Chadwickia* are at least superficially more similar to those of *Eupelmophotismus* than *Agamerion* because the scrobal depression is carinately margined only ventrally and the interantennal region is evenly to quite abruptly declined dorsally and not distinctly triangular. Females of *Chadwickia* also have conspicuously projecting ovipositor sheaths and otherwise very similar gastral structures to some females of *Eupelmophotismus*, including the hypopygium extending to or almost to the gastral apex in *Chadwickia* and some *Eupelmophotismus* (see Remarks for *Eupelmophotismus*).

Key to species of *Chadwickia* Bouček

1 Coxae and femora yellowish-orange; interantennal region uniformly rugulose-punctate; parascrobal region rugulose; flagellum dark; forewing with bare region behind parastigma closed posteriorly by several rows of setae between disc and basal cell; metafemur of female with fine crenulae on inner surface . . . . ***Chadwickia longiceps* Bouček**

– Coxae and femora dark, similar in color to mesosoma; interantennal region smooth and shiny above level of toruli; parascrobal region punctate-alveolate; flagellum with fl_2–fl_5 yellowish; forewing with large bare region behind parastigma incompletely closed posteriorly by 1 row of setae; metafemur of female with coarse crenulae on dorsal surface (Fig. 174) [WA (1♀, ANIC)] . . . . **Chadwickia n. sp.**

Eupelmophotismus Girault
Figs 179–194

Eupelmophotismus Girault, 1920[355]: 144. Type species: *Eupelmophotismus eupelmoideus* Girault; by monotypy.

Aligherinia Girault, 1922[365]: 148–149. Type species: *Aligherinia sidneyi* Girault; by monotypy. Synonymy by Bouček (1988*a*: 252).

Diversity. Four described and at least 15 undescribed species known from the Australasian region [Australia, *New Caledonia, *Papua New Guinea (*New Britain)].

✓ ***Eupelmophotismus angustifrons* (Girault)**. *Aligherinia angustifrons* Girault, 1927[387]: 3. Combination by Bouček (1988*a*: 252). DISTRIBUTION: Australia (QLD).

✓ ***Eupelmophotismus eupelmoideus* Girault**, 1920[355]: 144. DISTRIBUTION: Australia (QLD).

✓ ***Eupelmophotismus pulcher* (Girault)**. *Agamerion pulchra* Girault, 1925[387]: 3. Combination and justified emendation by Bouček (1988*a*: 252). DISTRIBUTION: Australia (*ACT, *NSW, *NT, QLD, *SA, *VIC, *WA); *Papua New Guinea.

✓ ***Eupelmophotismus sidneyi* (Girault)**. *Aligherinia sidneyi* Girault, 1922[365]: 149. Combination by Bouček (1988*a*: 252). DISTRIBUTION: Australia (NSW).

Biology. Bouček (1988*a*) summarized the then known hosts and biological attributes of *Eupelmophotismus*. Matthews (2000) documented *E. pulcher* as a parasitoid of late-larval or early pupal stages of *Psenulus interstitalus* Cameron (Sphecidae). He also reared females of an undescribed species from ACT (ANIC) from 'stem w/old *Hylaeus* nest' (Colletidae) (R. Matthews, pers. comm.). I also saw specimens of an undescribed species from ACT (ANIC) reared from cocoons (one containing a pupal exuvia of an unidentified ichneumonid) found in cerambycid mines in a dead *Eucalyptus*. These reared specimens might be the ones on which Bouček (1988*a*) based his host record for *E. sidneyi*. I collected species running on smooth bark gum trees.

Description. *Head* (Figs 179–181). Scrobal depression with outer margin acute or carinate from torulus to at least level of lower orbit and with dorsal margin at least 2 OD from anterior ocellus, but variable in shape, ∩- or bell-shaped (Fig. 179) between distinct parascrobal regions, or with dorsal margin broadly arched between inner orbits and with more or less mushroom- or hourglass-shaped depression occupying most of region between eyes (Fig. 180); scrobes and channel transversely reticulate. Face with parascrobal region variable depending on structure of scrobal depression, but with different sculpture than on frontovertex. Interantennal region not distinctly Λ-like, weakly convex with rounded rather than abrupt margins and/or with indistinct or broadly ∩-like to truncate dorsal margin. Vertex with posterior ocellus contiguous with or separated from inner orbit by distance up to about 1 OD; rounded into occiput; without mediolongitudinal sulcus. Occiput without any indication of occipital carina. Gena entirely sculptured. Eye superficially bare to densely microsetose, and less than twice as high as broad; inner orbits in frontal view variably distinctly convergent dorsally, sometimes evenly convergent onto vertex behind ocelli so minimum distance between eyes behind ocelli less than distance between eyes measured at posterior ocelli.

Antenna inserted below level of lower orbits, with dorsal margin of torulus at or below level of lower margin of eye. Pedicel much longer than to only about as long as clava; funicle 8-segmented; flagellum with large, flat or collapsing sensory region on clava and on preclaval segment (Fig. 188); clava 1-segmented.

Mesosoma. Pronotum inclined from neck, without distinct collar but with variably distinct median line (Fig. 182). Mesoscutum punctulate or reticulate with variably distinct rosetteform subsculpture to reticulate-alveolate without subsculpture. Scutellum with crenulate marginal rim (Figs 183–187), the scutellar lip not extending beyond dorsal edge of dorsellum; with or without axillular carina and variably distinct axillula; and with frenal arm at most evident only as curved posterior limit of axillula. Dorsellum setose, slightly convex, with thin, convex dorsal margin projecting at least to posterior margin of scutellar lip (Figs 185, 187) or higher into more obvious vertical flange over marginal rim of scutellum (Fig. 186). Prepectus triangular in lateral view. Upper and lower mesepimeron uniformly sculptured or with upper mesepimeron partly to entirely smooth and shiny, but entirely bare, including subalar pit (Figs 183–187). Metapleuron uniformly sculptured and setose (Figs 184, 185), or much more finely sculptured to smooth and bare dorsally (Figs 183, 186). Propodeum (Figs 185, 186) without distinct paraspiracular furrow or carina, with median carina, and variably distinctly crenulate along anterior margin, but only rarely with crenulae obviously recurved from anterior margin along either side of median carina; often densely setose over callus and most or entire plical region posterior of spiracle to level equal with lateral limit of foramen, but at least broadly setose behind spiracle, sometimes only to level slightly mesal of inner margin of spiracle, and with non-setose surface smooth and shiny to coriaceous-reticulate.

Forewing sometimes entirely setose, but usually with at least slender bare band or angulate region beyond basal cell; hyaline or with varied infuscate patterns.

Legs. Profemur with or without distinct preapical ventral angulation; protibia without carinate ventral margin and without dorsal spicules. Metacoxa setose and often acutely angled but only rarely carinately margined dorsally, and with exterior surface bare to entirely setose; metafemur variable, usually relatively slender with straight ventral margin (Fig. 189*a*) but rarely conspicuously enlarged with broad, low, ventrally denticulate subapical lobe on outer ventral surface (Fig. 190); metatibial spurs variable, often only about as long as apical width of tibia, but sometimes inner spur obviously longer than apical width of tibia and outer spur (Fig. 189*b*).

Metasoma. Petiole of male in dorsal view transverse-rectangular to lunate, and smooth and shiny; in ventral view broadly membranous medially. Gaster (Figs 191–194) not margined laterally, collapsing in female; terga mostly smooth and shiny to finely coriaceous, with posterior margin of Gt_1 usually and margins of one or more other terga often distinctly emarginate (Fig. 191), at least in female; and with Gt_2 exposed. Syntergum of female very short, dorsally transverse with cercus adjacent to posterior margin; without continuous suture between cerci, but sometimes with short, broad anal filament projecting from posterior margin over base of ovipositor sheaths (Fig. 192).

Ovipositor sheaths extending at least slightly and often conspicuously beyond apex of syntergum. Hypopygium in female extending for variable length, from level about equal with posterior margin of Gt_3 to apex of gaster (Fig. 194).

Remarks. Presumed relationships and features to differentiate *Eupelmophotismus* are discussed under *Agamerion* and *Chadwickia*. Structure of the scrobal depression was the primary feature used by Bouček (1988*a*) to separate *Eupelmophotismus* from *Agamerion*. The depression was stated to be deep, ∧-shaped, and reaching to within two ocellar diameters of the anterior ocellus in *Agamerion*, whereas in *Eupelmophotismus* it was stated to be mostly wide and shallow and not nearly reaching the ocellus. However, the dorsal margin of the scrobal depression is only two ocellar diameters from the anterior ocellus in males or both sexes of some undescribed species of *Eupelmophotismus*, similar to some species of *Agamerion*. *Eupelmophotismus* has two intergrading structures of the scrobal depression. Some species, such as *E. pulcher*, have a ∩-like depression extending dorsally mesal to the inner orbits so that there are distinct parascrobal regions (Fig. 179). This structure is similar to that of *Agamerion*, but in *Eupelmophotismus* the interantennal region gradually slopes dorsally and has an indistinct or broad dorsal margin so that the region is not distinctly ∧-like as in *Agamerion* (Fig. 151). Also, the sculpture on the frontovertex changes abruptly from that on the parascrobal region near the upper limit of the scrobal depression. Other species, such as *E. angustifrons*, have a ∩- or bell-shaped depression occupying the entire region between the inner orbits; yet others, such as *E. sidneyi*, have the dorsal margin broadly arched between the inner orbits but have the outer margins extending ventrally mesal to the inner orbits so that the depression is more or less mushroom- or hourglass-shaped (Fig. 180).

I saw a single broken male and female of an undescribed species from ACT (ANIC) that has the metafemur enlarged and ventrally denticulate (Fig. 190) similar to species of the *cleptideum*-group of *Agamerion*. The interantennal region of this species is also reminiscent of the *cleptideum*-group because it is abruptly truncate dorsally. Ventrally, the region is coarsely sculptured between the toruli, but dorsally near the truncation it is convex, smooth, shiny and sparsely setose; above the truncation the upper part of the interantennal triangle is transversely reticulate similar to the scrobes, but it is slightly convex (Fig. 181). The female also has the ovipositor sheaths projecting only slightly, but the gaster is strongly compressed and partly collapsed (Fig. 194). I classify this species in *Eupelmophotismus* rather than in *Agamerion* primarily because of the structure of its scrobal depression (broadly ∩- shaped with transverse dorsal margin about three ocellar diameters from the anterior ocellus, Fig. 181), but also because the dorsellar flange is most similar in structure to other species of *Eupelmophotismus* (Fig. 187). Females of this species are also unusual because the hypopygium extends to the apex of the gaster (Fig. 194). However, females of some other species of *Eupelmophotismus* have the hypopygium extending almost to the end of the gaster, about in line with the posterior margin of Gt_5. Sculpture of the mesonotum of the undescribed species is perhaps most similar to species of *Chadwickia* (*cf*. Figs 170, 181); females of *Chadwickia* have the hypopygium extending to the apex of the gaster.

Eupelmophotismus sidneyi is the only described species of a group of species that have the metacoxa triangular in cross-section with a flat, bare, triangular dorsal surface (Fig. 186). Species of the *sidneyi*-group also do not have the metacoxa extensively setose over the external surface, the metapleuron is bare and usually smoother dorsally, the axillula is less distinct because of the absence of an axillular carina, and the propodeum is less extensively setose mesally than in most other species (Fig. 186). The setal band extends only about half the distance between the inner margin of the spiracle and lateral margin of foramen, though usually the surface is still quite broadly setose behind the spiracle. I consider all of these as likely secondarily derived features within *Eupelmophotismus*. A very few species have the metacoxa carinately margined dorsally, which I also consider as secondarily derived within the genus.

Key to females of described species of *Eupelmophotismus* Girault

1 Flagellum with fl_2–fl_8 white; scutellum flat, posteriorly in same plane as reflexed marginal rim; dorsellum transverse (bandlike), smooth and shiny; propodeum distinctly reticulate; upper mesepimeron smooth and shiny and lower mesepimeron reticulate-coriaceous; metapleuron with about dorsal half smooth and shiny . . . . ***Eupelmophotismus eupelmoideus* Girault**

– Flagellum uniformly dark; scutellum variably distinctly convex, but obviously curved down to reflexed marginal rim (Figs 183, 184); other features variable, but not in combination as described above **2**

2(1) Head in dorsal view with upper inner orbits separated by distance only about equal to longest diameter of ocellus or half distance between outer margins of posterior ocelli; scrobal depression continuous between lower inner orbits, and very shallow, margined only between torulus and lower inner orbit; metatarsus with at least basitarsus white; upper mesepimeron finely coriaceous and lower mesepimeron reticulate-coriaceous; metapleuron coriaceous-reticulate and setose ventrally, but smooth, shiny and bare dorsally; metatibia with dorsal margin white . . . . ***Eupelmophotismus angustifrons* (Girault)**

– Head in dorsal view with upper inner orbits separated by distance distinctly greater than longest diameter of ocellus and at least about equal to distance between outer margins of posterior ocelli; other features variable **3**

3(2) Axilla and mesoscutal lateral lobe anterior to axilla smooth, shiny, and bare except for minute setal pores; metatibia not white dorsally; upper mesepimeron smooth and shiny and lower mesepimeron reticulate; metapleuron smooth and shiny dorsally; scrobal depression composed of two parts, a sinuate, carinately margined region lateral to toruli and a broad, dorsally carinate region between the lower inner orbits (Fig. 180); ovipositor sheaths projecting for distance about equal to length of hind basitarsus [forewing with bare area behind base of parastigma closed posteriorly by several lines of setae joining setae of disc and basal cell, and with line of setae extending along posterior margin of wing behind parastigma and about apical half of basal cell; metatibia not carinate dorsally] . . . . ***Eupelmophotismus sidneyi* (Girault)**

– Axillae and mesoscutal lateral lobe punctulate-rugulose, similar to scutellum; metatibia with dorsal margin white except basally; upper and lower mesepimeron similarly punctate, but separated medially by transverse smooth band (Fig. 184); metapleuron uniformly reticulate-punctate and setose; scrobal depression composed of single ∩-like region separated from inner orbits by about 1 OD (Fig. 179); ovipositor sheaths projecting for distance about equal to combined length of basal 3 metatarsal segments [metacoxa uniformly dark, including ventrally] . . . . ***Eupelmophotismus pulcher*** **(Girault)**

Grooca **Sureshan and Narendran**

Figs 195–210

Neoepistenia Sureshan and Narendran, 1995: 96; primary homonym of *Neoepistenia* Hedqvist (1959: 194–196). Type species: *Neoepistenia coorgensis* Sureshan and Narendran; by original designation and monotypy.

Grooca Sureshan and Narendran, 1997: 175. Replacement name for *Neoepistenia* Sureshan and Narendran.

Diversity. One described and at least five undescribed species based on females; known from the Afrotropical region [*Botswana, *Madagascar, *Saudi Arabia, *Somalia, *South Africa, *Uganda, *Zimbabwe] and Oriental region [India, *Malaysia, *Philippines, *Thailand].

✓ ***Grooca coorgensis*** **(Sureshan and Narendran)**. *Neoepistenia coorgensis* Sureshan and Narendran, 1995: 97–98; ♀ holotype (DZUC). Combination by Sureshan and Narendran (1997: 175). DISTRIBUTION: India (Karnataka), *Malaysia (AEIC, BPBM), *Thailand (UCDC).

Biology. Unknown, but likely parasitoids of wood-boring beetle larvae.

Description. *Head* (Figs 195–198, 204). Scrobal depression extending to within about 0.5–1.5 OD of anterior ocellus, abruptly declivous ventrally and with outer margin carinate at least dorsally near anterior ocellus; scrobes and often channel finely, transversely coriaceous to strigose. Face reticulate to punctate-reticulate. Interantennal region triangular, slender dorsally with dorsal angle weakly convex or distinctly expanded into angulate, rounded (Fig. 196), or truncate process (Fig. 204); with abruptly inclined sides and with surface on slightly lower plane than carinate margin of parascrobal region. Vertex with posterior ocellus separated from inner orbit by distance slightly less than to slightly more than 1 OD; without mediolongitudinal sulcus. Occiput without any indication of occipital carina (Figs 197, 198). Gena entirely sculptured. Eye densely and conspicuously microsetose, and less than twice as high as broad; inner orbits in frontal view not strongly convergent dorsally, but in dorsal view orbits divergent behind ocelli from about level of posterior ocelli.

Antenna inserted slightly below level of lower orbits in female, with dorsal margin of torulus at or below level of lower margin of eye (Fig. 195), but in male sometimes appearing as inserted above lower orbits, the ventral margin to middle of torulus in line with lower margin of eye. Pedicel and clava of similar length; preclaval segment without micropilose sensory region; flagellum usually with 8-segmented funicle and 3-segmented clava (*cf*. Fig. 264), but sometimes (*Grooca* n. sp. #5) with 7-segmented funicle and 2-segmented clava; clava with small micropilose sensory region at extreme apex.

Mesosoma. Pronotum with strongly transverse collar, and abruptly inclined neck having median line (Figs 197, 198). Mesoscutum meshlike-reticulate without subsculpture on interstices to reticulate-punctate with sparse coriaceous subsculpture on interstices; notaulus obscure, shallowly sulcate anteriorly but at least in female not evident over posterior half or more, or at most evident posteriorly as raised line resulting from ridges that form reticulate sculpture. Scutellum with frenal area differentiated laterally by distinct frenal arm (Figs 199, 203), the region posteromedial to frenal arms relatively large, setose, and sometimes differentiated by difference in sculpture, but curved down to dorsellum without reflexed or distinctly crenulate marginal rim (Figs 199–203); only sometimes with incomplete axillular carina dorsolaterally and usually without distinct axillula. Dorsellum reticulate-rugulose (Fig. 200) to smooth (Fig. 199), setose or bare, and sometimes with crenulate margin dorsally or both dorsally and ventrally. Prepectus triangular, or slightly lunate in lateral view if posteroventral margin slightly incurved (Fig. 203). Mesepimeron largely punctate except for smooth and shiny transepimeral line, with upper mesepimeron extensively setose and lower mesepimeron usually setose posteriorly (Fig. 203). Metapleuron uniformly punctate-reticulate and setose. Propodeum (Figs 199–202) without distinct paraspiracular furrow or carina, but with crenulate furrow along about lateral third of anterior margin to level about equal with lateral limit of dorsellum, the furrow in part differentiating callus from variably sculptured plical region; callus sparsely to quite densely setose, sometimes to level only about equal with outer margin of spiracle, but usually over almost entire surface posterior of spiracle to level about equal with lateral margin of foramen (Figs 199, 201); propodeum of female short medially, with or without distinct median carina, but with plical region reticulate to crenulate (Figs 199, 200); propodeum of male longer than for female, with strong median carina, and with at least non-setose surface reticulate (Figs 201, 202).

Forewing uniformly setose and hyaline.

Legs. Profemur slender, without preapical ventral angulation; protibia without carinate ventral margin and without dorsal spicules. Metacoxa variably extensively setose dorsally or dorsobasally, with dorsal margin distinctly carinate in female but carinate or not in male, and with exterior, concave surface bare; metatibial spurs only about as long as apical width of tibia.

Metasoma. Male with petiole in dorsal view strongly transverse (Figs 201, 202) and in ventral view broadly membranous; gaster margined laterally (Figs 209, 210), with Gt$_1$ dorsally smooth and shiny (Fig. 209) to distinctly reticulate (Fig. 210) and usually with broadly ∪-like, only rarely narrowly ∨-like, basomedial depression, and with Gt$_2$ dorsally entirely concealed under Gt$_1$ (Fig. 209) or variably extensively exposed between Gt$_1$ and Gt$_3$. Female gaster lanceolate, broadly attached to mesosoma and attenuated posteriorly, with at most a slightly convex mediolongitudinal line on Gt$_5$ and Gt$_6$ (Fig. 206) and with terga margined laterally(Fig. 207) or not (Figs 205, 206); Gt$_1$ smooth and shiny to reticulate dorsally; Gt$_2$ at least very narrowly exposed between Gt$_1$ and Gt$_3$ and sometimes exposed for distance equal to about half length of Gt$_3$; and with Gt$_3$ and Gt$_4$ reticulate. Syntergum of female short, at most slightly longer than Gt$_6$; cercus sometimes in deep depression (Fig. 208) but without continuous suture dorsally between cerci. Hypopygium in female extending to level about equal with posterior margin of Gt$_3$ or Gt$_4$.

Remarks. Both parsimony (Fig. 1*a*) and intuitive analyses support *Grooca* as forming a monophyletic group with *Solenura*. The parsimony analysis indicated this clade as the sister group of all New World Clade genera when NW *Proshizonotus* was subsumed within *Proshizonotus* (Fig. 1*b*) rather than treated as a separate taxonomic unit (Fig. 1*c*). Such a sister-group relationship does not concur with my intuitive analysis (see Biogeography of Lyciscini). Uncertainty over polarity of some shared features complicates hypotheses of monophyly. Complete absence of a scutellar marginal rim (23:0) and presence of a 3-segmented clava in both sexes (12:0, 13:0) either represent synapomorphies or uniquely retained symplesiomorphies for *Grooca* + *Solenura*. Individuals of *Grooca* and *Solenura* are also unusual within Lyciscini because the crenulate furrow along the anterior margin of the propodeum extends only over about its lateral third to a level equal with the lateral limit of the dorsellum (Figs 199–202, 268, 269). This structure is superficially similar to that of Chalcedectini (Figs 68, 69); in other Lyciscini the furrow extends more mesally (e.g., Figs 160, 171, 215, 243, 287). Except for individuals of *G. coorgensis*, *Grooca* and *Solenura* also possess a posteriorly setose lower mesepimeron (30:1), though so do individuals of *Chadwickia* and many Cleonymini. Posteriorly obsolete or obscure notauli (19:1) are another feature shared between *Grooca* + *Solenura* and Cleonymini. Surprisingly, the notauli in *Grooca* and *Solenura* are often much more distinct in SEM's (Figs 197, 198) than in specimens using light microscopy.

Presence or absence of a gastral 'tail' in females is the most conspicuous difference between *Solenura* and *Grooca*, but there are other less conspicuous differences. Both sexes of *Solenura* have the gastral terga more distinctly punctate (Figs 270, 271) compared with more meshlike-reticulate (Fig. 205) or reticulate-punctate (Figs 207, 209, 210) in *Grooca*. Individuals of *Solenura* also have more distinct notauli, though this is not evident with the SEM illustrations. Except for males identified as *Grooca* sp. M#5, males of the two taxa also have a slightly different structure of Gt$_1$. Males of *Grooca* sp. M#5 have a short and narrowly ∨-like, almost sulcate, basomedial depression on Gt$_1$, somewhat similar to the deep ∨-like declivity (Fig. 271) or even more parallel-sided basomedial depression of known *Solenura* males. Other males I assign to *Grooca* have a broadly ∪-like basomedial depression (Fig. 210).

I have seen females from India, Malaysia and Thailand I identify as *G. coorgensis*. I have also seen males from Thailand and Philippines that I tentatively identify as *G. coorgensis*, though they differ from females by having the gaster much more distinctly margined and Gt$_2$ entirely concealed. Females of *G. coorgensis* have a unique gastral structure within *Grooca*; the gaster is not margined laterally, but Gt$_3$ and Gt$_4$ have a lateral band of finer sculpture separating more strongly sculptured dorsal and lateral, vertical regions of sculpture (Fig. 205). Furthermore, at least some females of *G. coorgensis* have a slightly differentiated mediolongitudinal line on Gt$_5$ and Gt$_6$ (Fig. 205). Females of *Grooca* n. sp. #1 have a gaster that is subcircular in cross-section, not at all margined laterally, but with a differentiated mediolongitudinal line on Gt$_5$ and Gt$_6$ (Fig. 206), whereas females of other *Grooca* have a variably distinctly margined gaster and Gt$_5$ and Gt$_6$ uniformly convex (Fig. 207). The gaster of female *Grooca* n. sp. #1 is most similar to those of *Solenura*, except the posterior segments are not so distinctively elongated and Gt$_5$ and Gt$_6$ are much less distinctly margined mediolongitudinally. The gastral structure of female *G. coorgensis* could be the groundplan structure from which both the laterally margined gaster of some species of *Grooca* and the non-margined gaster of *Grooca* n. sp. #1 and *Solenura* evolved, or an intermediate stage in a single transformation from presence to loss of a margined gaster. If the former, *Grooca* n. sp. #1 is indicated to be more closely related to *Solenura* than to other species of *Grooca*. However, *Grooca* n. sp. #1 has the cerci in deep depressions so that the syntergum is almost entirely subdivided dorsally (Fig. 208) and individuals are non-metallic black. Females of all *Solenura* species have the syntergum uniformly sclerotized dorsally between the cerci, and individuals of *S. ania* and at least some females of *S. nigra* have a distinct metallic luster, more similar to *G. coorgensis*. A smooth Gt$_1$ and a distinctly meshlike-reticulate mesoscutum are two other features of *G. coorgensis* that may be symplesiomorphic groundplan features, though males of *G*. sp. M#1 also have a smooth Gt$_1$ and a more meshlike-reticulate mesoscutum.

Monophyly of *Grooca* is not supported by any putative autapomorphy. The genus may well be a grade-level taxon whose females retain a plesiomorphic lanceolate gaster, whereas *Solenura* represents a more derived group of species whose females have the posterior terga abruptly elongated into a dorsally carinate ‘tail’. Although *Solenura* very possibly renders *Grooca* paraphyletic, I prefer to retain it as a separate genus until relationships between *Grooca* + *Solenura* and other Lyciscini are clarified.

Key to species of *Grooca* Sureshan and Narendran

1 Female **2**
– Male **7**

2(1) Gt$_1$ and Gt$_2$ smooth and shiny, or at most very finely and inconspicuously coriaceous dorsally (Fig. 205); lower mesepimeron entirely bare; mesosoma and gaster with definite metallic green or bluish luster under some angles of light; postmarginal vein subequal in length to marginal vein . . . .
. . . . ***Grooca coorgensis* (Sureshan and Narendran)**
– Gt$_1$ and Gt$_2$ reticulate (Figs 206, 207); lower mesepimeron setose posteriorly anterior to metapleuron (Fig. 203); mesosoma and gaster black; postmarginal vein obviously shorter than marginal vein **3**

3(2) Legs uniformly reddish beyond coxae, and flagellum uniformly dark; scrobal depression extending to within less than 1 OD of anterior ocellus; parascrobal region and interantennal region with distinctly lanceolate setae; eye sparsely microsetose; gaster smoothly rounded laterally, not at all margined (Fig. 206); dorsellum setose (Fig. 200) [Botswana (1♀ CNCI), Zimbabwe (1♀ BMNH)]
. . . . ***Grooca* n. sp. #1**
– Legs with femora infuscate and/or flagellum with some segments yellowish; scrobal depression at least 1 OD from anterior ocellus (Fig. 196); parascrobal region and interantennal region with indistinctly lanceolate setae (Fig. 195); eye densely microsetose; gaster more or less distinctly margined laterally (Fig. 207); dorsellum setose or bare **4**

4(3) Flagellum uniformly dark; scrobal depression not carinately margined; dorsellum sometimes bare **5**

– Flagellum at with least fl_2 and fl_3, and sometimes fl_2–fl_5, lighter in color, variably distinctly yellowish; scrobal depression margined by fine reflexed rim (Fig. 195); dorsellum setose **6**

5(4) Gt_1 carinately margined anteriorly; dorsellum bare; metacoxa not distinctly carinate dorsally, the carina obscured by setae exterior to carina; scutellum without evident axillular carina [Sulawesi (1♀ BMNH)] . . ***Grooca* n. sp. #2**

– Gt_1 rounded anteriorly; dorsellum densely setose; metacoxa distinctly carinate dorsally, sparsely setose only interior of carina; scutellum with distinct though incomplete axillular carina basolaterally [Botswana (1♀ CNCI)] . . . . ***Grooca* n. sp. #3**

6(4) Flagellum with 8 segments between pedicel and clava; fl_2–fl_4 and often fl_5 light colored [Botswana (4♀♀ CNCI, 1♀ USNM), Ivory Coast (1♀ AUWN), Madagascar (1♀ UCDC), Somalia (1♀ CNCI), South Africa (1♀ CNCI), unknown locality (1♀ USNM)] . . . . ***Grooca* n. sp. #4**

– Flagellum with 7 segments between pedicel and clava; fl_2 and fl_3 light colored [South Africa (1♀ CNCI)] . . . . ***Grooca* n. sp. #5**

7(1) Gt_1 smooth and shiny to finely and inconspicuously coriaceous (Fig. 209) . **8**

– Gt_1 strongly reticulate (Fig. 210) **9**

8(7) Lower mesepimeron bare anterior to metapleuron; propodeum setose only to about level of nucha, hence broadly bare medially; antenna with at least pedicel dark as flagellum; interantennal region with dorsal angle expanded into variably distinct tooth; Gt_1 with slight coriaceous sculpture; body with dull metallic green luster [Philippines (2♂♂ BPBM, 1♂ ROMT), Thailand (1♂ CNCI)] . . . . ***Grooca* coorgensis (Sureshan and Narendran)**

– Lower mesepimeron setose posteriorly; propodeum setose almost to median carina; antenna with scape and pedicel uniformly yellowish-orange; interantennal region with dorsal angle not tooth-like; Gt_1 smooth and shiny; body black [Uganda (1♂ CNCI)] . . . . ***Grooca* sp. M#1**

9(7) Gt_2 exposed for distance equal to at least about half length of Gt_1, and reticulate-coriaceous to distinctly reticulate; metacoxa not carinately margined but with conspicuous band of setae along dorsal length; dorsellum bare **10**

– Gt_2 often concealed in dorsal view, but if exposed then for distance obviously less than half length of Gt_1 and smooth to finely coriaceous; metacoxa variably distinctly carinate dorsally and conspicuously setose only dorsobasally; dorsellum often setose **11**

10(9) Propodeum setose laterally to level only about equal with outer margin of spiracle; Gt_2 with about apical half of exposed surface having large reticulations similar to those anteriorly on Gt_1, and with much smaller, transverse reticulations over basal half (basal portion possibly normally concealed under Gt_1) [Thailand (1♂ CNCI)] . . . . ***Grooca* sp. M#2**

– Propodeum more extensively setose behind spiracle to about level of lateral margin of foramen (Figs 201, 202); Gt$_2$ with exposed surface uniformly reticulate-coriaceous, the sculpture distinct but obviously finer and more transverse than on Gt$_1$ [Thailand (1♂ BMNH)] . . . . ***Grooca* sp. M#3**

11(9) Dorsal portion of interantennal region projecting anteriorly as large truncate lobe clearly evident in lateral view when scape appressed in scrobe (Fig. 204) [South Africa (2♂♂ CNCI)] . . . . ***Grooca* sp. M#4**

– Dorsal portion of interantennal region either not projecting or projecting anteriorly as angulate lobe or small triangular ridge not clearly evident in lateral view when scape appressed in scrobe **12**

12(11) Scrobal depression separated from anterior ocellus by only about half maximum diameter of ocellus; Gt$_1$ with narrowly ∨-like, almost sulcate basomedial depression; dorsellum bare [Saudi Arabia (1♂ CNCI)] . . . . ***Grooca* sp. M#5**

– Scrobal depression separated from anterior ocellus by distance greater than 1 OD; Gt$_1$ with broadly ∨- or ∪-like basomedial depression; dorsellum setose **13**

13(12) Scape dark brown, yellowish only narrowly adjacent to radicle [Madagascar (1 ♂ BMNH, 1♂ CASC, 1♂ UCDC)] . . . . ***Grooca* sp. M#6**

– Scape with at least basal half, often entirely, yellow [Botswana (1♂ CASC, 4♂♂ CNCI), South Africa (4♂♂ CNCI)] . . . . ***Grooca* sp. M#7** [very possibly only a variant of M#6]

***Marxiana* Girault**
Figs 211–218

Marxiana Girault, 1932[437]: 6. Type species: *Marxiana grandiosa* Girault; by monotypy.

Diversity. One species known from Australia.

✓ ***Marxiana grandiosa* Girault**, 1932[437]: 6. DISTRIBUTION: Australia (NSW, QLD).

Biology. Moore (1963) reared *M. grandiosa* in New South Wales as a hyperparasitoid of *Phoracantha semipunctata* (Fabricius) (Cerambycidae) through *Syngaster lepidus* Brullé (Braconidae) and what was questionably identified as *Callibracon* (= *Bracon*) *capitator* (Fabricius) (Austin *et al.* 1994). There are also three specimens collected in 1968 from an unidentified site in Australia (ANIC) labelled as reared from *S. lepidus*, *B. capitator* and *Doryctes* (Braconidae).

Description. *Head* (Figs 211, 212). Face with upper parascrobal region raised above plane of eye and cristate from about level of dorsal limit of interantennal region to anterior margin of posterior ocellus (Fig. 211), hence anterior ocellus superficially within scrobal depression. Scrobal depression slightly convergent dorsally and extending to within 1 OD of anterior ocellus where channel right-angled, hence with slender, subhorizontal region between dorsal margin of channel and dorsally faced anterior ocellus, the depression abruptly declivous ventrally but with outer margin rounded; scrobes and channel sculptured. Interantennal region elongate-triangular, but dorsal angle not expanded into process. Vertex with posterior ocellus separated from inner orbit by less than 1 OD and about 3 times POL; without mediolongitudinal sulcus. Occiput with occipital carina laterally (Fig. 212). Gena with distinct smooth and shiny, mirrorlike bare region posterior to malar sulcus and ventral to lower orbit, the region narrowed toward mandible (Fig. 211). Eye densely and conspicuously microsetose, and less than twice as high as broad; inner orbits in frontal view not strongly convergent dorsally, with minimum distance between eyes about 1.3 times distance between outer margins of posterior ocelli, and in dorsal view with orbits slightly divergent behind ocelli.

Antenna inserted slightly above level of lower orbits, in frontal view ventral margin of torulus at about level of lower margin of eye. Pedicel shorter than clava; funicle 8-segmented; preclaval segment without micropilose sensory region; clava of male 1-segmented with non-collapsing micropilose sensory region only at extreme apex, but 2-segmented in female, with oblique suture extending ventrobasally to encompass large ventral micropilose region (*cf*. Fig. 254).

Mesosoma. Pronotum with transverse collar and short neck having median line (Fig. 212). Mesoscutum punctate-reticulate with sparse coriaceous subsculpture on interstices. Scutellum with sculpture similar to that of mesoscutal medial lobe but with variably distinct, finely coriaceous mediolongitudinal line; curved down to dorsellum, with crenulate marginal rim differentiated by furrow most clearly evident laterally, but not reflexed (Fig. 214); without distinct axillular carina but with slightly concave, carinate or rugose axillula (Fig. 214); and with short, smooth frenal arm basolaterally delimiting basal margin of scutellar marginal rim. Dorsellum exposed between scutellum and propodeum, convex, reticulate-coriaceous, and setose (Figs 214, 215). Prepectus triangular in lateral view. Upper mesepimeron setose dorsally, shiny with only obscure coriaceous sculpture anteroventrally; lower mesepimeron bare, reticulate ventrally (Fig. 213). Metapleuron uniformly punctate and setose (Fig. 214). Propodeum with transversely crenulate postspiracular furrow behind spiracle, the mesal margin of furrow forming obliquely angled paraspiracular carina and differentiating callus from plical region (Figs 214, 215); callus bare behind spiracle except along posterior margin; plical region setose, more distinctly so in female than in male; plical region of male with crenulate furrow along anterior margin recurved posteriorly on either side of median carina (Fig. 215); plical region of female abruptly raised behind dorsellum as subhorizontal sculptured surface, without complete median carina, and with or without distinct crenulate furrow along anterior margin (Fig. 214).

Forewing uniformly setose; only very slightly infuscate around stigma in male but with distinct mediolongitudinal infuscate band in female, the band triangularly expanded anteroapically to stigmal and postmarginal veins.

Legs. Profemur slender but with preapical ventral angulation; protibia without carinate ventral margin, but with dorsal spicules (Fig. 217). Metacoxa extensively setose and acutely but not carinately margined dorsally, and with exterior surface broadly bare; metatibial spurs at most about as long as apical width of tibia.

Metasoma. Petiole of male in dorsal view diamond-shaped (Fig. 215), slightly wider than long with reflexed lateral rim, weakly convex, coriaceous, and with median carina over posterior half; in ventral view broadly membranous (*cf*. Fig. 252*b*). Gaster not margined laterally, somewhat compressed in female; Gt_1 smooth and shiny; Gt_2 short, normally exposed for distance equal to less than half length of Gt_1 or Gt_2, and finely coriaceous; Gt_1–Gt_5 with posterior margins distinctly emarginate in female (Fig. 216); Gt_3–Gt_5 finely coriaceous in male to more distinctly transverse coriaceous-strigose in female; and female with Gt_6 strongly compressed into vertical flange above syntergum (Fig. 218). Syntergum elongate-slender, about as long as Gt_6, with continuous suture dorsally between cerci (Fig. 218). Hypopygium in female extending to level about equal with middle of Gt_4.

Remarks. Austin *et al.* (1994) provided habitus drawings as well as SEM's of diagnostic features of both sexes of *M. grandiosa*. The posterodorsally compressed and raised, flangelike penultimate gastral tergum of females (Fig. 218) is unique to *M. grandiosa*. Both sexes of this monotypic genus are also easily recognized among Old World Lyciscini by the distinctively raised, cristate upper parascrobal region (7:1; Fig. 211). Although similar to the parascrobal structures of *Paralycisca* and *Agrilocida*, the structure is certainly independently derived. Parsimony analysis did not resolve relationships of *Marxiana* prior to successive weighting (Fig. 1*a*), but indicated the genus as the sister group of *Neboissia* + (*Parepistenia* + *Striatacanthus*) after successive weighting (Figs 1*b*, 1*c*). My intuitive analysis suggests *Marxiana* is more likely the sister taxon of *Parepistenia* based on a similar structure of the male petiole (51:5; Figs 215, 252), 2-segmented clava in female (12:1; Fig. 254), a medially setose propodeal plical region (34:1, 35:1; Figs 214, 215, 250, 251), and presence of dorsal spicules on the protibia (41:1; Figs 217, 248). This sister-group hypothesis requires secondary loss of both the propodeal plical setae and protibial dorsal spicules from different species of *Parepistenia*. It also requires independent evolution of setae on the plical region in the New World genus *Lycisca*, and protibial dorsal spicules in *Heydenia* (Heydeniini) and some other chalcids. Individuals of *Marxiana* and *Parepistenia* also have a smoother and shinier region on the gena behind the malar sulcus (Fig. 211), though so do some species of *Proshizonotus* (Fig. 300). Males of some species of *Proshizonotus* also have a petiole that dorsally (Fig. 328*b*) is similar to those of *Marxiana* and *Parepistenia*, but that ventrally is uniformly sclerotized so as to be tubular (Fig. 329*b*). *Marxiana* and *Parepistenia* also share a comparatively inconspicuous scutellar marginal rim. A regular series of crenulae differentiates a marginal rim (Figs 214, 251), but these are curved down in the same plane as the scutellum (Fig. 248) rather than being reflexed. It is possible this structure represents an intermediate stage between complete absence of a marginal rim in *Grooca* + *Solenura* and a more distinctly differentiated rim in other Lyciscini. Individuals of *Marxiana* (Figs 214, 215), *Parepistenia* (Fig. 251) and some *Striatacanthus* (Fig. 276) all have a distinct paraspiracular carina and usually a transversely crenulate furrow posterior to the propodeal spiracle. At least females of these three genera also have the plical region conspicuously raised or convex (Figs 214, 250, 273, 276), but this similarity is likely convergent because the structures differ among the three genera. The less modified propodeal structures of *Marxiana* (Fig. 215) and some *Parepistenia* males likely represent the ancestral structure, i.e., with the plical region not abruptly raised, with a median carina, and with a crenulate furrow along each side of a median carina and along the anterior margin of the propodeum.

Mesamotura Girault
Figs 219–226

Mesamotura Girault, 1925[381]: 3. Type species: *Mesamotura aristophani* Girault; by monotypy.

Diversity. Four described species known from Australia.

✓ ***Mesamotura aeschyli* Girault**, 1927[416]: 312. DISTRIBUTION: Australia (QLD).
✓ ***Mesamotura aristophani* Girault**, 1925[381]: 3. DISTRIBUTION: Australia (QLD).
✓ ***Mesamotura corticis* Girault**, 1926[402]: 133–134. DISTRIBUTION: Australia (QLD).
✓ ***Mesamotura keatsi* Girault**, 1927[416]: 312. DISTRIBUTION: Australia (*ACT, NSW, QLD).

Biology. Parasitoids of the larvae of wood-boring beetles in dead tree trunks and logs (Bouček 1988*a*).

Description. *Head* (Figs 219, 220). Scrobal depression with dorsal limit sometimes obscure but variably distinctly extending to anterior ocellus, not carinately margined, with sculpture of parascrobal region extending slightly over rounded outer margin of depression (Fig. 219); scrobes strigose, but channel more cristate-granulate dorsally. Face with band of strigose to cristate sculpture across lower parascrobal region and interantennal region above level of toruli (Fig. 219). Interantennal region elongate-triangular with abruptly inclined sides, but dorsal angle not expanded into process. Vertex with posterior ocellus separated from inner orbit by less than 1 OD, similar in distance to POL; rounded into occiput and with distinct impunctate mediolongitudinal line posterior to ocelli (Fig. 220); with short white setae. Occiput without any indication of occipital carina; with short white setae. Gena entirely sculptured. Eye superficially bare, but very sparsely and inconspicuously microsetose (Fig. 220), and less than twice as high as broad; inner orbits in frontal view strongly convergent dorsally, with minimum distance between eyes posterior to ocelli slightly less than, to up to about 1.3 times greater than, distance between eyes measured at posterior ocelli.

Antenna inserted below level of lower orbits, with dorsal margin of torulus distinctly below level of lower margin of eye (Fig. 219). Pedicel distinctly longer than clava; funicle 8-segmented; flagellum with non-collapsing sensory region on fl_7, preclaval segment, and on clava (Fig. 224); clava 1-segmented.

Mesosoma. Pronotum almost in same plane (Fig. 222) without distinctly differentiated collar and neck, but with median line (Fig. 221) and with inconspicuous whitish setae. Mesoscutum reticulate-rugulose without distinct subsculpture; with inconspicuous whitish setae. Scutellum with variably distinct mediolongitudinal line, the line at least slightly sulcate anteriorly and often slightly ridgelike posteriorly (Fig. 223); with crenulate, reflexed marginal rim, the lip subvertical and extending slightly over dorsal margin of dorsellum (Figs 222, 223); without axillular carina or distinct axillula; and without distinct frenal arm. Dorsellum bandlike, convex, finely coriaceous to reticulate-punctulate, and bare (Fig. 223). Prepectus triangular in lateral view. Upper and lower mesopleuron uniformly punctulate-rugulose and setose (Fig. 222). Metapleuron uniformly sculptured and setose. Propodeum (Figs 221, 223) without distinct paraspiracular furrow or carina, but with crenulate furrow along anterior margin recurved toward posterior margin near median so as to differentiate anteromedial triangular region and median carina; callus not distinctly angulate or toothed posterolaterally, moderately densely setose behind spiracle to level equal with lateral limit of foramen; plical region with non-setose surface distinctly coriaceous to imbricate-strigose.

Forewing almost uniformly setose, but with slender, longitudinal bare band beyond basal cell; variably distinctly infuscate behind stigmal vein and parastigma, and along vanal fold.

Legs. Profemur slender, without preapical ventral angulation; protibia without carinate ventral margin and without dorsal spicules, with 2 widely spaced dorsoapical pegs (Fig. 225). Metacoxa setose but not carinately margined dorsally, and uniformly setose over exterior surface; metatibia conspicuously compressed (paddlelike) apically (Fig. 226); metatibial spurs shorter than greatest width of tibia.

Metasoma. Petiole of male in dorsal view transverse-rectangular to lunate, and smooth and shiny (Fig. 223); in ventral view tubelike, heavily sclerotized, with margins contiguous along midline, and angled posteriorly so as to be somewhat 'collarlike' in lateral view (*cf*. Fig. 291*b*). Gaster not margined laterally; Gt_1 smooth and shiny; Gt_2 exposed; Gt_2–Gt_5 transversely strigose in female to finely coriaceous in male; and with basal 4 or 5 terga slightly to distinctly emarginate. Syntergum and ovipositor sheaths of female greatly elongated into slender 'tail' about equal in length to rest of body, without any line dorsally between cerci. Hypopygium of female extending to level about equal with posterior margin of Gt_3.

Remarks. Monophyly of *Mesamotura* is supported by an entirely setose lower mesepimeron (30:3; Fig. 222) and by an apically compressed, paddlelike metatibia (50:2; Fig. 226). Within *Thaumasura*, individuals of *T. terebrator* have the upper mesepimeron extensively setose and they have a few setae dorsally on the lower mesepimeron (Fig. 290). The setae on the lower mesepimeron likely evolved through secondary encroachment from the upper mesepimeron. This may illustrate how the entirely setose mesepimeron of *Mesamotura* evolved, but the setal patterns of *T. terebrator* and *Mesamotura* probably do not form a single transformation series.

Both parsimony (Fig. 1*a*) and intuitive analyses indicate *Mesamotura* and *Thaumasura* comprise a monophyletic group; however, my intuitive analysis suggests *Mesamotura* very likely renders *Thaumasura* paraphyletic. I have seen two females of an undescribed species of *Thaumasura* from Papua New Guinea (BMNH) with a similar, though less distinct mediolongitudinal impunctate line on the vertex (8:1). These females also have the metatibia slightly compressed dorsally, with a thin lamina over about the apical 0.6 of the dorsal margin (50:1). They also have very sparsely microsetose eyes, an exposed and coriaceous dorsellum, a similar propodeal structure and sculpture pattern to *Mesamotura*, and the inner orbits of the eyes strongly convergent dorsally so that the minimum distance between the inner orbits behind the ocelli is slightly less than the distance measured at the level of the ocelli. The two females differ most conspicuously from individuals of *Mesamotura* by having an occipital carina laterally, the upper mesepimeron only finely coriaceous, the lower mesopleuron reticulate-strigose and bare, and by lacking a mediolongitudinal impunctate line from the scutellum.

Several features shared by *Mesamotura* and some or all species of *Thaumasura* indicate these two genera are at least closely related. The features include: 1) margins of the scrobal depression rounded rather than carinate; 2) parascrobal region and interantennal region partly transverse-strigose (*cf*. Figs 219, 281); 3) male petiole obliquely angled posteroventrally and collarlike in appearance (*cf*. Fig. 291*b*); 4) similarly structured scutellar-dorsellar complex (*cf*. Figs 223, 288); 5) similar sculpture pattern of the propodeum (*cf*. Figs 223, 287); and 6) non-collapsing sensory regions on some preclaval segments (*cf*. Figs 224, 297). No features are known to support monophyly of *Thaumasura* excluding *Mesamotura*. Species of *Mesamotura* probably are most closely related to the undescribed species of *Thaumasura* from Papua New Guinea or perhaps to some other group of species within *Thaumasura* with superficially bare eyes, a distinct region of transversely strigose to cristate sculpture on the face above the toruli, and a partly light-colored flagellum. *Mesamotura* is indicated as a relatively basal clade within *Thaumasura*, if it does render this genus paraphyletic, based on an exposed and sculptured dorsellum, uniformly sculptured and setose metapleuron, slender profemur, and a propodeum with the anterior crenulate furrow recurved along either side of a median carina. I retain *Mesamotura* as a separate genus until such time as species limits within the genus are better known. Four species of *Mesamotura* have been described based primarily on color pattern of the hind legs; validity of the species requires additional collecting to determine the limits of infraspecific variation.

Key to species of *Mesamotura* Girault

1 Metafemur uniformly yellowish or only dorsally brownish **2**
– Metafemur largely brown but light-colored either apically or basally **3**

2(1) Metatibia mostly brown, yellowish only over part of basal cylindrical portion . . . . ***Mesamotura corticis* Girault**
– Metatibia brown over less than apical half, yellowish over cylindrical and part of compressed region . . . . ***Mesamotura aristophani* Girault**

3(1) Hind leg with femur and tibia mostly brown, but with knee yellowish . . . . ***Mesamotura aeschyli* Girault**
– Hind leg with both femur and tibia yellowish basally and brown apically . . . . ***Mesamotura keatsi* Girault**

Neboissia Bouček

Figs 227–238

Neboissia Bouček, 1988*a*: 248–249. Type species: *Neboissia armipes* Bouček; by original designation.

Diversity. At least two species known from Australia.

✓ ***Neboissia armipes* Bouček**, 1988*a*: 249; ♀ holotype (ANIC). DISTRIBUTION: Australia (ACT, NSW, QLD, *SA, *VIC, *WA).

✓ ***Neboissia lata* Bouček**, 1988*a*: 249–250; ♀ holotype (ANIC). DISTRIBUTION: Australia (*NSW, NT, QLD, *SA, *WA).

Biology. Unknown, but Bouček (1988*a*) stated that they are apparently parasitoids of xylophagous beetles.

Description. *Head* (Figs 227–229). Scrobal depression extending dorsally to level about equal with angle of inner orbit (Fig. 228), about 2–3 OD from anterior ocellus, deep ventrally but not carinately margined; scrobes transversely strigose, channel with similar sculpture or with more transversely aligned reticulate to cristate-granulate sculpture. Face with frontovertex differentiated from parascrobal region by transverse microcoriaceous (granular) band of sculpture between inner orbits at level of dorsal margin of scrobal depression and by conspicuously smaller punctures above than below band (Figs 227, 228); parascrobal region punctate-alveolate. Interantennal region triangular, but dorsal angle not expanded into process. Vertex with posterior ocellus separated from inner orbit by slightly less than 1 OD and about half POL; without mediolongitudinal sulcus. Occiput with occipital carina laterally and with dense region of white lanceolate setae having apices directed toward outer orbit (Fig. 229). Gena entirely sculptured. Eye densely and conspicuously microsetose, and less than twice as high as broad; inner orbits in frontal view not strongly convergent dorsally, and in dorsal view orbits slightly divergent behind ocelli.

Antenna inserted slightly below level of lower orbits, with dorsal margin of torulus at or slightly below level of lower margin of eye. Pedicel subequal in length to clava; funicle 8-segmented; preclaval segment without micropilose sensory region; clava 1-segmented, slightly longer than broad, with comparatively large and conspicuous micropilose sensory region ventroapically (Fig. 231), the region often collapsed in air-dried specimens.

Mesosoma. Pronotum with strongly transverse collar, and inclined neck having median line (Fig. 233). Mesoscutum punctate-reticulate with rosetteform subsculpture. Scutellum with band of aligned crenulae differentiating marginal rim, but rim only very slightly, inconspicuously reflexed, and extending over and usually concealing dorsobasal crenulate margin of dorsellum (Figs 234, 235); without distinct axillular carina or axillula; and without distinct frenal arm basolaterally (Fig. 234). Dorsellum often with crenulate dorsobasal margin concealed under scutellar marginal rim, but with punctulate, setose, transverse region between and in same plane as scutellum and propodeum (Figs 233, 235). Prepectus triangular in lateral view. Upper mesepimeron variably extensively setose dorsally but smoother and shinier at least near transepimeral line; lower mesepimeron bare and transversely reticulate-strigose (Fig. 234). Metapleuron uniformly sculptured and entirely setose (Fig. 234) or more sparsely setose to bare medially or dorsally. Propodeum (Figs 233, 235) without paraspiracular furrow or carina, but with crenulate furrow along anterior margin, posteriorly along foramen, and more or less distinctly on either side of median carina; callus and plical region extensively setose behind spiracle to level equal with lateral limit of foramen (Fig. 235); plical region with non-setose surface distinctly coriaceous to slightly strigose.

Forewing uniformly setose and hyaline or at most slightly infuscate near stigma.

Legs. Profemur with distinct ventral angulation near middle of femur, the obliquely angled ventroapical margin uniformly serrate or toothed beyond larger basal lobe (Fig. 236); protibia with sinuate carina along entire ventral length, but without dorsal spicules. Metacoxa setose and carinately margined dorsally, and with exterior, concave surface bare; metatibial spurs shorter than apical width of tibia.

Metasoma. Petiole of male strongly flattened, in dorsal view transverse-lunate and smooth and shiny (Fig. 232*a*); in ventral view heavily sclerotized and sculptured, somewhat W-like with emarginate anterior and posterior margins, the anterolateral margin projecting into a denticle, and with ventromedial margins contiguous (Fig. 232*b*). Gaster often collapsed or quite abruptly angled laterally but rounded rather than linearly margined (Fig. 237); Gt_1 shiny and at most very finely and inconspicuously coriaceous, with posterior margin narrowly Λ-like emarginate medially (Fig. 237); Gt_2 in dorsal view almost entirely concealed under Gt_1 (Fig. 237) or exposed for distance at most about equal to length of apical smooth band on Gt_3, very finely, transversely coriaceous, and with straight posterior margin; Gt_3 and Gt_4 largely transversely strigose with straight posterior margins; and Gt_6 and Gt_5 more isodiametric coriaceous except basally. Syntergum of female shorter than Gt_6, with continuous suture dorsally between cerci (Fig. 238). Hypopygium in female extending to level about equal with posterior margin of Gt_3.

Remarks. Monophyly of *Neboissia* is supported by the enlarged and ventroapically serrate profemur of individuals (39:2; Fig. 236), and by the region of aligned lanceolate setae on the occiput behind the outer orbit in both sexes (Fig. 229). The setose region is very conspicuous in most individuals because the surface between the setae is covered with a whitish substance (Fig. 230). Circular openings interspaced among the setae are evident in the cuticle under high magnification. It is possible that the holes are openings to secretory ducts and the whitish material is some sort of exudate, though this remains to be proven. It is further possible that the unique dentate profemur of *Neboissia* evolved in conjunction with the setal patch and is used as a 'comb' to clean the whitish substance from the region. Some museum specimens with the forelegs directed dorsally and forward show that the dentate region of the profemur (Fig. 236) can be brought in contact with the setal patch. Presumably, a lateral occipital region with setae pointing toward the outer orbit would be easier to clean using the front legs than one with setae pointing away from the orbit toward the mesosoma. If these hypotheses are accurate, then function of the foreleg of *Neboissia* is not raptorial but grooming. Some species of *Thaumasura* have a superficially similar region of setae along the outer orbit, but in *Thaumasura* the apices of the setae point away from the orbit, which indicates an independent origin. Also, there is no evidence of pores in *Thaumasura* and the region lacks the whitish substance characteristic of *Neboissia*.

Parsimony analysis did not resolve relationships of *Neboissia* prior to successive weighting (Fig. 1*a*), but after successive weighting included the genus as part of a monophyletic assemblage including *Marxiana* and *Parepistenia* + *Striatacanthus* (Figs 1*b*, 1*c*). This relationship appears to be retrieved largely because of similar gastral structures (see Remarks for *Parepistenia*), but may be supported by the comparatively obscurely reflexed scutellar marginal rim of individuals. I coded marginal rim structure of *Neboissia* as distinctly reflexed for the purpose of the character-state analysis, but its structure (see discussion of character 23) might comprise part of a single transformation series including *Marxiana* + *Parepistenia*. The parsimony analysis does not concur with my intuitive analysis. The comparatively extensively setose propodeum of individuals (33:1; Fig. 235) may indicate a relationship with other genera exhibiting this feature (*Agamerion*, *Eupelmophotismus*, *Grooca*, *Mesamotura*, *Solenura*, *Thaumasura*) or simply reflect a symplesiomorphic feature. Perhaps more likely is that *Neboissia* renders *Proshizonotus* paraphyletic. *Neboissia* may be most closely related to such species as

P. incola and *P. pulchripes*, both of which have a profemur with a large preapical ventral angulation and a protibia with a carinate ventral margin that is sinuate (Fig. 317). Neither of the two species has an occipital setal patch and the profemoral angulation is carinate rather than toothed. This may indicate the foreleg structures are only superficially similar to those of *Neboissia*, though the structures characteristic of *P. incola* and *P. pulchripes* could represent an intermediate stage in a transformation series from a slender profemur and normal tibia to the more highly modified structures characteristic of *Neboissia*. Individuals of *P. incola* also have a slender, transverse band of finer sculpture across the upper parascrobal region as well as usually a transverse band of different color in this region. This sculpture and color pattern is somewhat similar to *Neboissia*, though the parascrobal region and frontovertex are not distinctly punctate as in *Neboissia*. Individuals of *P. incola* also have a very similar mesepimeral sculpture pattern to that described for *Neboissia*, a lateral remnant of an occipital carina, and a non-margined gaster. Other features of *P. incola* that are quite rare for Old World *Proshizonotus*, but which likely are groundplan features of *Neboissia*, include a uniformly punctate-reticulate metapleuron and a dorsoapically carinate metacoxa. Individuals of *P. incola* have Gt_2 exposed to a much greater extent than in *Neboissia* and males have a relatively large and laterally margined petiole (*cf*. Fig. 328*b*), but only the large petiole is likely apomorphic relative to the structure in *Neboissia*.

Bouček (1988*a*) mentioned a third species known to him based on a male from Victoria that differed by its larger size and long pronotum. Though I have not seen this male I have seen two males from ACT (ANIC) and Queensland (QMBA) that appear to represent one or two undescribed species. *Neboissia armipes* and *N. lata* have hyaline forewings with at most a slight infuscation around the stigma and have the metafemur yellowish only at the extreme apex. The two males have a distinct yellowish hue to the wings and the upper inner orbits are more distinctly convergent dorsally than in the two described species. In the two males, the minimum distance between the eyes is about 0.3 times the width of the head in dorsal view and the distance between the posterior ocelli is subequal to the maximum diameter of a posterior ocellus. In male *N. armipes* and *N. lata*, the minimum distance between the eyes is about 0.4 times the head width and the distance between the posterior ocelli is distinctly longer than an ocellar diameter. The Queensland male has the metafemur entirely yellowish, a long pronotum in almost one plane, and a scrobal color pattern similar to *N. armipes*, whereas the ACT male has about the apical third of the metafemur yellowish, a shorter pronotum, and the scrobal depression distinctly bright metallic green.

Key to the described species of *Neboissia* Bouček

1 *Both sexes*: upper mesepimeron with smooth and shiny region ventral to and anteroventral to setiferous region (Fig. 234); scrobal depression with band of different color immediately above interantennal region and often within each scrobe dorsally (Fig. 227); scrobes transversely strigose but channel distinctly more cristate-granulate (Fig. 228). *Female*: gaster at least about 2.4 times as long as wide, and dorsally dark except often for small green spot on extreme lateral margin of Gt_3–Gt_5 (seen best in lateral view); Gt_6 almost or fully as long as wide . . . . ***Neboissia armipes* Bouček**

– *Both sexes*: upper mesepimeron distinctly coriaceous to reticulate anteroventral to setiferous region; scrobal depression uniformly colored, not banded; scrobes and channel with similar transverse sculpture. *Female*: gaster only about 2 times as long as wide, and with lateral green spot occupying at least 0.25 width of tergum, the spots always obvious in dorsal view; Gt_6 distinctly transverse . . . . ***Neboissia lata* Bouček**

Nepistenia Bouček

Figs 239–246

Nepistenia Bouček, 1988*a*: 257–258. Type species: *Nepistenia septem* Bouček; by original designation and monotypy.

Anepistenia Bouček, 1988*a*: 258–259. Type species: *Anepistenia vexans* Bouček; by original designation and monotypy. **New synonymy**.

Diversity. At least two species known from Australia.

✓ ***Nepistenia septem* Bouček**, 1988*a*: 258; ♀ holotype (ANIC). DISTRIBUTION: Australia (QLD, *SA, WA).

✓ ***Nepistenia vexans* (Bouček), new combination**. *Anepistenia vexans* Bouček, 1988*a*: 259; ♀ holotype (ANIC). DISTRIBUTION: Australia (NSW, QLD, *SA, WA).

Biology. Unknown.

N. (*Nepistenia*) Bouček

Figs 240–242, 245 (top)

Description. *Head*. Scrobal depression extending dorsally to level about equal with angle of inner orbit (Fig. 239), at least 4 OD from anterior ocellus, distinctly defined but not carinately margined, and Λ-like with rounded dorsal margin; scrobes and channel transversely strigose. Face with weakly convex frontovertex smoothly merging into lower face; frontovertex, parascrobal region and interantennal region with meshlike sculpture of irregularly shaped cells defined by impressed lines (Fig. 240). Interantennal region broadly triangular, with dorsal angle not expanded into process. Vertex with posterior ocellus separated from inner orbit by about 1 OD; without mediolongitudinal sulcus; with obscurely differentiated line of elongate or subeffaced sculpture between anterior and posterior ocelli (Fig. 240). Occiput with occipital carina laterally. Gena entirely sculptured. Eye densely and conspicuously microsetose, and less than twice as high as broad; in frontal view not strongly convergent dorsally and in dorsal view subparallel for short distance behind ocelli.

Antenna inserted below level of lower orbits, with dorsal margin of torulus below level of lower margin of eye. Pedicel shorter than clava; funicle 7-segmented; preclaval segment quadrangular, without micropilose sensory region; clava 1-segmented, about twice as long as broad and slightly, sinuately attenuated to whitish apical lobe in both sexes (Fig. 245, top).

Mesosoma. Pronotum with strongly transverse collar, and abruptly inclined neck having variably distinct median line (line often concealed by back of head, Fig. 241).

Mesoscutum granular (Fig. 241). Scutellum with reflexed, crenulate marginal rim, the rim extending over dorsellum to base of propodeum; without distinct axillular carina or axillula; and without distinct frenal arm basolaterally (Fig. 243). Dorsellum a horizontal, very slender, bare and shiny strip between scutellum and propodeum (Fig. 243). Prepectus triangular in lateral view. Upper and lower mesepimeron differentiated by circular pit; upper mesepimeron mostly smooth and shiny but with a few setae within subalar pit; lower mesepimeron finely, transversely coriaceous (Fig. 242). Metapleuron setose ventrally but bare, smooth and shiny dorsally (Fig. 242). Propodeum (Fig. 243) strongly transverse, without paraspiracular furrow or carina but with crenulate furrow along anterior margin, posteriorly along foramen, and obscurely on either side of median carina; callus not distinctly differentiated from plical region, setose only along lateral and posterior margins; plical region bare with panel at most very finely coriaceous.

Forewing uniformly setose and hyaline.

Legs. Profemur without distinct preapical ventral angulation; protibia without carinate ventral margin and without dorsal spicules. Metacoxa setose but not carinate dorsally, and with exterior surface bare (Fig. 242); metatibial spurs at most about as long as apical width of tibia.

Metasoma. Petiole of male in dorsal view transversely lunate and smooth and shiny; in ventral view broadly membranous. Gaster of female ovate-lanceolate, flat dorsally with abruptly angled (Fig. 244) but not margined sides, and with posterior margins of all terga straight transverse; Gt_1 smooth and shiny; Gt_2 distinctly exposed, sometimes finely aciculate basally but broadly smooth and shiny apically; and subsequent terga more distinctly transversely aciculate to coriaceous-strigose. Syntergum short, triangular, with continuous suture dorsally between cerci. Ovipositor sheaths not projecting conspicuously. Hypopygium in female extending to level about equal with posterior margin of Gt_3.

***Nepistenia* (*Anepistenia*) Bouček**

Figs 239, 243, 244, 245 (bottom), 246

Description. Similar in structure to nominate subgenus except as follows.

Head. Frontovertex with more uniformly shaped cells defined by more distinctly impressed lines (Fig. 239; *cf*. sculpture of metapleuron, Fig. 112); parascrobal region with sculpture defined by impressed lines or raised ridges.

Antenna. Female with pedicel longer than clava (Fig. 245, bottom); preclaval segment with spinelike process projecting from apical margin; clava with large apical sensory region and with terminal spinelike process (Fig. 246), the clava subcircular if sensory region not collapsed. Male without spinelike process on preclaval or claval segments; clava longer than broad, oval, with large, often collapsing sensory region over about apical two-thirds.

Legs. Profemur with distinct subapical ventral angulation.

Remarks. Both parsimony (Fig. 1*a*) and intuitive analyses indicate *Nepistenia* + *Anepistenia* form a monophyletic assemblage. Loss of a single funicular segment (14:1) and origin of coriaceous sculpture on the frontovertex are autapomorphies for the clade. Rather than recognizing two monotypic genera, I hereby synonymize *Anepistenia* with

Nepistenia, but retain the two names as subgenera in recognition of the apomorphic structure of the preclaval and claval segments (Fig. 246) of *N.* (*Anepistenia*) females.

Bouček (1988*a*: 258) stated that *Anepistenia* has the “body form, wings and legs as in some shorter-bodied *Parepistenia* [= *Proshizonotus*], e.g., some species close to *P. mosei*.” However, species of *Anepistenia* and *Nepistenia* are at least superficially most similar to *P. nigriaenea* and *P. devannyi* among described *Proshizonotus*, the species having very similar structures of the head and mesosoma. The two *Proshizonotus* species have eight funicular segments, the sculpture of the frontovertex defined by raised ridges rather than impressed lines, a setose dorsellum, reticulate gastral terga at least beyond Gt_2, and an entirely sculptured metapleuron. All of these features are hypothesized as plesiomorphic relative to the states in *Nepistenia*. A bare dorsellum, finely sculptured terga, and a dorsally smooth and shiny metapleuron are either homoplastic synapomorphic features for *Nepistenia* or indicate the genus is most closely related to some species within *Proshizonotus* other than *P. devannyi* or *P. nigriaenea*. In either instance, *Nepistenia* probably renders *Proshizonotus* paraphyletic.

The two described species of *Nepistenia* are differentiated by those features described under *N.* (*Anepistenia*). Bouček (1988*a*) noted the possibility of a second species of *Anepistenia* with reddish legs. I have seen two females and one male from Queensland (ANIC, QMBA) that differ from *N.* (*Anepistenia*) *vexans* most conspicuously by having the legs extensively yellowish rather than dark brown. The single male has the legs almost entirely yellow beyond the coxae except for having the profemur dark ventrally and a ventromedial dark region on the outer surface of the metafemur, as well as the mesotibia being slightly darker in color. The females have a similar dark region on the metafemur but also dark are the profemur and protibia, ventral surface of the mesofemur, and mesotibia entirely. These females and the male also have the sculpture of the parascrobal region defined by raised ridges (reticulate). This sculpture pattern is similar to that of some specimens I currently identify as *N.* (*A.*) *vexans*. Other specimens I identify as *N.* (*A.*) *vexans* have the parascrobal sculpture defined by impressed lines, more similar to species of *N.* (*Nepistenia*). Additional specimens are required to accurately estimate infraspecific variation and the number of species within *N.* (*Anepistenia*).

***Parepistenia* Dodd**

Figs 247–255

Parepistenia Dodd *in* Girault, 1915[240]: 218. Type species: *Parepistenia varicornis* Dodd; by original designation and monotypy.

Diversity. Three described and two undescribed species known from the Australasian region [Australia, Indonesia (*Irian Jaya), *New Ireland, *Papua New Guinea].

✓ ***Parepistenia miripes* (Girault)**. *Epistenia miripes* Girault, 1922[360]: 41–42. Combination by Bouček (1988*a*: 255). DISTRIBUTION: Australia (*NSW, QLD).

✓ ***Parepistenia speciosissima* (Girault)**. *Epistenia speciosissima* Girault, 1927[416]: 313–314. Combination by Bouček (1988*a*: 256). DISTRIBUTION: Australia (QLD).

✓ ***Parepistenia varicornis* Dodd** *in* Girault, 1915[240]: 218–219. DISTRIBUTION: Australia (*ACT, *NSW, QLD, *SA).
= ✓ *Epistenia aedicula* Girault, 1927[407]: 3. Synonymy by Bouček (1988*a*: 256).

Excluded species:

Parepistenia annulicornis (Girault). Transferred to *Proshizonotus*.
Parepistenia arenae (Girault). Transferred to *Proshizonotus*.
Parepistenia australiensis (Girault). Transferred to *Proshizonotus*.
Parepistenia camilli (Girault). Transferred to *Proshizonotus*.
Parepistenia corticis (Girault). Transferred to *Proshizonotus*.
Parepistenia devannyi (Girault). Transferred to *Proshizonotus*.
Parepistenia froudei (Girault). Transferred to *Proshizonotus*.
Parepistenia fulviventris (Girault). Transferred to *Proshizonotus*.
Parepistenia incola (Girault), transferred to *Proshizonotus*.
Parepistenia inusitata (Girault). Transferred to *Proshizonotus*.
Parepistenia mosei (Girault). Transferred to *Proshizonotus*.
Parepistenia nigra (Walker). Transferred to *Solenura*.
Parepistenia nigriaenea (Girault). Transferred to *Proshizonotus*.
Parepistenia pallidicoxa (Girault). Transferred to *Proshizonotus*.
Parepistenia pulchripes (Girault). Transferred to *Proshizonotus*.
  = *Austrogerrhus gloriosus* Bouček. Transferred to *Proshizonotus*.
Parepistenia resplendens (Gourlay). Transferred to *Proshizonotus*.
Parepistenia tasmaniensis (Girault). Transferred to *Proshizonotus*.

Biology. Unknown, but likely parasitoids of wood-boring beetle larvae.

Description. *Head* (Fig. 247). Scrobal depression convergent dorsally, extending to within about 0.5–1 OD of anterior ocellus, abruptly declivous ventrally but with outer margins rounded; scrobes and channel smooth and shiny or sculptured. Face punctulate to reticulate-rugulose. Interantennal region triangular with abruptly inclined sides, but dorsal angle not expanded into process. Vertex with posterior ocellus separated from inner orbit by less than 1 OD, similar in distance to POL; without mediolongitudinal sulcus. Occiput with occipital carina laterally. Gena with distinct, much smoother and shinier, bare region posterior to malar sulcus and ventral to lower orbit, the region narrowed toward mandible. Eye densely and conspicuously microsetose, and less than twice as high as broad; inner orbits in frontal view not strongly convergent dorsally, and in dorsal view orbits parallel to slightly divergent behind ocelli.

Antenna inserted about in line with level of lower orbits, with dorsal to ventral margin of torulus at about level of lower margin of eye (Fig. 247). Pedicel shorter than clava; funicle 8-segmented; preclaval segment without micropilose sensory region; clava of male 1-segmented with micropilose sensory region only at extreme apex, but 2-segmented in female, with oblique suture extending ventrobasally to encompass large ventral micropilose region (Fig. 254).

Mesosoma. Pronotum with transverse collar, and with inclined neck having median line (Fig. 249). Mesoscutum punctate-reticulate with rosetteform subsculpture. Scutellum evenly curved down to dorsellum, with band of aligned crenulae differentiating variably distinct smooth rim along posterior margin (Fig. 251) but without distinctly reflexed marginal rim (Fig. 250); without distinct axillular carina or axillula, but with very short, smooth frenal arm posterolaterally (Fig. 250). Dorsellum often with dorsal crenulate rim visible under scutellar rim (Fig. 251) and with slender, posteriorly faced, punctate-reticulate, setose dorsellar region between scutellum and propodeum. Prepectus triangular in lateral view. Upper mesepimeron setose dorsally, shiny with fine coriaceous sculpture anteroventrally; lower mesepimeron bare, reticulate-punctate ventrally

(Fig. 250). Metapleuron uniformly reticulate-punctate and setose. Propodeum (Fig. 251) with callus differentiated from plical region by distinct, obliquely angled paraspiracular carina, the carina often the mesal margin of a transversely crenulate postspiracular furrow behind spiracle; callus bare behind spiracle except along posterior margin; plical region bare or setose medially posterior to region of enlarged anterior crenulae; plical region of female with about anterior half abruptly inclined to form triangular or broadly semicircular, variably crenulate shelf posterior to dorsellum (see Remarks); plical region of male similar to female or less conspicuously modified, sometimes unmodified with crenulate furrow along anterior margin and on either side of median carina.

Forewing uniformly setose and hyaline or variably infuscate.

Legs. Profemur with or without distinct preapical ventral angulation; protibia without carinate ventral margin, and with (Fig. 248) or without dorsal spicules. Metacoxa variably densely setose dorsally, with dorsal margin carinate in male but carinate or not in female, and with exterior surface broadly bare; metatibial spurs at most about as long as apical width of tibia.

Metasoma. Petiole of male in dorsal view subpentagonal with reflexed rim laterally, highly convex, and finely coriaceous to strigose (Fig. 252*a*); in ventral view membranous medially (Fig. 252*b*). Gaster margined laterally in female (Fig. 253), but not in male; Gt_1 and Gt_2 shiny and smooth or at most finely and inconspicuously coriaceous; Gt_2 concealed or exposed for distance only about equal to length of apical smooth band on Gt_3; Gt_3–Gt_5 transversely coriaceous-strigose in male to distinctly strigose in female; and with posterior margins of at least Gt_1–Gt_5 straight transverse, or with Gt_1 rounded in male. Syntergum of female elongate-slender, similar in length to Gt_6, with continuous suture dorsally between cerci (Fig. 255). Hypopygium in female extending to or slightly beyond level of posterior margin of Gt_3.

Remarks. *Parepistenia* is here interpreted in a more restrictive sense than by Bouček (1988*a*); most species treated by him as *Parepistenia* I transfer to *Proshizonotus*. *Parepistenia* is differentiated from *Proshizonotus* primarily by the absence of a distinctly reflexed scutellar marginal rim (*cf*. Fig. 250 with 312–314). Additional features useful, in combination, to differentiate *Parepistenia* from Old World *Proshizonotus* include: 1) metapleuron evenly sculptured and setose; 2) Gt_2 normally almost or entirely concealed under Gt_1 (hence with only six distinct terga); 3) Gt_1 and Gt_2 both smooth; and 4) females with gaster margined laterally. Females also have the propodeal plical region basally raised into a triangular or semicircular shelf. Most Lyciscini have a narrow, crenulate furrow along the anterior margin of the propodeum (e.g., Fig. 320). In females of *Parepistenia* the medial crenulae are enlarged to form the crenulate shelf (Figs 250, 251). Males either exhibit a propodeal structure similar to females or a less derived structure.

Subsequent to successive weighting, parsimony analysis indicated *Parepistenia* as the sister-group of *Striatacanthus* (Figs 1*b*, 1*c*), whereas my intuitive analysis suggests *Striatacanthus* is the sister group of *Marxiana* (see Remarks for *Marxiana*). A *Parepistenia* + *Striatacanthus* sister-group relationship likely is retrieved because the gaster is margined in females of both genera (53:1), and Gt_2 is largely concealed in both sexes of both genera (58:1, 59:1) along with individuals of *Neboissia*. The significance of female *Parepistenia* having a margined gaster, but males having a non-margined gaster, is uncertain. The gaster is unmargined in both sexes of *Marxiana* and margined in both sexes of *Striatacanthus*, and either margined or unmargined in both sexes of *Proshizonotus*. A sexually dimorphic structure is otherwise characteristic only of *Grooca* and *Solenura*, and the pattern is opposite to that of *Parepistenia*. Males always have a laterally margined gaster in *Grooca* and *Solenura*, whereas females of most species do not have the gaster margined. The dimorphic structure in *Parepistenia* might be synapomorphic for the genus or an intermediate stage toward either loss or gain of a margined gaster in both sexes.

Key to species of *Parepistenia* Dodd

1 Female **2**
– Male **6**

2(1) Funicle uniformly yellow to brown; scrobal depression smooth and shiny (Fig. 247); forewing hyaline or at most with obscure mediolongitudinal infuscate region; metacoxa setose dorsally on surface exterior to carina (Fig. 253); propodeum setose medially; protibia with 3 or 4 dorsal spicules (Fig. 248) . . . . ***Parepistenia varicornis*** **Dodd**
– Funicle brown with some apical or basal segments white; other features not in above combination **3**

3(2) Funicle white basally and dark apically, with at least 4 of fl_2–fl_6 white; metacoxa not carinate dorsally; forewing uniformly infuscate or with mediolongitudinal infuscate band having straight anterior margin subparallel with venation; legs with procoxa partly to entirely brown, but otherwise uniformly yellow to brownish beyond coxae; propodeum bare medially **4**
– Funicle dark basally and white apically, with at least fl_6 and fl_7, and often fl_5–fl_7 or fl_8, white; metacoxa with dorsal margin distinctly carinate; forewing either bimaculate or with band distinctly constricted, having a sinuate anterior margin; legs at least with procoxa yellow, similar to mesocoxa, and usually with variably distinct subbasal brown band on meso- and metatibia, and often with similarly colored region subapically on respective femora; propodeum setose medially **5**

4(3) Funicle with fl_2–fl_4 and sometimes fl_5 white; forewing variably conspicuously infuscate mediolongitudinally, but at least hyaline behind venation for width equal to length of stigmal vein; scrobal depression smooth and shiny; head black or with only very obscure metallic luster, and vertex smooth and shiny around ocelli [New Ireland (1♀ BPBM), Papua New Guinea (1♀ BPBM, 3♀♀ BMNH)] . . . . ***Parepistenia*** **n. sp. #1**
– Funicle with fl_3–fl_6 and base of fl_7 white; forewing uniformly infuscate; scrobal depression finely coriaceous-scabrous; head with distinct metallic blue luster, and vertex finely coriaceous in region around ocelli [Irian Jaya (1♀ BMNH)] . . . . ***Parepistenia*** **n. sp. #2**

5(3) Metacoxa rugulose-reticulate and setose dorsally, both on carina and exterior to carina; propodeum setose medially; forewing bimaculate, with large infuscate spot touching stigma and distinctly separated spot medially behind base of marginal vein; protibia without dorsal spicules . . . . ***Parepistenia speciosissima* (Girault)**

– Metacoxa dorsally coriaceous and bare exterior to carina (often with a few setae projecting from posterodorsal surface interior to carina); propodeum bare medially; forewing with large infuscate region touching stigma and usually with infuscate region extending mediolongitudinally to about level of parastigma; protibia with 1–4 dorsal spicules . . . . ***Parepistenia miripes* (Girault)**

6(1) Propodeum with raised, semicircular, cuplike basal region subdivided by median and by obliquely angled paramedial carinae; procoxa partly brownish [Papua New Guinea (1♂ BMNH, 1♂ CASC)] . . . . ***Parepistenia* n. sp. #1**

– Propodeum with median carina extending between anterior and posterior margins, at most more or less triangularly produced; procoxa yellowish, similar to mesocoxa **7**

7(6) Propodeum bare; metacoxa coriaceous dorsally, and setose on interior surface dorsally but not along dorsal margin . . . . . . ***Parepistenia miripes* (Girault)**

– Propodeum with some setae medially (Fig. 251); metacoxa uniformly reticulate to reticulate-rugulose and densely setose along dorsal margin (Fig. 253) **8**

8(7) Forewing hyaline; protibia with 3–4 dorsal spicules (Fig. 248); scrobal channel smooth and shiny . . . . ***Parepistenia varicornis* Dodd**

– Forewing bimaculate, with infuscate region touching stigma and with spot near posterior margin of wing at about level of parastigma; protibia without dorsal spicules; scrobal channel finely but distinctly transverse striate-coriaceous . . . . ***Parepistenia speciosissima* (Girault)**

***Riekisura* Bouček**

Figs 256–263

Riekisura Bouček, 1988*a*: 247–248. Type species: *Agamerionella curculionis* Girault; by original designation.

Diversity. Two valid and four undescribed species based on females; known from the Australasian region [Australia, Indonesia (*Ceram), *Papua New Guinea].

✓ ***Riekisura auritegula* (Girault)**. *Thaumasura auritegula* Girault, 1927[416]: 315. Combination by Bouček (1988*a*: 248). DISTRIBUTION: Australia (QLD).

✓ ***Riekisura curculionis* (Girault)**. *Agamerionella curculionia* Girault, 1915[240]: 221. Combination by Bouček (1988*a*: 248). DISTRIBUTION: Australia (*NSW, QLD, NT).
= *Agamerionella brisbanensis* Girault, 1915[240]: 222. Synonymy by Bouček (1988*a*: 248).

Excluded species:

Riekisura keralensis Narendran. Transferred to *Solenura*.

Biology. The type series of *A. curculionis* was reared from *Euthyrrhinus mediatabundus* (Fabricius) (Curculionidae). The hosts of other species are unknown.

Description. *Head* (Figs 256, 257). Scrobal depression extending to anterior ocellus or separated by at most 2 OD, abruptly declivous with outer margin entirely or at least dorsally carinate (Fig. 257); scrobes and channel smooth and shiny. Face punctate-reticulate, sometimes with vertex and upper part of parascrobal region differentiated by abrupt change of color and/or distinctly smaller punctures. Interantennal region triangular with abruptly inclined sides, and slender dorsally with dorsal angle sometimes weakly convex in lateral view but not projecting into distinct process (Fig. 257). Vertex with posterior ocellus at least narrowly separated from inner orbit, but at most by 1 OD; without mediolongitudinal sulcus. Occiput with variably distinct, sometimes obscure occipital carina laterally. Gena entirely sculptured. Eye superficially bare to densely and conspicuously microsetose, and less than twice as high as broad; inner orbits in frontal view not strongly convergent dorsally, and in dorsal view orbits parallel to slightly divergent behind ocelli.

Antenna inserted below level of lower orbits, in frontal view dorsal margin of torulus at or below level of lower margin of eye (Fig. 256). Pedicel and clava of similar length; funicle 8-segmented; preclaval segment without micropilose sensory region; clava 1-segmented, with slender micropilose sensory region apically and more basal sensory band evident as lighter-colored, elongate-slender region (Figs 258, 259).

Mesosoma. Pronotum with strongly transverse collar, and abruptly inclined neck having median line (Fig. 260). Mesoscutum punctate-reticulate with sparse coriaceous or indistinct rosetteform subsculpture on interstices. Scutellum with similar sculpture as mesoscutal medial lobe and with reflexed, crenulate marginal rim that in lateral view extends over subvertical dorsellum to or slightly over base of propodeum (Fig. 262); usually with distinct axillular carina (Fig. 261) but at least with shiny vertical axillula (Fig. 262); and without distinct frenal arm basolaterally. Dorsellum bare, sometimes almost entirely concealed under scutellum (Fig. 261) but if visible then with convex, coriaceous to smooth band adjacent to scutellum and/or crenulate rim along propodeum (Fig. 262). Prepectus triangular in lateral view. Upper mesepimeron partly setose and punctulate to punctate-reticulate, but smoother and shinier near transepimeral sulcus and with lower mesepimeron bare and reticulate-coriaceous ventrally (Fig. 261). Metapleuron punctate and setose except ventrally or posteroventrally (Fig. 261), and with variably large and distinct, convex, smooth and shiny region above metacoxa (Fig. 262). Propodeum of female strongly transverse (Fig. 260), with (Fig. 262) or without distinct paraspiracular carina, but crenulate anteriorly (Figs 261, 262) to partly rugose, and sometimes with medial crenulae enlarged into differentiated region; propodeum of male longer than in female and with about posterior half abruptly curved down or steeply angled, strongly sculptured with some coarse rugae to entirely rugose, and with or without distinct median carina; callus of both sexes acutely angled and sometimes distinctly toothlike posterolaterally, setose only to level about equal with outer margin of spiracle (Fig. 262).

Forewing uniformly setose or at least with basal cell uniformly setose, and hyaline.

Legs. Profemur with or without distinct preapical ventral angulation; protibia with dorsoapical pegs, but without dorsal spicules. Metacoxa (Fig. 261) setose but with or without carina dorsally, and with exterior, concave surface bare; metatibial spurs at most about as long as apical width of tibia.

Metasoma. Petiole of male in dorsal view small and transverse, and shiny or sometimes with rugae; in ventral view broadly membranous. Gaster not margined laterally (Fig. 263), broadest subbasally and attenuated posteriorly, in female subconical and very broadly attached to mesosoma (Fig. 260); Gt_1 smooth and shiny basally and apically but with transverse sculptured band medially, the sculptured region variably distinctly concave or sulcate relative to convex basal region in at least female (Fig. 262); Gt_2 exposed and similar in length to Gt_3; Gt_2–Gt_5 coriaceous to punctulate basally but with apical margins broadly smooth and shiny, and sometimes with transversely sulcate or depressed region medially, similar to Gt_1; and in female Gt_6 often mediolongitudinally angulate to carinate. Syntergum of female longer than Gt_6 but shorter than combined length of Gt_5 and Gt_6, with suture dorsally continuous between cerci or not. Hypopygium in female extending to level about equal with posterior margin of Gt_3 or Gt_4.

Remarks. Although the species assigned to *Riekisura* undoubtedly represent a monophyletic group, the genus is difficult to characterize by unique, quantifiable features. A possible autapomorphy is that ventrally the metapleuron is convex, smooth and shiny, at least posteriorly above the constricted portion of the metacoxa inserting into the metacoxal foramen (Fig. 262). This contrasts to the structure in some other Old World genera, which often have the metapleuron bare and shiny dorsally (e.g., Figs 312, 319). The ventral bare region is developed to a different extent in the different species and likely was derived from a smooth, but reflexed ventral flange possessed by many *Proshizonotus* (Fig. 319) (often obscured by setae, Fig. 315). Another unusual feature of both sexes of *Riekisura* is the presence of a variably long slender band of modified sensilla on the clava basal to the normal micropilose sensory region (Fig. 258). The individual sensilla are not obvious using light microscopy, but the region is evident because it is lighter in color than the surrounding surface. Using SEM and higher magnification, the region is seen to be composed of three or four rows of aligned setae with slightly nodular apices (Fig. 259). I have seen females of at least two species of *Proshizonotus* with similar claval sensory regions (Figs 333–335). In one species the clava is dark and a light-colored sensory region is evident over most of its length; under high magnification it is seen to be composed of two or three rows of aligned, modified sensilla (Figs 334, 335). Females of the second species have a whitish clava so that the sensory region is obscure using light microscopy, but under high magnification is evident as a single row of modified setae (Fig. 333). The similar sensory regions may well represent a synapomorphy supporting monophyly of *Riekisura* plus a group of species presently classified in *Proshizonotus*. The two apparently undescribed species appear to be closely related to *P. arenae* and other species within the genus that do not have an evident linear sensory region on the clava. Females of these species have a lanceolate gaster that is quite narrowly attached to the mesosoma, unlike *Riekisura*, but the terga have transverse-reticulate bands of sculpture that are slightly concave relative to more convex, smooth and shiny basal and apical bands (Fig. 325). This could be the plesiomorphic structure from which the gaster characteristic of species of *Riekisura* was derived. Members of this species group of *Proshizonotus* also have a bare dorsellum, a distinct axillular carina (Fig. 319), a carinately margined scrobal channel extending close to the anterior ocellus (Fig. 300), and a posterolaterally angulate propodeal callus similar to species of *Riekisura* (*cf*. Figs 262, 319). Females of this group can have hyaline or patterned forewings and the metacoxae may or may not be dorsally carinate over at least the apical half, but all have the upper mesepimeron entirely bare (Fig. 312). This is unlike species of *Riekisura*, but a bare upper mesepimeron could be a symplesiomorphic feature of Lyciscini (see Biogeography of Lyciscini). *Riekisura* may well render *Proshizonotus* paraphyletic, but I prefer to retain it as a valid genus until relationships are determined more confidently.

When Bouček (1988*a*) established *Riekisura* for *R. auritegula* and *R. curculionis*, both relatively large-bodied species, he stated that the genus was close to *Thaumasura*. I have seen one female of an undescribed species of *Thaumasura* from Northern Territory in Australia (ANIC) that is very similar to some species of *Riekisura* in habitus, sculpture and color pattern. However, among other features it lacks the apomorphic sensory band from the clava, has the propodeum densely setose behind the spiracle to a level equal with the lateral limit of the foramen, the outer surface of the metacoxa setose ventroapically, and an unusually long, styluslike syntergum (Fig. 293). Females of *Riekisura* are perhaps superficially most similar to some species of *Grooca* or *Solenura*, primarily because of their very broadly attached meso- and metasoma. Females of one species of *Grooca* (n. sp. #1), even have a slight transverse depression on Gt_1 (Fig. 200) as well as the propodeum only very sparsely and inconspicuously setose mesal to the spiracle. Furthermore, some females of *Riekisura* have the penultimate gastral tergum (Gt_6) mediolongitudinally angulate to carinate and the dorsal angle of the interantennal region is sometimes raised into a low, convex lobe similar to some *Grooca* and *Solenura*. Individuals of these last two genera are always differentiated from those of *Riekisura* by the absence of a recurved, crenulate scutellar marginal rim (Figs 299–202), and the similarity in habitus is likely convergent. Individuals of *Riekisura* also resemble those *Agamerion* that have a carinately margined scrobal depression and the scutellum extending over the dorsellum, but members of this latter genus have the propodeum extensively setose behind the spiracle to near the lateral margin of the foramen and often the exterior surface of the metacoxa extensively setose, as well as having the upper mesepimeron entirely bare and a much more broadly triangular interantennal region. Most species of *Riekisura* also have the parascrobal region differentiated from the frontovertex by an abrupt change of sculpture. The distinctive facial sculpture is somewhat similar to that of *Neboissia*, a few *Proshizonotus* and some *Chalcedectus*, but is likely convergent.

In addition to the females keyed below, I have seen males representing possibly four species. Males representing two species key to *R. curculionis* and *Riekisura* n. sp.#1 using the key provided below. Three males from Queensland (ANIC), Papua New Guinea (CASC) and Indonesia (Ceram) (RMNH) have setose eyes, the scrobal depression extending to the anterior ocellus, the basal two or three flagellar segments light-colored, and a facial sculpture similar to females of *R. auritegula*, but have at least the profemur in addition to the metafemur dark with metallic green luster. The male from Indonesia has the propodeum a bright blue and the gaster dark violaceous dorsally, whereas the other two males have the propodeum bright green and the gaster bright cupreous. It remains to be proven whether these three males represent one or two species and whether one is the male of *R. auritegula*.

Key to females of *Riekisura* Bouček

1 Legs entirely yellowish-orange beyond coxae; pronotum uniformly setose and sculptured to posterior margin (Figs 260, 261); scrobal depression separated from anterior ocellus by maximum diameter of ocellus (Fig. 256); lower parascrobal region reticulate-rugulose, the reticulations somewhat larger but not conspicuously different than those on frontovertex [Australia, QLD (1♀ AEIC, 3♀♀ ANIC, 1♀ QMBA, 1♀ VMNH)] . . . . ***Riekisura* n. sp. #1**

– Legs more extensively dark, at least metafemur and often at least hind leg and profemur ventrally; pronotum usually with distinct though slender, smooth and shiny rim along posterior margin; scrobal depression sometimes separated from anterior ocellus by distinctly less or distinctly more than 1 OD; lower parascrobal region punctate-alveolate, the punctures conspicuously larger than on frontovertex **2**

2(1) Scrobal depression separated from anterior ocellus by about twice minimum diameter of ocellus; flagellum with funicle white; Gt_1–Gt_3 with transverse, sulcate furrow, and much longer basal and apical smooth bands having very fine coriaceous sculpture; scutellum in lateral view distinctly protuberant over propodeum [Papua New Guinea (1♀ CNCI)] . . . . ***Riekisura* n. sp. #2**

– Scrobal depression separated from anterior ocellus by at most minimum diameter of ocellus; flagellum with funicle at most light-colored basally; Gt_2 and Gt_3 with at least basal half reticulate; scutellum in lateral view not or only slightly protuberant **3**

3(2) Legs with all femora and tibiae metallic blue-green, similar to color of body; Gt_1 medially with transverse punctulate band occupying at least half length of tergum; body entirely blue with some greenish luster; flagellum entirely dark [Australia, NSW (1♀ ANIC)] . . . . ***Riekisura* n. sp. #3**

– Legs with at least tibiae and sometimes front and middle legs mostly yellowish to brown without distinct metallic luster; Gt_1 with almost furrowlike band that is much shorter than basal or apical smooth bands; body blue-green with some rufous luster; flagellum with basal funicular segments light colored **4**

4(3) Eye bare; legs with all femora dark with metallic luster, and tibia brownish; female propodeum with medial crenulae enlarged into hemispherical, crenulate, cuplike structure, and plical region otherwise with strong crenulae or rugae . . . . ***Riekisura curculionis* (Girault)**

– Eye densely microsetose; front and middle legs mostly or entirely yellowish; female propodeum with low, fine crenulae **5**

5(4) Gt_6 carinately margined mediolongitudinally and with scattered dark setae dorsally; posterior surface of head rufous except for slender greenish band along outer orbits [New Guinea (1♀ USNM)] . . . . ***Riekisura* n. sp. #4**

– Gt_6 dorsally rounded and bare; posterior surface of head green with rufous triangular region narrowed from frontovertex toward occiput . . . . ***Riekisura auritegula* (Girault)**

Solenura Westwood

Figs 264–271

Solenura Westwood, 1868: xxxvi. Type species: *Solenura telescopica* Westwood; by monotypy.

Ormyrodes Brues, 1907*a*: 46. Type species: *Ormyrodes carinatus* Brues; by original designation and monotypy. Synonymy by Gahan (1951: 174).

Taoga Cameron, 1909: 210–211. Type species: *Taoga rufipes* Cameron; by monotypy. Synonymy by Hedqvist (1961: 98).

Thecasoma Matsumura, 1918: 158.Type species: *Thecasoma longicauda* Matsumura; by monotypy. Synonymy by Bouček (1958: 382).

Thaumasurelloides Girault, 1927[415]: 554. Type species: *Thaumasurelloides silvae* Girault; by original designation and monotypy. Synonymy by Baltazar (1961: 394).

Diversity. Ten nominal extant species likely representing only four or five species from the Afrotropical, Oriental and Palearctic regions.

✓ ***Solenura ania* (Walker)**. *Epistenia ania* Walker 1846: 93–94; ♀ lectotype (BMNH: 5.911) designated by Bouček *et al.* (1979: 456). Combination by Hedqvist (1961: 98). DISTRIBUTION: *Oriental* — China (*Jiangsu (CASB)), India, Indonesia (*Borneo (USNM), Java), Malaysia (Malaya, *Sabah (BMNH), Sarawak), Philippines, Singapore, Sri Lanka, *Taiwan (USNM), *Thailand (UCDC). *Palearctic* — China (*Anhui (CASB), *Beijing (CASB), *Liaoning (CASB), *Shandong (CASB), Shaanxi), Japan.

= ✓ *Solenura telescopica* Westwood, 1868: xxxvi; ♀ lectotype (OXUM: T. 653 1/3) designated by Bouček *et al.* (1979: 456). Synonymy by Bouček *et al.* (1979: 456).

= ✓ *Solenura rufipes* (Cameron). *Taoga rufipes* Cameron, 1909: 211; ♀ lectotype (BMNH: 5.909) designated by Bouček *et al.* (1979: 456). Combination by Hedqvist (1961: 98); synonymy by Bouček *et al.* (1979: 456).

= *Solenura longicauda* (Matsumura). *Thecasoma longicauda* Matsumura, 1918: 159; ♀ type (location uncertain). Combination by Bouček (1958: 382); synonymy with *S. telescopica* by Hedqvist (1961: 98) and Bouček (1958: 382), and with *S. ania* by Bouček *et al.* (1979: 456).

= ✓ *Solenura silvae* (Girault). *Thaumasurelloides silvae* Girault, 1927[415]: 554–555; ♀ syntype (QMBA), ♀ syntype (USNM: 41904). Combination by Baltazar (1961: 394). **New synonymy**.

✓ ***Solenura feretrius* (Walker)**. *Epistenia feretrius* Walker, 1846: 52, 93; ♀ holotype (BMNH: 5.901). Combination by Hedqvist (1961: 98). DISTRIBUTION: Malaysia, Philippines, Sri Lanka.

***Solenura fuscoaenea* Masi**. *Solenura fusco-aenea* Masi, 1943: 68; ♀ holotype (MCSN?). DISTRIBUTION: Somalia.

✓ ***Solenura keralensis* (Narendran), new combination**. *Riekisura keralensis* Narendran, 1992: 57–58; ♀ holotype (on permanent loan to CNCI: 22617). DISTRIBUTION: India, *Sri Lanka.

✓ ***Solenura nigra* (Walker)**, **combination reestablished**. *Epistenia nigra* Walker, 1872: 87; ♀ holotype (BMNH: 5.907). *Solenura nigra* (Hedqvist 1961: 98); *Parepistenia nigra* (Bouček 1988*a*: 255). DISTRIBUTION: *Afrotropical* — *Botswana (CNCI), *Ivory Coast (AUWN), *Kenya (CASC), South Africa, *Yemen (CNCI). *Palearctic* — *Israel (CNCI, UCDC).

= *Solenura carinatus* (Brues). *Ormyrodes carinatus* Brues, 1907*a*: 47; ♀ holotype (MCPM). Combination by Gahan (1951: 175). **New synonymy**.

Excluded species:

Ormyrodes petrefactus Brues†, 1910: 10. Listed under the combination *Solenura petrefactus* by Noyes (1998). Unplaced herein, see Remarks.

Biology. Hosts are known for only one species, *S. ania*, which Yang (1991) reared from *Chrysobothris succedanea* Sanders (Buprestidae) and *Trichoferus campestris*

(Faldermann) (Cerambycidae). The other species are undoubtedly also parasitoids of wood-boring beetle larvae.

Description. *Head* (Fig. 265). Scrobal depression extending to or within less than 1 OD of anterior ocellus, abruptly declivous ventrally and with outer margin carinate at least dorsally near anterior ocellus; scrobes and often channel finely, transversely coriaceous to strigose. Face punctate-reticulate. Interantennal region triangular, slender dorsally with dorsal angle expanded into acutely angled process evident in lateral view when scape appressed into scrobe (Fig. 265); with abruptly inclined sides and with surface on slightly to distinctly lower plane than parascrobal region. Vertex with posterior ocellus separated from inner orbit by distance slightly less than to slightly more than 1 OD; without mediolongitudinal sulcus. Occiput without any indication of occipital carina. Gena entirely sculptured. Eye densely and conspicuously microsetose, and less than twice as high as broad; inner orbits in frontal view not strongly convergent dorsally, and in dorsal view orbits divergent behind ocelli from about level of posterior ocelli.

Antenna inserted slightly below level of lower orbits in female, with dorsal margin of torulus at or below level of margin of eye, but in male with about ventral margin to middle of torulus in line with lower margin of eye. Pedicel and clava of similar length; funicle 8-segmented; preclaval segment without micropilose sensory region; clava 3-segmented, with small sensory region at extreme apex (Fig. 264).

Mesosoma. Pronotum with strongly transverse collar, and abruptly inclined neck having median line (Fig. 266). Mesoscutum punctate-reticulate with sparse coriaceous subsculpture on interstices; notaulus an impunctate line or shallow furrow of aligned reticulations, but at least obscurely continuous to transscutal articulation (Fig. 266). Scutellum with frenal area differentiated laterally by distinct frenal arm, the region posteromedial to frenal arms relatively large, setose, and curved down to dorsellum without reflexed or distinctly crenulate marginal rim (Figs 267–269); without distinct axillular carina but with axillula differentiated as more finely sculptured, triangular region anterolaterally (Figs 268, 269). Dorsellum reticulate-rugulose to smooth, setose or bare, and sometimes with crenulate margin dorsally or both dorsally and ventrally. Prepectus triangular, or slightly lunate in lateral view if posteroventral margin slightly incurved. Mesepimeron largely punctate except for smooth and shiny transepimeral line, with upper mesepimeron extensively setose and lower mesepimeron setose posteriorly (Fig. 267). Metapleuron uniformly punctate-reticulate and setose (Figs 267–269). Propodeum (Figs 268, 269) without paraspiracular furrow or carina, but with crenulate furrow along about lateral third of anterior margin to level about equal with lateral limit of dorsellum, the furrow in part differentiating callus from variably sculptured plical region; callus sparsely to quite densely setose over almost entire surface posterior of spiracle to level about equal with lateral margin of foramen; female with propodeum short medially (Fig. 268), with or without distinct median carina, and with plical region reticulate-punctate to crenulate; male with longer propodeum having strong median carina (Fig. 269), and with non-setose surface reticulate to punctate-alveolate.

Forewing uniformly setose and hyaline.

Legs. Profemur slender, without preapical ventral angulation; protibia without carinate ventral margin and without dorsal spicules. Metacoxa with or without setae dorsally, carinate dorsally in female and carinate or not in male, but with exterior, concave surface bare (Fig. 267); metatibial spurs at most about as long as apical width of tibia.

Metasoma. Male with petiole in dorsal view strongly transverse (Fig. 271) and in ventral view broadly membranous; gaster (Fig. 271) margined laterally, with Gt_1 obscurely coriaceous to distinctly punctulate and with V-like or parallel-sided basomedial depression, with Gt_2 concealed under Gt_1 (normally visible only in lateral view as triangular sclerite but if narrowly exposed then at most finely coriaceous), and with Gt_3 and subsequent terga punctate to punctulate. Female with gaster broadly attached to mesosoma, subconical basally, with Gt_5–syntergum abruptly narrowed and elongated into slender ‘tail’, with Gt_3 sometimes, Gt_4 entirely or apically, and Gt_5 and Gt_6 entirely carinate mediolongitudinally, but terga not margined laterally (Fig. 270); Gt_1 usually reticulate-punctate (variable in *S. nigra*); Gt_2 medially concealed under Gt_1 or variably extensively exposed and smooth to punctate-reticulate; and Gt_3 and Gt_4 punctate. Syntergum of female subequal in length with, to distinctly longer than, combined length of Gt_5 and Gt_6; without continuous suture dorsally between cerci. Hypopygium in female extending to level about equal with posterior margin of Gt_3 or Gt_4.

Remarks. I have not seen the type specimen of *Ormyrodes petrefactus* Brues, an impression fossil described from Florissant shale (MCZC). Gahan (1951) synonymized *Ormyrodes* under *Solenura*, but transferred only the type-species, *O. carinatus* to *Solenura*. Noyes (1998) subsequently listed *O. petrefactus* under the combination of *Solenura petrefactus*, but this CD-Rom is not an official publication under the International Code of Zoological Nomenclature. The figure and description given by Brues (1910) suggest *O. petrefactus* is incorrectly classified in *Solenura* and is more likely a specimen of, or is related to, *Leptofoenus*. Features that suggest this association include the description of the venation (“long marginal and minute stigmal vein”), what is likely description of the propodeum rather than the stated metathorax (“metathorax transversely rugose, as long as the mesonotum”), as well as the illustration (Brues 1910, fig. 13), which indicates a long, subcircular metacoxa as well as a gastral structure similar to extant *Leptofoenus*. I exclude *O. petrefactus* from *Solenura*, but do not formally assign it to *Leptofoenus* because I have not examined the impression and am basing my opinions only on the original description and illustration. It is premature to propose another new combination until the type specimen is examined.

Monophyly of extant *Solenura* is supported by the unique gastral structure of females, which have a variably long ‘tail’ composed of the syntergum and abruptly narrowed and elongated Gt_5 and Gt_6. The syntergum, Gt_5 and Gt_6, and Gt_4 at least apically, are also carinately margined mediolongitudinally. Although monophyletic, *Solenura* likely renders *Grooca* paraphyletic (see Remarks under *Grooca* and Biogeography of Lyciscini for more extensive discussion).

Females of *S. keralensis* have a comparatively short gastral ‘tail’, which likely contributed to Narendran (1992) describing the species originally in *Riekisura*. Although similar in habitus because of their robust body form and basally subconical gaster, females of *Riekisura* are distinguished by the presence of a reflexed scutellar rim and entirely bare lower mesepimeron.

Solenura is the only genus of Lyciscini known from the Palearctic region. The two recorded species occur also in the Afrotropical and Oriental regions and their presence in the Palearctic likely represents the northern limits of species that originated within the former two regions.

Key to species of *Solenura* Westwood

1 Female **2**

– Male **5**

2(1) Body with distinct metallic blue or bright green luster; dorsellum setose; interantennal region with distinct notch at base of dorsal process; syntergum with precercal length 2–4 times postcercal length; propodeal plical region reticulate to punctate-reticulate except for median carina; legs often uniformly reddish beyond coxae . . . . ***Solenura ania* (Walker)**

– Body usually dark or with cupreous luster on mesonotum under some angles of light, though sometimes with metallic blue or green luster; dorsellum bare; interantennal region smoothly recurved into anteriorly projecting process (Fig. 265); syntergum with precercal length at most only slightly greater than postcercal length (Fig. 270); propodeal plical region sometimes longitudinally crenulate (Fig. 268); legs with at least femora and sometimes tibiae dark . **3**

3(2) Gt_4 entirely carinately margined dorsomedially (Fig. 270); petiole smooth and shiny except for basal crenulate line (Fig. 268); tibiae distinctly bicolored, white basally and yellowish-brown to dark brown apically; syntergum usually at least very narrowly brown to yellowish basally; interantennal region uniformly reticulate . . . . ***Solenura nigra* (Walker)**

– Gt_4 with only about posterior half carinately margined; petiole with some fine longitudinal carinae, including a median carina, in addition to basal crenulate line; tibiae uniformly brownish to dark brown; syntergum entirely dark; interantennal region with mediolongitudinal, finely coriaceous ridge **4**

4(3) Gt_2 exposed for distance at most about equal to length of apical smooth band on Gt_1, and smooth and shiny except at most linearly along basal margin; in lateral view length of ‘tail’, measured from spiracle to posterior margin of syntergum, at least 6 times height of syntergum at level of cercus; forewing with slight brownish tinge . . . . ***Solenura feretrius* (Walker)**

– Gt_2 exposed for distance about equal to median length of Gt_1 and extensively sculptured (punctate basally and coriaceous apically); in lateral view length of ‘tail’, measured from spiracle to posterior margin of syntergum, less than 4.5 times height of syntergum at level of cercus; forewing hyaline . . . . ***Solenura keralensis* (Narendran)**

5(1) Gt_1 smooth and shiny to coriaceous or reticulate (Fig. 271); dorsellum bare; metatibia white basally and dark over about apical two-thirds . . . . ***Solenura nigra* (Walker)**

– Gt_1 strongly punctate-reticulate; dorsellum bare or setose; metatibia uniformly yellowish to dark brown **6**

6(5) Mesosoma black without metallic luster; dorsellum bare; metacoxa carinate dorsally over at least apical half . . . . ***Solenura*** ? ***feretrius*** **(Walker)**
. . . . ***Solenura*** ? ***keralensis*** **(Narendran)**

– Mesosoma with variably distinct metallic green or blue luster; dorsellum setose; metacoxa not carinate dorsally . . . . ***Solenura ania*** **(Walker)**

Striatacanthus **new genus**

Figs 272–279

Etymology. Combination of the Latin words *striatus* (furrow or groove) and *canthus* (rim or edge), in reference to the structure and sculpture pattern of the marginal rim of the scutellum, which is unique to members of the genus.

Type species. *Striatacanthus abruptus* Gibson, by present designation.

Diversity. Two species known from the Australasian region [Australia, Indonesia, Irian Jaya, Sula Islands), Papua New Guinea, Solomon Islands].

Biology. Unknown, but probably parasitoids of wood-boring beetles.

Description. *Head* (Figs 272, 273). Scrobal depression comparatively shallow and extending only to about 3 OD of anterior ocellus, with surface evenly inclined and smoothly merging with parascrobal region; scrobes and channel smooth and shiny (Fig. 272). Face with frontovertex punctulate and with flat interstices shiny or variably distinctly coriaceous. Interantennal region triangular, with rounded sides smoothly merging with parascrobal region, and dorsal angle not expanded into process. Vertex with posterior ocellus separated from inner orbit by less than 1 OD and less than POL; without mediolongitudinal sulcus. Occiput without occipital carina laterally (Fig. 273). Gena uniformly sculptured posterior to malar sulcus (Fig. 274). Eye densely and conspicuously microsetose, and less than twice as high as broad; inner orbits in frontal view strongly convergent dorsally, and in dorsal view orbits parallel behind posterior ocelli.

Antenna inserted slightly below level of lower orbits, with dorsal margin of torulus at about level of lower margin of eye. Pedicel shorter than clava; funicle 8-segmented; preclaval segment without micropilose sensory region; clava 1-segmented with small micropilose sensory region apically.

Mesosoma. Pronotum with strongly transverse collar, and inclined neck having median line (Fig. 273). Mesoscutum variably distinctly punctulate with rosetteform subsculpture to granular-rugulose. Scutellum with crenulate furrow differentiating flat, finely striate marginal rim (Figs 275, 276) from weakly convex scutellum, the marginal rim extending over base of dorsellum; without distinct axillular carina but with vertical, shiny axillula anterolaterally (Fig. 276); and without distinct frenal line posterolaterally. Dorsellum setose (Figs 275, 276). Prepectus triangular in lateral view. Upper mesepimeron setose dorsally, transversely strigose ventral to setose area; lower mesepimeron bare, transversely strigose (Fig. 274). Metapleuron coriaceous along anterior margin but punctate-reticulate posteriorly, most broadly so near middle, and bare except ventrally and along anterior margin (Figs 274, 276). Propodeum with (Figs 275, 276) or without distinct, oblique paraspiracular carina delineating inner margin of transversely crenulate postspiracular furrow behind spiracle, but with crenulate furrow along anterior margin laterally and with medially raised plical region either forming horizontal basomedial shelf (Fig. 273) or posteriorly convergent rugulose-crenulate region (Fig. 275); callus bare except along lateral and posterior margins; plical region bare, extending posteriorly into short but distinct nucha between metacoxae (Fig. 275), and distinctly coriaceous to granular within concave portion mesal to paraspiracular carina.

Forewing uniformly setose and variably distinctly infuscate; stigmal vein distinctively short and angled at acute angle to postmarginal vein, with distance between postmarginal vein and anterior margin of stigma similar to width of stigma, and with marginal vein at least 6 times length of stigmal vein.

Legs. Profemur without preapical ventral angulation; protibia without carinate ventral margin and, at least in female, with variably distinct dorsal spines but not spicules. Metacoxa (Fig. 278) carinate dorsally except basally, and with exterior and dorsal surfaces bare; metatibia with inner spur conspicuously longer than apical width of tibia or exterior spur (*cf*. Fig. 299, top).

Metasoma. Petiole of male in dorsal view transverse, striplike (Fig. 277*a*); in ventral view (based only on *S. arcuatus*) heavily sclerotized and angled posteroventrally so as to form entirely sclerotized, ‘collarlike’ structure, with posteroventral angulate portion recurved ventrally under base of gaster (Fig. 277*b*). Gaster margined laterally; Gt_1 smooth and shiny or with variably distinct meshlike coriaceous sculpture; Gt_2 exposed for distance equal to about one-third to half length of Gt_3 (Fig. 278), and transversely coriaceous; Gt_3–Gt_5 transversely strigose to imbricate; and with posterior margins of at least Gt_1–Gt_5 straight transverse. Syntergum of female in lateral view with dorsal margin evenly curved or abruptly angled and then with sinuate, vertical posterior margin (Fig. 279); with continuous suture dorsally between cerci. Hypopygium in female extending to level about equal with posterior margin of Gt_3.

Remarks. The flat, striate marginal rim of the scutellum is autapomorphic for *Striatacanthus* (Figs 275, 276). Individuals also have an unusually short and acutely angled stigmal vein, which is difficult to quantify but autapomorphic. A metacoxa that is entirely bare dorsally is also unusual, as is the very long inner metatibial spur of individuals. Individuals of *Agamerion* and some *Eupelmophotismus* also have comparatively long and robust metatibial spurs, as do some species of *Thaumasura* (Fig. 299, top). Petiolar structure of at least *S. arcuatus* males is also similar to dissected *Thaumasura* (Fig. 291*b*) and *Mesamotura*, except the collarlike petiole is entirely sclerotized (Fig. 277*b*) rather than being divided along the ventral midline. Individuals of *Striatacanthus* are otherwise morphologically dissimilar to *Thaumasura* and I suspect both the elongate metatibial spur and collarlike petiole of males are convergent features. My intuitive analysis suggests *Striatacanthus* most likely represents a conspicuously modified clade that renders *Proshizonotus* paraphyletic. Structure of the head and scrobal depression in *Striatacanthus* is quite similar to some species of *Proshizonotus* (*cf*. Figs 272, 300). Parsimony analysis indicated *Striatacanthus* as the sister group of

Parepistenia, but only after successive weighting (Figs 1*b*, 1*c*). Individuals of *S. arcuatus* have a raised, shelflike surface anteromedially on the propodeum (Fig. 273) similar to some *Parepistenia*, and at least most females of *Striatacanthus* have a distinct paraspiracular carina (Figs 275, 276) similar to species of *Parepistenia* and *Marxiana*. However, the plical region is bare and extends posteriorly between the base of the metacoxae so as to form a short nucha, unlike in *Parepistenia* and *Marxiana* (*cf.* Figs 275, 251). Individuals of *Striatacanthus* also do not have a smoother and shinier region on the gena posterior to the malar sulcus (Fig. 272), unlike *Parepistenia* and *Marxiana*. Members of the last two genera also have the metacoxae setose dorsally, the head with a lateral remnant of the occipital carina, and the metapleuron uniformly sculptured and setose.

Key to species of *Striatacanthus* new genus

1 Metacoxa yellow except for up to about basal third of dorsal and lateral surfaces; propodeum with V-like rugulose region medially (Fig. 275); syntergum in lateral view with dorsal surface abruptly recurved into vertical, sinuate, posterior margin (Fig. 279) . . . . ***Striatacanthus abruptus* n. sp.**

– Metacoxa with at least basal half dark dorsally; propodeum with horizontal, posteriorly sinuate or emarginate, shelflike region basomedially (Fig. 273); syntergum in lateral view with dorsal surface evenly curved down to apex . . . . ***Striatacanthus arcuatus* n. sp.**

***Striatacanthus abruptus* new species**

Figs 276–279

Type-material. *Holotype* ♀ (UCDC) — PAPUA NEW GUINEA, MOROBE: Tekadu, 7°38'S 146°34'E, 1-20.IV.2000, T.A. Sears & binatung brigade, MT. *Allotype* ♂ (CNCI) — PAPUA NEW GUINEA: Morobe Prov., Wao [Wau]: Mt. Kaindi; 1150-2300 m., 6.I.1993, Y. Basset / Tree: *Elmerrillia tsiampacca*, FIT. *Paratypes* — AUSTRALIA: Gordon Creek, Claudie River district, Qld, 12°42'S 143°17'E, 10 Dec 1986, G. Daniels, M.A. Schneider (1♀ UQIC). Middle Claudie Riv., Iron Range, N. Qld., 17 Sept. 1974, G. Daniels (1♀ AMSA); same data but collected 4 Oct. and with additional label: “very distinctive Parepistenia sp. ♀ det. Z. Bouček 1984” (1♀ AMSA); same data but collected 23 Oct. and with additional label: “Iron Rge sp. +2♀ in Sydney A. Mu., ♀ Parepistenia sp. det. Z. Bouček 1984” (1♀ BMNH). NEW GUINEA: NE Maprik, 160 m. XII.29.59 - I.17.60 (1♀ BPBM). PAPUA NEW GUINEA: Milne Bay, Cape Vogel, Menapi Valley, 24-31.X.1999, R. Wharton (1♀ CNCI).

Etymology. In reference to the abruptly truncate posterior margin of the syntergum, seen in lateral view.

Description. FEMALE. Head dark with distinct metallic blue to violaceous band on frontovertex adjacent to inner orbit from scrobal depression to about 1 OD of anterior ocellus; lower face with obscure metallic luster under some angles of light.

Mesosoma dark with variably conspicuous metallic green to violaceous lusters under some angles of light, in particular propodeum bright green except for rugose plical region. Propodeum with distinct paraspiracular carina and with median carina dividing raised, posteriorly attenuate, rugulose plical region. Forewing infuscate but with narrow hyaline band or at least more lightly infuscate band along anterior margin for distance about equal to length of marginal vein. Legs yellowish except metacoxa with up to basal third of lateral and dorsal surfaces dark with metallic green luster under some angles of light, and with one or more of following sometimes dark: pro- and mesocoxae, pro- and metatibiae partly, meso- and metatibiae partly, and anteroventral surface of metafemur.

Gaster dark with obscure metallic luster on Gt_1 under some angles of light. Syntergum in lateral view with sinuate, vertical, posterior margin above ovipositor sheaths, the sinuation obscured by dense setae but at least abruptly angled relative to dorsal surface.

MALE. Similar to female except forewing almost uniformly infuscate, the more lightly infuscate band along anterior margin obscure; paraspiracular carina less distinct.

Remarks. Individuals of *S. abruptus* are distinguished from those of *S. arcuatus* by the different structure/sculpture pattern of the propodeal plical region and by having the metacoxa more extensively yellow ventrally and apically. The tarsi of both hind legs are missing from the point-mounted holotype of *S. abruptus* and this female differs from others by having much more extensively dark fore and middle legs (both pro- and mesocoxae, tibiae and profemur dark). Females of *S. abruptus* from Australia have the legs entirely yellow except for the extreme base of the metacoxae, whereas the other two females from New Guinea have the procoxae dark. There also appears to be infraspecific variation in development of the narrow, less infuscate band along the anterior margin of the wing, with the single known male having only a very obscurely differentiated region.

***Striatacanthus arcuatus* new species**

Figs 276–279

Type material. *Holotype* ♀ (BPBM) — NEW GUINEA: NETH., VOGELKOP: Fak Fak, S. coast of Bomberai, 10-100 m., VI-3-1959 / T.C. Maa collector BISHOP. *Allotype* ♂ (RMNH) — INDONESIA: Sula Isl., Mangole, near Buya, Mal. trap 9, c 480 m, 12.x-2.xi.1993, C. v. Achterberg, RMNH ‘93. *Paratypes* — NEW GUINEA (NE), Karimui, South of Goroka, 1000 m., 3.VI.1961 / J.L. & M. Gressitt collectors (1♀ BPBM). PAPUA NEW GUINEA, MOROBE: Tekadu, 7°38'S 146° 34'E, 1-20.IV.2000, T. Sears & binatung brigade, MT (1♀ UCDC). NEW IRELAND (SW), ridge above “Camp Bishop”, 15 km. up Kait R., 250-750 m., VII-14-1956 / J.L. Gressitt collector (1♀ BPBM). SOLOMON IS., SAN CRISTOBAL, Kira-Kira, 0-50 m., 15.XI.1964 (1♀ BPBM). Naval Air Base, Bougainville, Solomon Is., IV.45 / G.E. Bohart collector (1♀ CASC).

Etymology. In reference to the evenly curved profile of the syntergum, seen in lateral view.

Description. FEMALE. Head dark with at least small metallic green to violaceous spot paramedially on frontovertex immediately above scrobal depression, and sometimes with more extensive metallic luster on frontovertex and face.

Mesosoma dark with variably conspicuous metallic green to violaceous lusters under some angles of light, in particular propodeum bright green except for raised plical region. Propodeum with or without distinct paraspiracular carina; plical region with raised, horizontal, posteriorly sinuate or emarginate shelflike surface anterior to median carina, and with irregularly sculptured posteromedial region. Forewing hyaline to infuscate, but without evident hyaline band along anterior margin. Legs primarily brownish to black, but with basal 4 tarsal segments, mesocoxa sometimes, and up to apical half of metacoxa yellow dorsally (often more extensively yellow ventrally).

Gaster dark with obscure metallic luster on Gt_1 under some angles of light. Syntergum in lateral view with dorsal surface evenly curved to apex above ovipositor sheaths.

MALE. Similar to female, except forewing sometimes infuscate medially, with narrow hyaline band along anterior margin and hyaline posteriorly.

Remarks. The holotype is pinned through the mesoscutal medial lobe, but is entire and in good condition. I dissected the metasoma of the allotype from the mesosoma and glued it to the point onto which the specimen is mounted. The allotype differs from other specimens by having a much more distinct hyaline band along the anterior margin of the forewing than other specimens of the species. The Morobe female has a short syntergum that, comparatively, is abruptly recurved posteriorly so as to be intermediate in structure between typical *S. arcuatus* and *S. abruptus* females. It also has the most heavily infuscate wings of all the specimens.

***Thaumasura* Westwood**

Figs 280–299

Thaumasura Westwood, 1868: xxxvi. Type species: *Thaumasura terebrator* Westwood; by monotypy.

Belonea Westwood, 1874: 146. Type species: *Belonea australica* Westwood; subsequently designated by Ashmead (1904: 283). Synonymy by Bouček (1988*a*: 245).

Aressida Cameron, 1911: 350–351. Type species: *Aressida carinicollis* Cameron; by monotypy. Synonymy by Girault (1917[334]: 155).

Calosetroides Girault, 1913[148]: 227–228. Type species: *Calosetroides australica* Girault; by original designation. Synonymy by Bouček (1988*a*: 245).

Agamerionella Girault, 1915[240]: 219–220. Type species: *Agamerionella locustiformis* Girault; by original designation. Synonymy by Girault (1917[334]: 155).

Primisura Bouček, 1988*a*: 244. Type species: *Primisura bidens* Bouček; by original designation and monotypy. **New synonymy**.

Diversity. Thirty-eight nominal species and an unknown number of undescribed species known from the Australasian region [Australia, Indonesia (Ceram, Halmahera, Irian Jaya, Sula Islands), Papua New Guinea, Solomon Islands (Guadalcanal)] and Oriental region [Malaysia]. Farooqi and Subba Rao (1985) included *Thaumasura* in a key to Indian genera of Pteromalidae, but this undoubtedly was based on a misidentification because the taxon was described as possessing an inconspicuous epipygium (syntergum) and often lacking a median carina from the propodeum.

✓ ***Thaumasura annulicornis* (Cameron)**. *Aressida annulicornis* Cameron, 1912*b*: 207–208; ♀ lectotype (BMNH: 5.898) designated by Bouček (1988*a*: 245). Combination by Bouček (1988*a*: 245). DISTRIBUTION: Australia (NSW).

✓ ***Thaumasura arboris* Girault**, 1932[439]: 4. DISTRIBUTION: Australia (SA).

✓ ***Thaumasura australica* (Westwood)**. *Belonea australica* Westwood, 1874: 146, pl. 27; ♀ holotype (OXUM: T. 668). Combination by Bouček (1988*a*: 245). DISTRIBUTION: Australia (NSW, QLD, SA, VIC).

✓ ***Thaumasura australiensis* Bouček**, 1988*a*: 245. Replacement name for *Calosetroides australica* Girault, 1913[148]: 228 (♀ holotype, QMBA), preoccupied by *Thaumasura australica* (Westwood). DISTRIBUTION: Australia (VIC).

✓ ***Thaumasura bella* Girault**, 1927[416]: 315. DISTRIBUTION: Australia (SA, QLD).

✓ ***Thaumasura bidens* (Bouček), new combination**. *Primisura bidens* Bouček, 1988*a*: 244; ♀ holotype (ANIC). DISTRIBUTION: Australia (NT, WA).

Note: Because the proposed synonymy of *Primisura* with *Thaumasura* is subjective, below I amplify on or provide additional features to the original description of *T. bidens*.

Head. Face with parascrobal region quite abruptly convex at level of dorsal angle of interantennal region (line of demarcation most distinct adjacent to scrobal depression), with convex region coarsely punctate and dorsal region rugulose-reticulate; interantennal region rugulose over ventral half and cristate over dorsal half. Occiput with fine occipital carina at least laterally and sometimes continuous dorsally. Eye superficially bare, very sparsely and inconspicuously microsetose; not strongly convergent dorsally, with minimum distance between eyes at least about 1.7 times distance across posterior ocelli.

Antenna. Flagellum of both sexes with differentiated sensory regions on interior to dorsal surfaces of apical segments, in female apparently on fl_6–fl_8 but in male on fl_5–fl_8 (*cf*. Fig. 297); both sexes also with differentiated, flat to slightly depressed sensory regions having aligned setae on outer surface of basal segments (*cf*. Fig. 298), in male the elongate regions over most of outer surfaces of fl_2–fl_5 and extreme base of fl_6, and in female the sensory regions much more obscure and only within basal half of each of fl_3–fl_5.

Mesosoma. Mesoscutal lateral lobe with small patch of dense, white lanceolate setae adjacent to notaulus. Scutellum of female with narrow band of white lanceolate setae basally along scutoscutellar suture; scutellar marginal rim bidentate (posterior margin of rim conspicuously emarginate). Dorsellum crenulate, shiny, bare, and vertical below scutellar rim. Propodeum densely setose posterolaterally between posterolateral tooth and oblique ridge extending from spiracle toward lateral edge of foramen; female plical region with medial crenulate region between transverse anterior and posterior flat bands; male plical region longer, with median carina between flat anterior triangular region and flat ∩-like band around foramen, and obliquely crenulate paramedially. Upper mesepimeron extensively punctulate and setose dorsally, smooth and shiny ventrally or anteroventrally; lower mesepimeron uniformly sculptured. Metapleuron uniformly sculptured and setose.

Legs. Protibia with 4 or 5 dorsoapical pegs in a row. Metatibia quite abruptly widened dorsoapically and with digitlike spines along dorsal and outer apical edges; metatibial spurs shorter than apical width of tibia.

Metasoma. Gaster of female with hypopygium extending to level about equal with posterior margin of Gt_4.

***Thaumasura brevicaudata* (Westwood)**. *Belonea brevicaudata* Westwood, 1874: 147; ♀ holotype (location uncertain). Combination by Bouček (1988*a*: 245). DISTRIBUTION: Indonesia.

✓ ***Thaumasura brevistylus* (Girault)**. *Agamerionella brevistylus* Girault, 1915[240]: 220. Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (VIC).

✓ ***Thaumasura carinicollis* (Cameron)**. *Aressida carinicollis*, 1911: 351–352; ♀ holotype (BMNH: 5.899). Combination by Girault (1917[334]: 155). DISTRIBUTION: Solomon Islands (Guadalcanal).

✓ ***Thaumasura colliscutellum* Girault**, 1932[439]: 3. DISTRIBUTION: Australia (NSW).

✓ ***Thaumasura dentatibia* Girault**, 1927[416]: 315–316. DISTRIBUTION: Australia (QLD, VIC).

✓ ***Thaumasura diana* Girault**, 1928[422]: 2. DISTRIBUTION: Australia (VIC).

✓ ***Thaumasura eleganta* Girault**, 1926[405]: 1. DISTRIBUTION: Australia (VIC).

✓ ***Thaumasura femoralis* (Westwood)**. *Belonea femoralis* Westwood, 1874: 146–147; 1♀, 2♂ syntypes (OXUM: T. 669). Combination by Bouček (1988*a*: 246). DISTRIBUTION: Indonesia.

✓ ***Thaumasura fera* Girault**, 1932[439]: 4. DISTRIBUTION: Australia (QLD).

✓ ***Thaumasura goethei* Girault**, 1937[448]: 1. DISTRIBUTION: Australia (QLD).

✓ ***Thaumasura imperialis* (Froggatt)**. *Aressida imperialis* Froggatt, 1927: 54–55. Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (NSW).

- ✓ ***Thaumasura juno* Girault**, 1926[405]: 1. DISTRIBUTION: Australia (VIC).
- ✓ ***Thaumasura locustiformis* (Girault)**. *Agamerionella locustiformis* Girault, 1915[240]: 219–220. Combination by Girault (1917[334]: 155). DISTRIBUTION: Australia (VIC, WA).
- ✓ ***Thaumasura longa* Girault**, 1928[424]: 4. DISTRIBUTION: Australia (QLD).
- ✓ ***Thaumasura macrocalculus* Girault**, 1932[439]: 4. DISTRIBUTION: Australia (TAS).
- ✓ ***Thaumasura magnispina* Girault**, 1932[439]: 4. DISTRIBUTION: Australia (QLD).
- ✓ ***Thaumasura marmoratipennis* Girault**, 1927[416]: 314. DISTRIBUTION: Australia (QLD).
- ✓ ***Thaumasura micans* Girault**, 1932[439]: 4. DISTRIBUTION: Australia (QLD).
- ✓ ***Thaumasura nelsoni* Girault**, 1932[439]: 4. DISTRIBUTION: Australia (QLD).
- ✓ ***Thaumasura nigricornis* (Cameron)**. *Aressida nigricornis* Cameron, 1912*a*: 208–209; ♀ lectotype (BMNH: 5.900) designated by Bouček (1988*a*: 246). Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (NSW).
- ✓ ***Thaumasura niobe* Girault**, 1932[439]: 4. DISTRIBUTION: Papua New Guinea.
- ✓ ***Thaumasura omnicyanea* Girault, combination reestablished**. *Thaumasura omnicyanea* Girault, 1932[439]: 4. *Agamerion omnicyaneum* (Bouček 1988*a*: 254). DISTRIBUTION: Australia (QLD).
- ✓ ***Thaumasura pavo* (Girault)**. *Agamerionella pavo* Girault, 1915[240]: 221. Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (QLD).
- ✓ ***Thaumasura rubrifunicle* Girault**, 1932[439]: 4. DISTRIBUTION: Australia (TAS).
- ✓ ***Thaumasura rubritibia* Girault**, 1932[439]: 4. DISTRIBUTION: Australia (NSW).
- ✓ ***Thaumasura rubrofemoralis* Ashmead**, 1900*b*: 341; ♀ holotype (USNM: 48921). DISTRIBUTION: Australia (NSW).
- ✓ ***Thaumasura sanguinipes* (Girault)**. *Agamerionella sanguinipes* Girault, 1915[240]: 220–221. Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (NSW, VIC).
- ✓ ***Thaumasura scutellata* (Girault)**. *Agamerionella scutellata* Girault, 1915[240]: 221. Combination and new status from *A. sanguinipes* var. *scutellatus* by Bouček (1988*a*: 246). DISTRIBUTION: Australia (VIC).
- ✓ ***Thaumasura solis* Girault**, 1932[439]: 4. DISTRIBUTION: Australia (QLD).
- ✓ ***Thaumasura terebrator* Westwood**, 1868: xxxvi; 3♀ syntypes (OXUM: T. 652). DISTRIBUTION: Australia (SA).
    - = ✓ *Belonea erythropoda* Cameron, 1888: 122–123; ♀ lectotype (BMNH: 5.913) designated by Bouček (1988*a*: 246). Synonymy by Bouček (1988*a*: 246).
- ✓ ***Thaumasura westwoodi* Girault**, 1917[334]: 154–155; ♀ holotype (USNM: 20894). DISTRIBUTION: Australia (SA).

Biology. Parasitoids of wood-boring beetle larvae and, according to Bouček (1988*a*), probably mainly of Buprestidae and Cerambycidae but occasionally of other larvae such as those of Curculionidae. Males are commonly collected on smooth-bark gum trees.

Description. *Head* (Figs 280–283). Scrobal depression extending to or separated from anterior ocellus but not carinately margined dorsally or laterally, with sculpture of parascrobal region extending slightly over rounded outer margin of depression (Fig. 281); scrobes strigose, channel more cristate-granulate to rugulose at least dorsally. Face usually with region of transversely reticulate-strigose to cristate sculpture across parascrobal region and interantennal region above level of toruli (Fig. 280), but at least with sculpture aligned transversely on interantennal region dorsally. Interantennal region triangular and with abruptly inclined sides, but dorsal angle not expanded into process. Vertex with posterior ocellus separated from inner orbit by at most about 1 OD; rounded into occiput, rarely with impunctate mediolongitudinal line posterior to ocelli (Fig. 283); variably distinctly setose with white to dark setae. Occiput with at least short, fine occipital carina laterally, the carina sometimes dorsally curved though only very rarely continuous as complete ∩-like carina (Fig. 282); variably setose with white to dark setae, sometimes laterally with dense region of white lanceolate setae having apices directed away from outer orbit. Gena entirely sculptured. Eye densely microsetose to superficially bare, and less than twice as high as broad; inner orbits in frontal view variably distinctly convergent dorsally, very rarely convergent onto vertex behind ocelli so minimum distance between eyes posterior to ocelli less than distance between eyes measured at posterior ocelli.

Antenna inserted below level of lower orbits, with dorsal margin of torulus at or below lower margin of eye. Pedicel usually distinctly longer than clava (Fig. 296); funicle 8-segmented; flagellum with variably large and distinct sensory region on clava (Figs 296, 297) and usually on one or more of fl_5–fl_8 (Fig. 298); clava 1-segmented.

Mesosoma. Pronotum often almost in same plane without distinctly differentiated collar and neck, but with median line (Figs 282, 284) and with inconspicuous white to dark setae. Mesoscutum with variable sculpture and inconspicuous white to dark setae. Scutellum often with variably distinct mediolongitudinal line or short sulcus anteriorly and with crenulate, reflexed marginal rim, the rim sometimes longer medially and slightly emarginate to distinctly bidentate, and with scutellar lip overlying (Fig. 285) and sometimes concealing dorsellum (Fig. 289); with or without distinct axillula basolaterally, the region sometimes delimited dorsally by axillular carina (Fig. 289); and with frenal arm at most evident as curved posterior margin of axillula. Dorsellum bare when visible (except very few *T. fera*, see under Remarks), but otherwise highly variable, sometimes exposed between scutellar lip and propodeum as convex, coriaceous (Fig. 288) to reticulate band (Fig. 287), or more vertical under scutellar lip and then usually crenulate to smooth and shiny (Fig. 286). Prepectus triangular in lateral view (Fig. 285). Upper and lower mesepimeron similarly sculptured or upper mesepimeron more finely sculptured to smooth; upper mesepimeron setose at least within subalar pit and sometimes extensively setose (Fig. 285); lower mesepimeron bare or very rarely with a few inconspicuous setose dorsally if upper mesepimeron extensively setose (Fig. 290). Metapleuron uniformly sculptured and setose (Fig. 290) or variably extensively more finely sculptured to smooth and bare dorsally (Fig. 285). Propodeum without distinct paraspiracular furrow or carina, but with crenulate furrow along anterior margin at least to level about equal with lateral limit of dorsellum; females of most species with transverse region of crenulae medially (Figs 286, 289), but males of most species (Figs 287, 288) and females of some species with median carina or posteriorly convergent triangular region delineated by crenulae recurved from along anterior margin; callus sometimes with posterolateral angle extending into distinct tooth, and moderately densely setose posterior of spiracle to level equal with lateral limit of foramen (Figs 286, 288, 289); plical region with non-setose surface usually distinctly sculptured.

Forewing with basal cell entirely setose though usually with bare region (often as angulate band) beyond basal cell; hyaline to variably infuscate behind parastigma and stigmal vein or more extensively infuscate behind marginal vein.

Legs. Profemur slender or with variably distinct preapical ventral angulation; protibia without carinate ventral margin and without dorsal spicules. Metacoxa setose and often acutely angled but only very rarely carinately margined dorsally, and with exterior surface setose at least apically and often uniformly setose; metatibial spurs variable, shorter than apical width of tibia (Fig. 299, bottom) or with inner spur sometimes conspicuously longer than apical width of tibia or exterior tibial spur (Fig. 299, top).

Metasoma. Petiole of male in dorsal view transverse-rectangular to lunate, and smooth and shiny or with some longitudinal carinae (Fig. 291*a*); in ventral view tubelike, heavily sclerotized, with margins contiguous along midline, and angled posteriorly so as to be somewhat 'collarlike' in lateral view (Fig. 291*b*). Gaster (Figs 292, 293) not margined laterally; Gt_1 usually smooth and shiny, only rarely distinctly sculptured; Gt_2 exposed; Gt_2–Gt_5 at least partly coriaceous to transversely strigose and often one or more terga with posterior margin slightly emarginate. Syntergum of female always distinctly longer than wide, from about as long as length of hind basitarsus to much longer than length of rest of body; usually without (Fig. 294) or with only fine ridge dorsally between cerci, only rarely with distinct suture and then suture divided dorsomedially by short carina or ridge (Fig. 295). Hypopygium of female extending to level at least equal with posterior margin of Gt_3 and often to posterior margin of Gt_4.

Remarks. Hypothesized relationships of *Thaumasura* are discussed partly under 'Remarks' for *Agamerion*, *Mesamotura* and *Westwoodiana*. Bouček (1988*a*) noted the similarity of *Mesamotura*, *Westwoodiana* and *Primisura* to *Thaumasura*. *Mesamotura* quite likely renders *Thaumasura* paraphyletic (see Remarks for *Mesamotura*), but I retain it as a separate genus until such time as the number of valid species in the clade can be determined. I also retain *Westwoodiana* as a separate genus, even though it likely is monotypic, because exact relationships with *Thaumasura* remain unsubstantiated (see Remarks for *Westwoodiana*). I newly synonymize *Primisura* under *Thaumasura* because it is monotypic and because *T. bidens* shares what I interpret as secondarily derived features with some species classified in *Thaumasura*. In particular, *T. bidens* and some species of *Thaumasura* share a shiny dorsellum that is vertical below the scutellar rim (*cf*. Fig. 285) and a similar metatibial structure. The dorsoapical angle of the metatibia is widened abruptly and has strong, peglike spines along the margin (Fig. 299, bottom). I interpret both structures as secondarily derived features within *Thaumasura* and therefore as evidence *Primasura* renders *Thaumasura* paraphyletic. The putative groundplan structure of the scutellar-dorsellar complex for *Thaumasura* (a convex, sculptured dorsellum exposed between the scutellum and propodeum, Figs 287, 290), is possessed by individuals of *Mesamotura* (Fig. 223). Other features I suspect are secondarily derived within *Thaumasura* and that are shared with *T. bidens* include: 1) superficially bare eyes; 2) differentiated sensory regions with aligned sensilla on the exterior surface of one or more basal flagellar segments (Fig. 298); and 3) a hypopygium extending to a level about equal with the posterior margin of Gt_4. Some species of *Thaumasura* also have a relatively slender profemur without a ventroapical angulation; a few also have the posterolateral angle of the propodeum projecting into a more or less distinct 'tooth' (e.g., *T. arboris*, *T. colliscutellum* and *T. scutellata*) and the posterolateral, inclined surface densely setose (similar to *T. bidens*, but not delimited laterally by a strong ridge), and/or a variably distinct, narrow band of white lanceolate setae along the scutoscutellar suture basally. Many species of *Thaumasura* have the parascrobal region quite abruptly differentiated near the dorsal limit of the interantennal region, with the ventral region being more distinctly convex and having a different sculpture than dorsally. In most such instances both the lower parascrobal region and at least the dorsal half of the interantennal region are strigose to cristate (Fig. 281), whereas in *T. bidens* only the dorsal half of the interantennal region is strigose and the parascrobal region is coarsely punctate. However, I have seen a single female from Victoria (VMNH) and a male from South Australia (CNCI) with a very similar facial sculptural pattern (Fig. 280) to *T. bidens*. The specimens also have the metapleuron uniformly sculptured and setose, the mesonotum similar to though much less coarsely sculptured than in *T. bidens*, and antennal sensillar regions similar to those described for T. *bidens*. The scutellar marginal rim is not emarginate in the male, though it is indistinctly emarginate in the female, and the femora are rufous, but I consider the distinctly bidentate scutellum and dark femora of *T. bidens* as specific features. A phylogenetic revision of *Thaumasura* is necessary to determine the exact relationships of *T. bidens*, but I am confident segregation of the single species as a separate genus renders *Thaumasura* paraphyletic.

One of the few species in *Thaumasura* with the hypothesized groundplan structure of the scutellar-dorsellar complex, *T. fera*, exhibits several other features that likely are groundplan features of *Thaumasura*. These include: 1) a uniformly sculptured and setose metapleuron; 2) a metacoxa with the exterior surface entirely setose; 3) a profemur without a distinct ventroapical angulation; 4) densely microsetose eyes; 5) a metatibia that is not distinctly widened dorsoapically and that has comparatively slender spines dorsoapically; and 6) both metatibial spurs of similar length rather than the inner spur being conspicuously elongate. A few females of *T. fera* that I have seen also have a few inconspicuous setae on the dorsellum. All other *Thaumasura*, *Mesamotura* and *Westwoodiana* have an entirely bare dorsellum, even when the dorsellum is distinctly exposed. Females of *T. fera* also have a differentiated, non-collapsing sensory region on the clava and preclaval segment. All species of *Thaumasura* have at least a few modified setae (Fig. 296) forming a variably large sensory region on the clava and usually modified setae also on one or more of fl_5–fl_8 (Fig. 297). The sensory regions usually are more obvious in males (Fig. 297) than in females and sometimes the claval region is collapsed in air-dried individuals (mostly males) of some species. I have not seen any males I identify as *T. fera*. I have seen both sexes of *T. rubrifunicle*, another species exhibiting many of the hypothesized groundplan states for the genus. This species is unusual because the female has an extensively setose propodeum, but the male has the propodeum setose only near its posterolateral margin (Fig. 287). As for males of most other *Thaumasura* species, a crenulate furrow along the anterior margin of the propodeum recurves posteriorly to delimit a posteriorly convergent medial region (Figs 287, 288). Females of most *Thaumasura* species differ by having a crenulate furrow only anterolaterally, and the propodeum is more or less longitudinally crenulate (Figs 286, 289) or smooth medially. I interpret the structure that is characteristic of most males as the groundplan structure for both sexes because females of some species (including an undescribed species that likely is most closely related to *Mesamotura*, see Remarks for *Mesamotura*) have a similar structure or intermediate structures.

A provisional key to species is not presented for *Thaumasura* because of the number of described species involved.

***Westwoodiana* Girault**

Westwoodiana Girault, 1922[365]: 151. Type species: *Westwoodiana testaceiformis* Girault; by monotypy.

Diversity. Two nominal species known from Australia.

✓ ***Westwoodiana purpureipes* Girault**, 1927[416]: 316. DISTRIBUTION: Australia (QLD).
✓ ***Westwoodiana testaceiformis* Girault**, 1922[365]: 151. DISTRIBUTION: Australia (QLD).

Biology. Unknown, but presumably a parasitoid of wood-boring beetle larvae.

Description. *Head*. Scrobal depression dorsally shallowed to, and indistinctly attaining, anterior ocellus, with outer margin not carinate and sculpture of parascrobal region extending slightly over rounded margin; scrobes and channel with cristate-granular sculpture. Face uniformly cristate-granular over parascrobal region and interantennal region, similar to sculpture of scrobes and vertex. Interantennal region triangular and with abruptly inclined sides, but dorsal angle not expanded into process. Vertex with posterior ocellus linearly separated from inner orbit; rounded into occiput; without impunctate mediolongitudinal line posterior to ocelli; with slightly lanceolate and yellowish setae. Occiput with occipital carina laterally and, particularly near outer orbit, with yellowish lanceolate setae having apices pointed away from orbit. Gena entirely sculptured. Eye densely microsetose, and less than twice as high as broad; inner orbits in frontal view strongly convergent dorsally, with minimum distance between eyes posterior to ocelli slightly less than distance between eyes measured at posterior ocelli.

Antenna inserted below level of lower orbits, with dorsal margin of torulus below level of lower eye margin. Pedicel distinctly longer than clava; funicle 8-segmented; flagellum without obviously differentiated sensory regions on clava or funicular segments, but with short erect sensilla at least on clava and preclaval segment; clava 1-segmented.

Mesosoma. Pronotum almost in same plane without distinctly differentiated collar and neck, but with median line and with slightly yellowish lanceolate setae medially. Mesoscutum reticulate-rugulose without distinct subsculpture; medial lobe covered with slightly yellowish lanceolate setae similar to those on pronotum, but lateral lobe with inconspicuous whitish setae. Scutellum with obscure mediolongitudinal line anteriorly and, under some angles of light, with posteriorly convergent region of slightly yellowish setae; with crenulate, reflexed marginal rim, the lip subvertical and extending slightly over dorsal margin of dorsellum; without axillular carina but with shiny, partly crenulate, vertical axillular region; and with very short frenal arm developed only as posterior margin of axillula. Dorsellum reticulate-rugulose, bare, and exposed as vertical band below scutellar rim. Prepectus triangular in lateral view. Upper mesepimeron smooth, shiny, and almost entirely bare but with a few short setae within subalar pit; lower mesepimeron reticulate-coriaceous, bare. Metapleuron uniformly sculptured and setose. Propodeum without distinct paraspiracular furrow or carina but crenulate-rugose around spiracle, and with crenulate furrow along anterior margin extending almost to midline, the anterior furrows interrupted by narrow, longitudinally crenulate medial region; callus in dorsal view with 2 right-angled projections, 1 posterior and 1 lateral, and with long, sparse setae to level about equal with inner margin of spiracle (at least some specimens also with a few long setae along foramen); plical region with coriaceous subsculpture in addition to crenulae.

Forewing with basal cell uniformly setose but with large bare spot beyond basal cell, the region closed posteriorly by several rows of setae continuous between basal cell and disc; longitudinally infuscate along vanal fold and from level near apex of basal cell to stigma, but with variably broad and distinct, longitudinal hyaline region immediately behind marginal vein.

Legs conspicuously long and slender. Profemur without preapical ventral angulation; protibia without carinate ventral margin and without dorsal spicules. Metacoxa setose but not carinately margined dorsally, and uniformly setose over exterior surface; metatibial spurs about as long as apical width of tibia.

Metasoma. Gaster not margined laterally; Gt_1–Gt_5 transversely strigose-coriaceous; Gt_2 exposed; and posterior margins of basal 4 or 5 terga slightly emarginate. Syntergum and ovipositor sheaths of female greatly elongated into slender ‘tail’ longer than rest of body; with suture between cerci not continuous dorsally. Hypopygium of female extending to level about equal with posterior margin of Gt_3.

Remarks. Girault described two species of *Westwoodiana*, but the genus likely is monotypic. *Westwoodiana testaceiformis* is distinguished from *W. purpureipes* by having a yellowish-orange rather than a brown metafemur. The original type series of the two species, all females, are the only specimens I have seen and the color difference probably constitutes infraspecific variation. Females of *Westwoodiana* are easily distinguished by the somewhat yellowish and obviously more dense setae on the posterior of the head, pronotum, mesoscutal medial lobe and scutellum, which together form a ∨-like setal region dorsally on the body. This setal pattern is autapomorphic. Females also have a posterolaterally bidentate propodeum, with the supracoxal flange forming a posteriorly directed angulation and the posterolateral margin of the callus forming another distinct angulation anterior to the supracoxal flange. Some *Thaumasura* also have the posterior margin of the callus projecting into a single ‘tooth’, but a double angulation is unique for *Westwoodiana*. *Westwoodiana* appears to be closely related to *Thaumasura* + *Mesamotura*, but unlike members of these two genera females have the propodeum quite sparsely setose posteriorly. Also, although the sculpture of the face is composed of tiny, more or less denticulate bumps somewhat similar to cristate sculpture, the sculpture is not aligned into distinctly transverse rows as in *Mesamotura* and most *Thaumasura*. Structure of the dorsellum in *Westwoodiana* is intermediate between the hypothesized groundplan state for *Mesamotura* + *Thaumasura* and more derived species within *Thaumasura*. The dorsellum is bare, visible as a transverse band between the scutellum and propodeum, and reticulate-rugulose, but rather than being a convex lobe between the scutellum and propodeum it is vertical below the scutellar rim, which I consider as apomorphic. *Westwoodiana* may be the sister group of *Thaumasura* + *Mesamotura* (Fig. 1*a*) or render *Thaumasura* + *Mesamotura* paraphyletic. If it does render *Thaumasura* + *Mesamotura* paraphyletic, it likely is quite a basal clade based on its dorsellar structure, uniformly punctate and setose metapleuron and unmodified hind leg. The apex of the metafemur is not abruptly expanded and the inner tibial spur is only slightly longer than the outer spur, unlike more derived species of *Thaumasura*. Discovery of the structure of the male petiole may help resolve relationships.

LYCISCINI: Genera present in both the Old and New World

Proshizonotus Girault revised status

Figs 300–335

Proshizonotus Girault, 1928[422]: 2. Type species: *Proshizonotus mosei* Girault; by monotypy. Synonymy with *Parepistenia* Dodd by Bouček (1988*a*: 254). **Generic status reestablished**.

Austrogerrhus Bouček, 1958: 371–373. Type species: *Austrogerrhus gloriosus* Bouček; by original designation. **New synonymy**, previously synonymized with *Parepistenia* by Bouček (1988*a*: 254).

Oxyepistenia Bouček, 1988*a*: 256. Type species: *Oxyepistenia lenticeps* Bouček; by original designation and monotypy. **New synonymy**.

Excisoclea Bouček, 1988*a*: 259–260. Type species: *Excisoclea prima* Bouček; by original designation and monotypy. **New synonymy**.

Kraska Bouček, 1988*a*: 260–261. Type species: *Erotolepsiella migneti* Girault; by original designation and monotypy. **New synonymy**.

Diversity. At least 20 undescribed species in the *Neotropical region [Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Panama, Paraguay, Peru] plus 20 nominal and an unknown number of undescribed species in the Australasian region [Australia, Indonesia (*Ceram), *New Caledonia, New Zealand, *Papua New Guinea (*New Britain)]. Bouček (1988*a*) listed the genus (as *Parepistenia*) as occurring in Madagascar and South Africa, but these records were based on *Solenura nigra* and two other unnamed species more likely belonging to *Grooca*. Farooqi and Subba Rao (1985, 1986) also keyed and catalogued, respectively, an unidentified species (as *Austrogerrhus*) from Sri Lanka. I have not seen any *Proshizonotus* from the Afrotropical or Oriental regions, but the dorsal mesosoma illustrated by Farooqi and Subba Rao (1985, fig. 379) could be that of a species of *Proshizonotus*.

✓ ***Proshizonotus annulicornis* (Girault)**, **new combination**. *Platygerrhus annulicornis* Girault, 1913[175]: 78. *Parepistenia annulicornis* (Bouček 1988*a*: 255). DISTRIBUTION: Australia (TAS).

Note: Dahms (1983: 44) stated that the female holotype lacked the head and wings and that an associated slide contains parts of both the holotype of *P. annulicornis* and a male of *Aplatygerrhus magnificus* Girault (= *Cleonymus magnus* Bouček) under two cover slips. He further stated that "there is no mention of this species [*A. magnificus*] on the label", although the label has clearly written: "*Platygerrhus annulicornis* Girault ♀ Head of ♂ *Aplatygerrhus magnifica*", in the same handwriting and ink. The single female antenna with fl_6–fl_8 yellowish (fl_6 gradually darker brown basally) under the complete cover slip closest to the label belongs to *P. annulicornis*, whereas the other parts belong to *A. magnificus*. The forewing and hind wing under the second cover slip belong to *P. annulicornis*, which means the head of *P. annulicornis* is lost.

✓ ***Proshizonotus arenae* (Girault)**, **new combination**. *Thaumasura arenae* Girault, 1932[439]: 4. *Parepistenia arenae* (Bouček 1988*a*: 255). DISTRIBUTION: Australia (QLD).

Note: The original description does not match the remaining parts labelled as the holotype. The description states "legs red save coxae" but the female labelled as type has the profemur as well as all coxae dark. The description also states "only joints 1–3 of funicle red" whereas the flagellum on the slide labelled as type has fl_2–fl_5 whitish and fl_1 almost white but with a brownish tinge.

✓ ***Proshizonotus australiensis* (Girault), new combination**. *Platygerrhus australiensis* Girault, 1915[240]: 211–212. *Parepistenia australiensis* (Bouček 1988*a*: 255). DISTRIBUTION: Australia (TAS).

Note: Only the metasoma of what Dahms (1983: 107) interpreted as the female holotype of *P. australiensis* remains, plus a slide labelled as *Platygerrhus australiensis* Girault ♀ type. The slide has body parts under two separate cover slips. Under a partial cover slip is an almost complete forewing and a middle leg excluding the tarsus. Under a complete cover slip is a female antenna and a metatibia and tarsus. The remaining metasoma is of the type with Gt_1 smooth, Gt_2 narrowly but distinctly exposed and smooth, and the terga not delimited laterally by an abrupt margin. Although similar structures are possessed by many species of *Proshizonotus*, the syntergum is flat and uniformly coriaceous dorsally, without any indication of a syntergal suture between the cerci dorsally. The gastral structure is thus most similar to females of Cleonymini. However, the preclaval segment of the antenna under the complete cover slip is symmetrical, lacking the apicolateral process characteristic of Cleonymini. Also, the venation and color pattern of the forewing (hyaline with U-like infuscate band connecting stigmal vein and parastigma) under the partial cover slip is more similar to some species of *Proshizonotus*, such as *P. tasmaniensis* (Girault), as originally noted by Girault (1913[175]: 79). I do not believe the metasoma and the body parts on the slide belong to the same specimen. I interpret *Platygerrhus australiensis* Girault based on the parts on the slide because these match the original description and I do not consider the metasoma as part of the type specimen. I suspect that either the point bearing the metasoma was incorrectly labelled as type or there were two specimens originally glued to the point, one of which, the type of *P. australiensis*, was subsequently lost. The former alternative probably is more likely because there is no indication of another impression in the glue on the point.

✓ ***Proshizonotus camilli* (Girault), new combination**. *Epistenia camilli* Girault, 1925[381]: 1. *Parepistenia camilli* (Bouček 1988*a*: 255). DISTRIBUTION: Australia (QLD).

✓ ***Proshizonotus corticis* (Girault), new combination**. *Epistenia corticis* Girault, 1925[381]: 1. *Parepistenia corticis* (Bouček 1988*a*: 255). DISTRIBUTION: Australia (QLD).

✓ ***Proshizonotus devannyi* (Girault), new combination**. *Epistenia devannyi* Girault, 1937[448]: 1. *Parepistenia devannyi* (Bouček 1988*a*: 255). DISTRIBUTION: Australia (QLD).

✓ ***Proshizonotus froudei* (Girault), new combination**. *Platygerrhus froudei* Girault, 1929[431]: 318. *Parepistenia froudei* (Bouček 1988*a*: 255). DISTRIBUTION: Australia (QLD).

✓ ***Proshizonotus fulviventris* (Girault), new combination**. *Platygerrhus fulviventris* Girault, 1915[240]: 212–213. *Parepistenia fulviventris* (Bouček 1988*a*: 255). DISTRIBUTION: Australia (QLD).

Note: The remains of the unique holotype of *P. fulviventris* do not match the description entirely because the mesosoma is brownish, similar to the metasoma, whereas Girault described the metasoma as “pale brown” and the rest of the body as “dark aeneous green.” This discrepancy presumably is the result of fading of the mesosoma. I have not seen any other females I could match confidently with *P. fulviventris*.

✓ ***Proshizonotus incola* (Girault), new combination**. *Platygerrhus incola* Girault, 1929[431]: 317–318. *Parepistenia incola* (Bouček 1988*a*: 255). DISTRIBUTION: Australia (QLD, SA).

✓ ***Proshizonotus inusitata* (Girault), new combination**. *Epistenia inusitata* Girault, 1937[448]: 1. *Parepistenia inusitata* (Bouček 1988*a*: 255). DISTRIBUTION: Australia (QLD).

✓ ***Proshizonotus lenticeps* (Bouček), new combination**. *Oxyepistenia lenticeps* Bouček, 1988*a*: 256–257; ♀ holotype (AMSA). DISTRIBUTION: Australia (NSW, SA).

Note: Because the proposed synonymy of *Oxyepistenia* with *Proshizonotus* is subjective, below I amplify on or provide additional features to the original description of *O. lenticeps*.

Head. Scrobal depression ∩-like, carinately margined dorsally above level of interantennal region. Gena with bare and shiny but very finely coriaceous region behind malar sulcus, the region narrowed toward mandible. Frontovertex with distinct, separate, tiny punctures separated by interstices of similar size as punctures, the interstices with coriaceous subsculpture.

Mesosoma. Pronotum with very short or obscure median line behind extreme anterior margin. Dorsellum bare, usually concealed by scutellar lip under overhanging scutellum. Upper mesepimeron smooth, shiny and bare, including dorsal flat surface of subalar pit. Metapleuron with less than dorsal half bare and very finely coriaceous to smooth.

Forewing. Anterior and posterior hyaline spots with white setae.

✓ ***Proshizonotus migneti* (Girault), new combination**. *Erotolepsiella migneti* Girault, 1935[445]: 3. *Kraska migneti* (Bouček 1988*a*: 261). DISTRIBUTION: Australia (QLD).

Note: Because the proposed synonymy of *Kraska* with *Proshizonotus* is subjective, below I amplify on or provide additional features to the original description of *Kraska* based on the female type specimen of *E. migneti*.

Head. Interantennal region with white lanceolate setae directed laterally to ventrolaterally in band between lower margin of torulus to level slightly above dorsal margin of torulus; interantennal region coriaceous above setal band, weakly convex and cristate below setal band; scrobes and parascrobal region below frontovertexal carina cristate-reticulate. Frontovertex distinctly differentiated by sinuate, transverse, carinate margin between inner orbits about midway between torulus and anterior ocellus; finely coriaceous with setiferous punctures. Parascrobal region with line of white setae along lower inner orbit.

Mesosoma. Pronotum with conspicuous band of white lanceolate setae along posterolateral margin anterior to mesoscutal lateral lobe. Mesoscutal medial lobe punctate-alveolate with narrow band of setae posterolaterally adjacent to notaulus. Scutellum highly convex, sculpture dorsally similar to mesoscutal medial lobe, but laterally and posteriorly broadly smooth and shiny above crenulate rim; axilla smooth and shiny without any evident coriaceous sculpture. Dorsellum bandlike, vertical below scutellar apex; smooth, shiny and sparsely setose. Upper mesepimeron smooth, shiny and bare except for 1 seta within subalar pit. Metapleuron with dense white lanceolate setae ventrally, bare and very finely coriaceous over slightly more than dorsal half.

Wings. Forewing with basal cell delineated posteriorly by 1 row of setae, but entirely bare within cell; infuscate between level of base of parastigma and apex of postmarginal vein but with anterior and posterior hyaline spot having white setae behind about middle of marginal vein, the posterior spot contiguous with posterior margin of wing.

Metasoma. Gaster elongate-lanceolate, about 4 times as long as greatest width; Gt_1 smooth and shiny, with posterior margin broadly incurved; Gt_2 only very finely and obscurely transversely coriaceous; Gt_3 and Gt_4 finely, transversely coriaceous-strigose medially, but with smooth and shiny band basally and with longer bare band apically; Gt_5 the broadest tergum, distinctly transversely coriaceous-strigose except for apical smooth band; Gt_6 finely coriaceous. Syntergum with continuous suture between cerci dorsally.

✓ ***Proshizonotus mosei* Girault, combination reestablished**. *Proshizonotus mosei* Girault, 1928[422]: 2. *Parepistenia mosei* (Bouček 1988*a*: 255). DISTRIBUTION: Australia (VIC).

Note: The unique, minuten-mounted female holotype of *P. mosei* is badly damaged by dermestids. In 1999, what remained was the pronotum, dorsal and left surfaces of the mesothorax, metanotum and metapleurae, propodeum, left forewing, right hind wing, metacoxae, complete right hind leg except most of inner surfaces of femur and tibia eaten, and almost complete left middle leg, with mesocoxa gone except for linear strip and most of inner surface of tibia eaten. Because of the fragile condition of the type specimen, I provide notes to aid future recognition of the type species.

Mesoscutum and scutellum with relatively large reticulations, shiny without any indication of subsculpture on interstices; axilla finely coriaceous; scutellum with vertical axillula delimited dorsally by complete axillular carina; metapleuron reticulate-coriaceous ventrally, to finely coriaceous and shiny dorsally, with distinctive setal pattern: long, moderately dense white setae anteroventrally and with similar setae dorsally and along both anterior and posterior margins (bare mediolongitudinally); dorsellum bare, shiny, very broadly V-like with crenulae along both anterior and posterior margins; propodeum with plical region smooth and shiny, setose lateral to spiracle. Middle leg brown with following white: trochantellus, extreme apex of femur and base of tibia (knee), about apical 0.2 of tibia and entire tarsus. Hind leg with similar color pattern as for middle leg. Forewing entirely hyaline with smv:mv:stv:pmv = 8.0:5.5:1.7:4.5.

The parts remaining of *P. mosei* appear to be very similar to *P. froudei*. The holotype of *P. froudei* has the metapleuron somewhat more distinctly and extensively reticulate and the dorsal angle less distinctly setose than in *P. mosei,* but these features probably are somewhat variable.

The mesotibia of *P. mosei* is also much more extensively whitish (about apical two-thirds), than is the metatibia of *P. froudei*. In the original description of *P. mosei*, fl_1 was stated to be twice as long as wide, fl_2 twice as long as fl_1 and equal in length to the pedicel, and fl_8 equal in length to fl_1 but wider. Although fl_1 is obviously longer than wide in *P. froudei* it is not twice as long as wide; furthermore, fl_2 is fully 3 times as long as fl_1 and fl_8 is almost twice as long as fl_1.

Proshizonotus mosei was described from Queensland whereas *P. froudei* was described from Victoria. I have seen one female from ACT (ANIC) I assign to *P. froudei* as well as one female of a very similar undescribed species from Queensland (QMBA), but no female from Australia comparable with *P. mosei*. However, two females from Papua New Guinea (CNCI) are very similar to *P. mosei*, having the metapleuron similarly conspicuously setose dorsally, fl_1 twice as long as wide and fl_2 twice as long as fl_1, though fl_8 is distinctly longer (17:12) than fl_1, fl_2 is slightly shorter than the pedicel (21:29), and all femora and tibiae are uniformly dark brown. Additional collecting is necessary to determine whether the specimens from New Guinea are *P. mosei* or a very similar but separate species. *Proshizonotus mosei* and *P. froudei* are very similar to each other and closely related.

✓ ***Proshizonotus nigriaenea*** **(Girault)**, **new combination**. *Epistenia nigriaenea* Girault, 1915[240]: 215–216. *Parepistenia nigriaenea* (Bouček 1988*a*: 255). DISTRIBUTION: Australia (QLD).

✓ ***Proshizonotus pallidicoxa*** **(Girault)**, **new combination**. *Platygerrhus pallidicoxa* Girault, 1929[431]: 318. *Parepistenia pallidicoxa* (Bouček 1988*a*: 256). DISTRIBUTION: Australia (QLD).

✓ ***Proshizonotus primus*** **(Bouček)**, **new combination**. *Excisoclea prima* Bouček, 1988*a*: 260; ♀ holotype (ANIC). DISTRIBUTION: Australia (NSW).

Note: Because the proposed synonymy of *Excisoclea* with *Proshizonotus* is subjective, below I amplify on or provide additional features to the original description of *E. primus*.

Mesosoma. Upper mesepimeron setose within subalar pit. Metapleuron with about dorsal half bare and very finely coriaceous.

Metasoma. Syntergum with continuous suture dorsally between cerci.

✓ ***Proshizonotus pulchripes*** **(Girault)**, **new combination**. *Thaumasura pulchripes* Girault, 1927[416]: 314–315. *Parepistenia pulchripes* (Bouček 1988*a*: 256). DISTRIBUTION: Australia (QLD).

= ✓ *Austrogerrhus gloriosus* Bouček, 1958: 373–374; ♀ holotype (DEIC). Synonymy, under *Parepistenia pulchripes*, by Bouček (1988*a*: 256).

Proshizonotus resplendens **(Gourlay)**, **new combination**. *Thaumasura resplendens* Gourlay, 1928: 372; ♀ holotype (MONZ; missing, 1♀ paratype remaining according to J. Berry, *in lit.*). *Parepistenia resplendens* (Bouček 1988*a*: 256). DISTRIBUTION: New Zealand.

✓ ***Proshizonotus tasmaniensis*** **(Girault)**, **new combination**. *Platygerrhus tasmaniensis* Girault, 1913[175]: 79. *Parepistenia tasmaniensis* (Bouček 1988*a*: 256). DISTRIBUTION: Australia (TAS).

Biology. Bouček (1988*a*) stated that “several species have been reared from logs containing wood-boring larvae of beetles, one species from a stem of a thistle, also containing beetle larvae.” Specimens of an undescribed species from New Zealand (DSIR) are labelled as reared from the pupal cell of a weevil in wood of *Coprosma australis*. Other plant host associations on labels for this species are *C.* ? *linarifolia*, *Carpedesus serratus*, *Hebe barkeri*, *H. stricta*, *Pseudopanax chathamica*, and *Sympedius testudo*. *Coelostomidia zealandica* (Maskell) (Hemiptera: Margarodidae) on *Meulenbeckia australis* is given as host information for another undescribed species from New Zealand (DSIR). I have collected species running on smooth-bark gum trees and upright dead trees without bark.

Description. *Head* (Figs 300–307). Scrobal depression variably deep, very shallow to abruptly declivous ventrally, but with outer margin usually not carinate above level of interantennal region; widely separated from anterior ocellus and occupying entire region between lower inner orbits when very shallow, but more bell- or ∧-like and extending for variable distance toward anterior ocellus mesal to inner orbits when deep; scrobes and channel usually sculptured but sometimes smooth and shiny. Face sometimes differentiated into distinct frontovertex and upper face by abrupt change of angle or transverse to broadly ∩-like carina between inner orbits at level of dorsal limit of scrobal depression (Fig. 303); parascrobal region and interantennal region with similar coriaceous to reticulate or punctulate sculpture, the sculpture sometimes aligned transversely (Figs 302, 303) and rarely cristate if head with a transverse frontovertexal carina or angle. Interantennal region weakly convex when scrobal depression shallow and more distinctly triangular with abruptly inclined margins when scrobes deep, but dorsal angle not expanded into process. Vertex with posterior ocellus contiguous with inner orbit or separated by at most 2 OD; rounded into occiput or variably abruptly to carinately angled relative to flat or concave occiput (Figs 306, 307); with (Fig. 304) or without mediolongitudinal sulcus or groove extending slightly onto occiput. Occiput sometimes with complete ∩-like (Fig. 305) or ∧-like (Fig. 306) carina, but usually with carina absent or present only laterally (Fig. 304). Gena sometimes with slender, shiny but finely coriaceous bare region behind malar sulcus (Fig. 300); sometimes with genal flange (Fig. 308) in New World species. Eye usually densely and conspicuously microsetose, only very rarely superficially bare, and less than twice as high as broad; inner orbits in frontal view variably convergent dorsally, and in dorsal view orbits sometimes recurved mesally behind ocelli so minimum distance between eyes behind ocelli less than distance between eyes measured at posterior ocelli.

Antenna inserted distinctly below to about in line with level of lower orbits, with dorsal to ventral margin of torulus at or below level of lower margin of eye. Pedicel at most as long as clava (Fig. 332); funicle 8-segmented; preclaval segment without micropilose sensory region; clava 1-segmented, often with non-collapsing sensory region apically and sometimes with additional sensory region evident as elongate-slender region of lighter color (Figs 333–335).

Mesosoma. Pronotum with variably conspicuous transverse collar, and with inclined neck usually having variably long and distinct median line (Fig. 305). Mesoscutum reticulate to punctate-alveolate, with or without distinct coriaceous subsculpture on interstices. Scutellum (Figs 309–314, 318–323) only extremely rarely with anteromedial sulcus, but with reflexed, crenulate marginal rim, the rim sometimes extending over dorsellum as triangular flange to base of propodeum; with or without axillular carina or distinctly differentiated axillula; and without or with only very short frenal arm basolaterally. Dorsellum often a horizontal or obliquely angled setose lobe between scutellum and propodeum, but sometimes bare (Fig. 312) and sometimes either vertical under scutellar apex or entirely concealed by overhanging scutellar lip. Prepectus triangular in lateral view (Fig. 312) or with posteroventral margin variably conspicuously incurved, resulting in more or less distinctly lunate (Fig. 315) to lobate (Fig. 316) posterodorsal angle. Upper mesepimeron bare (Fig. 312) or variably extensively setose dorsally, often only near subalar pit (Figs 313–315); lower mesepimeron variably sculptured, but bare. Metapleuron entirely sculptured and setose (Fig. 315) or, in most Old World species, dorsally bare or less setose and more finely sculptured to smooth (Figs 312–315). Propodeum often with crenulate postspiracular furrow posterior to spiracle (Fig. 320) but only sometimes with distinct paraspiracular carina (Figs 319, 321, 322), and with crenulate furrow along anterior margin extending to, and often variably distinctly recurved along either side of, median carina (Figs 318–322); callus setose posteriorly only to about level of inner margin of spiracle or at least with distance from setal band to median carina distinctly greater than width of setal band; plical region bare medially.

*Forew*ing uniformly setose or very rarely with distinct bare region beyond basal cell; hyaline or variably infuscate, sometimes with anterior and posterior hyaline spots behind marginal vein having white setae.

Legs. Profemur with (Fig. 317) or without distinct preapical ventral angulation, the obliquely angled margin sometimes carinate but not toothed; protibia only very rarely with sinuate, carinate margin over about ventrobasal half (Fig. 317), and without dorsal spicules. Metacoxa usually at least sparsely setose dorsally or dorsobasally and only rarely carinately margined, but with exterior surface bare; metatibial spurs at most about as long as apical width of tibia.

Metasoma. Petiole of male in dorsal view strongly transverse (Fig. 328*a*) to quadrate or subpentagonal with reflexed lateral rim (Fig. 328*b*), and smooth and shiny to coriaceous or strigose; in ventral view broadly membranous to tubelike with ventromedian suture (Fig. 329*a*) or entirely sclerotized (Fig. 329*b*). Gaster ovate to elongate-lanceolate; margined laterally (Fig. 327) or not in both sexes; Gt_1 variably sculptured, smooth (Fig. 324) to finely coriaceous, transversely strigose, or punctulate (Fig. 322) to reticulate (Fig. 328*b*); Gt_2 usually distinctly exposed (Figs 325–327, 328, 330) but at least exposed for very short distance between Gt_1 and Gt_3 (Fig. 324); and Gt_2–Gt_5 variably sculptured. Syntergum of female in dorsal view triangular, of similar length to Gt_6 and with continuous (Fig. 331), though sometimes very fine, suture dorsally between cerci. Ovipositor sheaths not projecting conspicuously, extending beyond apex of syntergum at most by distance equal in length to Gt_6 + syntergum. Hypopygium in female extending to level about equal with posterior margin of Gt_2–Gt_4.

Remarks. *Proshizonotus* is reestablished from synonymy under *Parepistenia* for the reasons discussed under this latter genus. Bouček (1988*a*) differentiated *Proshizonotus* (as *Parepistenia*) from the New World genus *Epistenia* based on *Epistenia* having a strong lateral carina posteriorly on the gena *versus Proshizonotus* lacking such a lateral carina. Examination of more diverse Neotropical material proved this feature to be insufficient to distinguish New World *Proshizonotus* from *Epistenia* and other New World Lyciscini. A few New World species I classify in *Proshizonotus* have a genal flange (10:1; Fig. 308). Some species also share a distinctly pedunculate prepectus (28:1; Fig. 316) with other New World Lyciscini. Based on females, I differentiate 21 morphospecies of *Proshizonotus* in the New World (see below). Twenty of the species comprise a cohesive group that is morphologically much less diverse than is Old World *Proshizonotus* (see Biogeography of Lyciscini for list of common features). The species group, which I refer to as NW *Proshizonotus*, excludes *Proshizonotus* n. sp. #1. Almost all of the features common to NW *Proshizonotus* are also shared with some or all members of other New World genera. An extensively setose dorsellum (26:1, 27:1) is the only feature that differentiates NW *Proshizonotus* from all other New World Lyciscini (females of *Hadroepistenia erwini* with a single line of setae on the dorsellum). Females of NW *Proshizonotus* also have a more distinct suture entirely across the syntergum (60:1; Fig. 331) than do females of other New World genera (Fig. 355), though this difference is more subtle. Most NW *Proshizonotus* species have hyaline wings and a transverse propodeum with a distinct, longitudinal paraspiracular carina mesal to the propodeal spiracle, a median carina, and the plical panels otherwise more or less shiny to variably longitudinal carinate (Fig. 322). They also have the gaster at least as distinctly margined (Figs 326, 327, 330), if not more so, than any Old World species of *Proshizonotus*, and the metapleuron uniformly sculptured and setose (31:0; Fig. 315). Most Old World species have the metapleuron bare or obviously less setose dorsally (Figs 314, 320) and often more finely sculptured (Fig. 313) to smooth (Fig. 312) dorsally (31:1). This feature may be synapomorphic for a subset of Old World *Proshizonotus*, but if so then similar patterns evolved independently within *Agamerion*, *Eupelmophotismus* and *Thaumasura*, and either evolved convergently in *Nepistenia* and *Striatacanthus* or indicate these last two genera render *Proshizonotus* paraphyletic. As discussed under 'Biogeography of Lyciscini', my intuitive analysis suggests NW *Proshizonotus* is likely the paraphyletic ancestral group from which all other New World genera of Lyciscini were derived. *Proshizonotus* n. sp. #1 probably represents a second and possibly much more recent introduction of the genus into the New World based on the morphological differences between this species and those species collectively referred to as NW *Proshizonotus*.

In the Old World, *Proshizonotus* is recognized essentially by not having the combination of features that characterize other recognized genera of Lyciscini. There seems little doubt *Proshizonotus* is paraphyletic to some or several currently recognized Old World genera, but exact relationships are ambiguous because of uncertain character polarity and homology. Below I provide rationale for new synonymy of three monotypic genera with *Proshizonotus*. Other established genera with more than one species that possibly render *Proshizonotus* paraphyletic I retain as valid until *Proshizonotus* can be revised and relationships clarified. It may then be possible to divide *Proshizonotus* into genera representing evolutionary lineages that include other currently recognized genera.

Within the Old World, Bouček (1988*a*) recognized *Oxyepistenia* for the single species *O. lenticeps*, based on individuals having the vertex carinately margined and the occiput strongly excavated with a more or less Λ-like occipital carina (Fig. 306). I have seen three males and one female (QMBA) representing one or two undescribed species of *Proshizonotus* from Queensland that are similar to *O. lenticeps*. The males have only an obscure pronotal median line and although the vertex is carinately margined the occiput is virtually flat (Fig. 307); the frontovertex is also reticulate-rugulose with more or less pentagonal cells separated by raised lines, with each cell having a central pustule from which a seta originates. The female has a similar forewing color pattern to *O. lenticeps*, apparently lacks a pronotal median line, and although the occiput is slightly concave the vertex is abruptly angled rather than carinately margined relative to the occiput. *Proshizonotus lenticeps* appears to be related to a group of mostly undescribed species within *Proshizonotus* having the dorsellum bare and more or less overlain by a posteriorly projecting scutellum (Figs 312, 319), the first four gastral terga with transverse medial bands of reticulate sculpture between more finely sculptured to smooth basal and apical bands (Figs 325, 328*a*), a strong axillular carina (Fig. 319), the body including the coxae uniformly dark with only a slight metallic green luster, and often an elongate bell-shaped scrobal depression extending to within about 1 OD of the anterior ocellus (Fig. 300) (see also under Remarks for *Riekisura*). This group includes some undescribed species often having a similar forewing color pattern to *O. lenticeps* and either lacking a pronotal median line or (males) having only an obscure line, as well as some species with hyaline forewings and a distinct pronotal median line. The latter group of species includes *P. annulicornis* and *P. arenae*. Females of at least one species similar to *P. arenae* are unusual because the metacoxa is distinctly carinate dorsally, unlike in *P. lenticeps*, *P. annulicornis* and almost all other species of the genus. I believe *O. lenticeps* represents a highly modified species most closely related to the undescribed species discussed above that, in turn, are related to other described species such as *P. annulicornis* and *P. arenae*. For this reason I synonymize *Oxyepistenia* under *Proshizonotus*. *Proshizonotus lenticeps* is unusual within the genus because the syntergal suture is extremely fine or even completely effaced dorsally, but some of the species to which it appears to be closely related also have a fine or effaced syntergal suture.

Bouček (1988*a*) established *Excisoclea* for *E. prima*, differentiating the genus from '*Parepistenia*' primarily by two features: posterior margin of Gt_1 with a deep triangular excision, and scutellum anteriorly with a distinct median groove (Bouček 1988*a*, fig. 399). He noted in the original description that in some respects the head was similar to both '*Parepistenia*' and *Cleonymus*, and that the genus "seems to combine some characters of *Parepistenia* and *Cleonymus*" (Bouček 1988*a*: 260). I have not seen an anteromedially sulcate scutellum or such a deeply emarginate Gt_1 in any other species of *Proshizonotus*, but the head is not unlike some other species of *Proshizonotus*. The relatively bright metallic green color, short mediolongitudinal sulcus on the vertex (*cf*. Fig. 304), and very shallow and uniformly sculptured scrobes, are somewhat similar to such species as *P. pallidicoxa* and *P. tasmaniensis*. These and other species further resemble *P. primus* in several respects, including forewing color pattern, dorsally bare and smooth metapleuron, setose dorsellum, and similar sculpture pattern of the gaster. Other, apparently unrelated species in *Proshizonotus*, very rarely have the posterior margins of Gt_1 and the subsequent terga obviously emarginate medially. I consider tergal emargination and a sulcate scutellum as species-specific features. I therefore synonymize *Excisoclea* under *Proshizonotus*. *Proshizonotus pallidicoxa* and *P. tasmaniensis* appear to be closely related to such species as *P. incola* and *P. pulchripes*. Further study is required to determine whether *P. prima* is most closely related to this group or to some other group of species within *Proshizonotus*.

Bouček (1988*a*) established *Kraska* for the single species, *K. migneti*, and an undescribed second species. The type species of *Kraska* is very distinctive, but likely is most closely related to a group of species in *Proshizonotus* that are differentiated from other species by at least three features of the head (Fig. 303): 1) frontovertex differentiated by a frontovertexal carina between the inner orbits; 2) interantennal region ventrally with variably dense, laterally to ventrolaterally directed, white lanceolate setae; and 3) scrobes and parascrobal region with transversely aligned reticulate to cristate sculpture above the setal band. Such species sometimes have the axillae obviously more finely sculptured than the scutellum, coriaceous to smooth rather than reticulate (Fig. 311), but this sculpture pattern is also possessed by some other species of *Proshizonotus*. Two species groups can be distinguished among those species with the modified head structure. One of the groups, here called the *camilli*-group, is composed of those species that have all gastral terga, including Gt_1 and Gt_2, strongly reticulate. Females of this group also have the gaster abruptly curved down posteriorly so that the dorsal surface is distinctly above the level of the very short syntergum, the interantennal setal band not continued lateral to the toruli, and the forewing partly infuscate but without both a discrete anterior and posterior hyaline spot having white setae. This group includes *P. camilli*, *P. corticis* and *P. inusitata* among described species. A second, unnamed species group is composed entirely of undescribed species and is characterized by having Gt_1 and Gt_2 smooth and shiny and the subsequent terga transversely coriaceous to strigose. Females of this group do not have the gaster as conspicuously curved down posteriorly as for the first group, usually have the interantennal setal band continuous to or partly to the lower inner orbit (Fig. 303), and have yellowish to distinctly infuscate forewings with discrete hyaline spots behind the marginal vein having white setae. *Proshizonotus migneti* may be most closely related to one or more species in this second species group based on these features; however, I have also seen a single female of a species from Queensland (ANIC) that appears to be intermediate between the two species groups and *P. migneti*. The species resembles *P. migneti* because it has dense white setae along the posterodorsal margin of the pronotum anterior to the mesoscutal lateral lobe and posteriorly on the mesoscutum along the notauli and mesoscutal medial lobe, as well as having the basal cell bare and the axillae shiny and only very obscurely coriaceous. However, it has a relatively weakly convex and evenly sculptured scutellum (Fig. 311) and a more ovate-lanceolate gaster similar to the other two species groups. Sculpture of the gaster of this single female is intermediate between the two species groups: Gt_1 and Gt_2 are smooth similar to the unnamed species group, but the subsequent terga are reticulate similar to the *camilli*-group. It also has the gaster abruptly curved down posteriorly to a short syntergum, has only a single hyaline region with dark setae behind the marginal vein and lacks a distinct setal band between the torulus and lower inner orbit. Those species with a frontovertexal carina (Fig. 303) could be classified in a separate genus from *Proshizonotus*, but the species of the unnamed species group with more finely sculptured terga appear also to be closely related to *P. tasmaniensis*, *P. pallidicoxa* and other undescribed species that have a distinct frontovertex differentiated by a rounded rather than a carinate margin between the inner orbits. These species also have a bright green head and mesosoma with cupreous lusters under some angle of light and, to varying degrees, lanceolate setae and transverse-reticulate sculpture over the interantennal region and face, often obviously more finely sculptured axillae, and infuscate forewings with hyaline spots. As discussed above, such species as *P. tasmaniensis* and *P. pallidicoxa* appear to be related to *P. pulchripes* and *P. incola*, which have more distinctly differentiated bell-shaped scrobal depressions and the parascrobal regions more smoothly merging into the vertex. Furthermore, *camilli*-group species seem to be closely related to undescribed species that have a well defined scrobal depression, smoothly merging parascrobal region and vertex, and unmodified dark setae on the interantennal region. It may be possible to segregate the species into more than one genus when the Old World species of *Proshizonotus* are revised and relationships are better understood, but until then I consider it best to synonymize *Kraska* under *Proshizonotus* and classify all the species in a single genus.

Relative size of the eyes was the primary key feature used by Bouček (1988*a*) to separate '*Parepistenia*' from *Thaumasura*, the eye at most nearly 1.4 times as long as broad in '*Parepistenia*' compared with 1.50–1.65 times as long as broad in *Thaumasura*. However, there is some overlap in this feature and although relative eye size segregates most species it will not separate all species of the two genera. There is also some overlap in extent of setation on the propodeum, but usually this difference between the two genera is more obvious than the difference in eye size and will differentiate individuals in combination with the exterior surface of the metacoxa being extensively setose, at least ventrally, and the dorsellum always being bare in *Thaumasura*. Furthermore, species of *Proshizonotus* with the parascrobal region smoothly merging into the vertex (as for all *Thaumasura*) never have transversely strigose to cristate sculpture on the parascrobal region and dorsal half of the interantennal region, unlike most species of *Thaumasura*. Some males of *Proshizonotus* without a distinct median line on the pronotum also resemble some males of Cleonymini because of a similar pronotal structure and propodeal structure and sculpture pattern, but are differentiated by distinct notauli.

Below I provide two keys to females of *Proshizonotus,* one to the described Australasian species and the other to all morphospecies I have seen from the New World. The key to Australasian *Proshizonotus* is based on study of type specimens of all of Girault's species and, for most species, additional specimens compared with the type material. Three species names are keyed together as part of a single couplet because I could not find features to adequately distinguish the types. I do not synonymize the relevant names because a species revision is necessary to determine limits of infra- and interspecific variation. Information provided between square brackets includes additional features helpful to differentiate the described species from similar undescribed species.

Key to females of described Australasian species of *Proshizonotus* Girault

(*P. australiensis* not keyed, see notes in species checklist)

1 Gt$_1$ at least with distinct punctate or reticulate region medially (Fig. 318); Gt$_2$, if extensively exposed, similarly distinctly sculptured as Gt$_1$ **2**

– Gt$_1$ shiny and uniformly smooth or at most very finely coriaceous (Fig. 324); Gt$_2$, if extensively exposed, not sculptured or at most very finely coriaceous basally **6**

2(1) Gaster either with 6 distinct terga (Gt$_2$ with all but extreme apical margin concealed under Gt$_1$, *cf*. Fig. 324) or, if with 7 distinct terga because Gt$_2$ secondarily exposed, then Gt$_2$ smooth and shiny; forewing hyaline; legs, including coxae, of similar color to mesosoma except knees and all but apical 1 or 2 tarsal segments white; dorsellum setose; scrobal depression Λ-like convergent to level equal with angle of inner orbit and with rounded margins (Fig. 301); interantennal region not densely setose . . . .
. . . . **P. nigriaenea** **(Girault)**

– Gaster with 7 distinctly exposed terga (note: gaster sometimes with very short syntergum projecting only slightly if abruptly curved down), and with Gt$_2$ both distinctly exposed and sculptured; other features variable **3**

3(2) Gaster ovate with apex abruptly curved down to very short, only slightly projecting syntergum; dorsellum setose; interantennal region densely covered with white lanceolate setae (scrobe bare); head with transverse, carinate

margin between eyes differentiating face from frontovertex; Gt_1 and Gt_2 strongly punctate to punctate-alveolate; scutellum with or without distinct axillula but dorsal margin of axillula not carinate; forewing infuscate at least below parastigma and stigmal vein, and usually with entire ∪-like infuscate region . . . . **P. camilli** **(Girault)**
. . . . **P. corticis** **(Girault)**
. . . . **P. inusitata** **(Girault)**

– Gaster elongate-ovate to lanceolate, with syntergum in same plane as other terga and projecting conspicuously; dorsellum bare; interantennal region either not densely covered with reflective setae or, if so, then setae also within scrobe; head not carinately margined between eyes; Gt_1 and Gt_2 reticulate; scutellum with complete axillular carina; forewing sometimes hyaline **4**

4(3) Forewing disc infuscate with anterior and posterior hyaline spot having white setae behind apical half of marginal vein; flagellum with clava and often fl_8 yellowish; head with vertex carinately margined and occiput concave with ∧-like occipital carina (Fig. 306) [frontovertex with distinct tiny punctures separated by interstices having coriaceous subsculpture and of similar dimension as punctures] . . . . **P. lenticeps** **(Bouček)**

– Forewing hyaline; flagellum with clava dark and with some funicular segments other than fl_8 yellowish; head with vertex rounded into occiput and occiput not concave **5**

5(4) Flagellum with fl_2–fl_5 yellowish; legs yellowish except all coxae and profemur dark (see notes in species checklist) . . . . **P. arenae** **(Girault)**

– Flagellum with at least fl_6 apically plus fl_7 and fl_8, to all of fl_5–fl_8, yellowish-white; legs yellowish with at least mesocoxa and usually procoxa apically to entirely yellowish or light brown, much lighter than dark metacoxa (metafemur sometimes slightly darker brown medially) [face with large region of quite dense white setae over interantennal region and within scrobes; scrobal depression separated from anterior ocellus by distance subequal to 1 OD; metacoxa yellowish apically] . . . . **P. annulicornis** **(Girault)**

6(1) Gaster ovate, usually with 6 distinct terga because all but sublinear apex of Gt_2 concealed under Gt_1 (Fig. 324), but if Gt_2 more extensively exposed then smooth and about equal in length to basal smooth band on Gt_3; Gt_3–Gt_5 strongly reticulate-punctate; Gt_5 (apparent Gt_4) usually more or less distinctly divided mediolongitudinally by slight ridge (tergum depressed paramedially, Fig. 324); forewing hyaline or with indistinct infuscation adjacent to stigma and parastigma; legs mostly dark brown but often with trochanters, apex of tibiae, apex of metafemur, and metatibia entirely, lighter yellowish-orange, and tarsi white . . . . **P. devannyi** **(Girault)**

– Gaster lanceolate to elongate-lanceolate and always with 7 evident terga, Gt_2 distinctly exposed and Gt_3 not having basal smooth band (except *P. migneti*); Gt_3–Gt_5 finely coriaceous to transversely strigose or reticulate; Gt_5 not paramedially depressed; forewing often with infuscate pattern **7**

7(6) Forewing hyaline; scrobal depression smooth and shiny and parascrobal region coriaceous; Gt_3 and Gt_4 finely coriaceous **8**

– Forewing variably infuscate, with separate infuscate regions behind parastigma and stigmal vein, or with ∪-like infuscate band joining parastigma and stigmal vein, or more extensively infuscate with anterior and posterior hyaline spots; scrobal depression with sculpture similar to that on face; Gt_3 and Gt_4 sometimes distinctly transversely strigose to reticulate **10**

8(7) Metasoma elongate-lanceolate, twice as long as mesosoma, and brownish-cupreous compared with metallic green mesosoma (see notes in species checklist); dorsellum setose; Gt_1 with posterior margin Λ-like emarginate; L:W of fl_2 = 8:6 and of fl_1 = 6:5 (base of fl_1 constricted on dorsal surface); legs, including coxae, yellow; scrobal depression extending only to angle of inner orbit, separated from anterior ocellus by about 2 OD [syntergum in dorsal view with postcercal length about 4 times precercal length] . . . . ***P. fulviventris* (Girault)**

– Metasoma ovate-lanceolate, only about 1.6 times as long as, and similarly dark as, mesosoma; dorsellum bare; Gt_1 with posterior margin transverse; flagellum with fl_2 at least about 3 times as long as wide and 2–3 times as long as fl_1; legs with at least femora largely dark brown; scrobal depression extending above inner orbit angle to within about 1 OD of anterior ocellus [gena behind eye smooth and shiny; see also notes for *P. mosei* in species checklist] **9**

9(8) Meso- and metatibiae mostly yellowish, with only subbasal brownish band over about 0.2 length of tibia [flagellum long, slender, and microsetose with comparatively short sensilla restricted to apical half of segments; fl_1 1.3 times as long as wide; fl_2 3.25 times as long as fl_1, and 4 times as long as wide; all other segments distinctly longer than wide, with fl_8 1.75 times as long as wide] . . . . ***P. froudei* (Girault)**

– Meso- and metatibiae mostly brown, only extreme base and about apical 0.2 yellowish [flagellum similar to *P. froudei*, but fl_1 twice as long as wide and fl_2 only twice as long as fl_1] . . . . ***P. mosei* Girault**

10(7) Frontovertex delimited by strong, slightly sinuate, transverse carina between inner orbits (*cf*. Fig. 303); scutellum highly convex, punctate dorsally but broadly smooth and shiny laterally and posteriorly over subvertical surfaces; basal cell bare; axilla smooth and shiny; pronotum with patch of dense white lanceolate setae on posterolateral margin anterior to mesoscutal lateral lobe . . . . ***P. migneti* (Girault)**

– Frontovertex at most delimited by abrupt but rounded angle; scutellum weakly convex and uniformly sculptured; basal cell entirely setose; axilla often smoother than scutellum, but at least distinctly coriaceous; pronotum without distinct patch of white lanceolate setae posterolaterally **11**

11(10) Legs with femora and tibiae dark, the femora with slight metallic green luster similar to mesosoma; Gt_1 with posterior margin broadly and deeply ∧-like emarginate, and Gt_2 and Gt_3 with posterior margins slightly emarginate; scutellum with mediolongitudinal sulcus over about basal half . . . . ***P. primus*** **(Bouček)**

– Legs with femora and tibiae largely to entirely yellowish or orange; Gt_1–Gt_3 with posterior margins straight transverse; scutellum without sulcus, at most with mediolongitudinal impunctate line basally **12**

12(11) Head with abruptly margined, bell-shaped scrobal depression; flagellum sometimes with some segments light colored **13**

– Head with shallow, relatively broad and indistinctly defined scrobal depression; flagellum uniformly dark **14**

13(12) Flagellum with some funicular segments light colored (at most apex of fl_2 through fl_8); eyes strongly convergent behind ocelli, minimum distance between inner orbits dorsally less than distance across posterior ocelli; metapleuron with about dorsal half finely coriaceous; pro- and mesocoxae entirely, and metacoxa at least ventrally, yellow; Gt_3 and Gt_4 transversely strigose-reticulate . . . . ***P. pulchripes*** **(Girault)**

– Flagellum entirely dark; eyes not strongly convergent behind ocelli, distance between inner orbits dorsally slightly greater than distance across posterior ocelli; metapleuron uniformly punctate or with only extreme dorsal angle smooth; all coxae dark with metallic luster, similar to mesosoma; Gt_3 and Gt_4 reticulate-punctate . . . . ***P. incola*** **(Girault)**

14(12) New Zealand; gaster elongate-lanceolate, about 3.5 times as long as wide; dorsellum bare, finely coriaceous, and divided medially by transversely carinate furrow (Fig. 321); occiput with ∩-like occipital carina (Fig. 305); forewing with ∪-like infuscate band, the band narrower than length of stigmal vein or parastigma and either interrupted below level of parastigma or with basal region not smoothly continuous with longitudinal band; Gt_3 finely coriaceous [parascrobal region strongly reticulate-punctate and without distinct, dense patch of silvery white setae near middle; metapleuron with only a few scattered setae ventrally, not densely setose over ventral half; dorsal surface of head with sculpture defined by raised ridges rather than engraved lines] . . . . ***P. resplendens*** **(Gourlay)**

– Australia; gaster ovate-lanceolate, less than 3 times as long as wide; dorsellum setose, crenulate posteriorly but not divided medially; occipital carina not continuous dorsally (Fig. 304); forewing often with broader infuscate region encompassing length of stigmal vein and parastigma, or even with distinct anterior and posterior hyaline spots; Gt_3 transversely strigose-striate or distinctly reticulate **15**

15(14) Forewing with posterior hyaline spot anterior to costal fold without white setae; procoxa, mesocoxa and at least ventral surface of metacoxa yellowish . . . . ***P. pallidicoxa* (Girault)**

– Forewing with posterior hyaline spot anterior to costal fold having white setae; coxae sometimes dark with metallic luster similar to mesosoma . . . . ***P. tasmaniensis* (Girault)**
[*P. pallidicoxa* and *P. tasmaniensis* possibly just color forms: length of frontovertex in dorsal view at most 1.4 times maximum width, and distance between upper inner orbits in dorsal view at least very slightly longer than distance across posterior ocelli; face at most with narrow, usually obscure band of silvery white setae, never extensively setose over interantennal region]

Key to females of New World species of *Proshizonotus* Girault

1 Head with dense band of silvery white setae across lower parascrobal region and interantennal region between lower inner orbits; metapleuron with dense silvery white setae ventrally, but about dorsal half smooth and shiny; dorsellum without setae; Gt_2 only narrowly exposed, smooth and shiny; head with frontovertex delineated from scrobal depression by strongly carinate, sinuate ridge between inner orbits; frontovertex with network of fine engraved lines [Brazil (1♀ USNM)] . . . . ***Proshizonotus* sp. #1**

– Head at most with interantennal region having dense silvery white setae; metapleuron entirely punctate and setose; dorsellum with setae; Gt_2 conspicuously exposed and sculptured; head with frontovertex not differentiated by carinate ridge between inner orbits; frontovertex coarsely sculptured, punctate to reticulate **2**

2(1) Forewing conspicuously patterned, with slender infuscate band behind base of marginal vein and along extreme apical margin of wing, and with broad infuscate region behind postmarginal and apical half of marginal vein, the broad infuscate region angulate toward base of wing and hyaline regions with white setae **3**

– Forewing hyaline with dark setae **4**

3(2) Procoxa yellow, similar to mesocoxa; funicle with basal 5 segments light brown and apical 3 segments yellow, and clava with about basal half yellowish and apical half light brown [Brazil (1♀ USNM)] . . . . . . ***Proshizonotus* n. sp. #2**

Procoxa dark except ventroapically, distinctly contrasting with yellow mesocoxa; funicle with basal 4 segments dark brown and apical 4 segments yellow, and clava with about basal quarter yellow and apical three-quarters dark brown [Colombia (1♀ BMNH), Ecuador (1♀ USNM), Peru (2♀♀ USNM)] . . . . ***Proshizonotus* n. sp. #3**
[very possibly just a color variant of *P.* n. sp. #2]

4(2) Scrobal depression conspicuously deep and with carinately margined ∩-like scrobal channel; coxae dark **5**
Scrobal depression often quite shallow and more or less ∧-like with channel rounded into vertex, but at most ∩-like dorsal margin abruptly angled to vertex; pro- and/or mesocoxae sometimes yellow **6**

5(4) Flagellum mostly yellowish (darker basally and apically) and elongate-slender, with all segments longer than wide; scrobe with outer vertical surface covered with white setae; upper parascrobal region with carinate scrobal margin recurved slightly toward inner orbit so margin sinuate; metasoma bicolored, the postcercal portion of syntergum and ovipositor sheaths yellow; body large, about 6 mm in length [Panama (1♀ RMNH)] . . . . ***Proshizonotus* n. sp. #4**
– Flagellum uniformly dark and short-compact, with all segments transverse; scrobe with outer vertical surface bare; upper parascrobal region with carinate scrobal margin evenly ∩-like; metasoma uniformly dark; body smaller, about 4 mm in length [Costa Rica (3♀♀ BMNH)] . . . . ***Proshizonotus* n. sp. #5**

6(4) Legs beyond coxae yellow with dark band (sometimes incomplete) medially to subapically on tibiae **7**
Legs beyond coxae entirely yellow to quite dark but tibiae not conspicuously banded **8**

7(6) Pro- and mesocoxae dark with metallic luster, similar to metacoxa; flagellum entirely dark; head in frontodorsal view with region between eyes almost 0.4 width of head across eyes [Dominican Republic (3♀♀ CNCI)] . . . . ***Proshizonotus* n. sp. #6**
– Procoxa broadly yellow ventrally and mesocoxa entirely yellow; flagellum with apical 1 or 2 segments yellowish-brown, obviously lighter than clava and remaining funicle; head in frontodorsal view with region between eyes conspicuously elongate-slender, only about 0.25 width of head across eyes [Dominican Republic (2♀♀ CNCI)] . . . . ***Proshizonotus* n. sp. #7**

8(6) Pro- and mesocoxae both dark, similar in color to metacoxa **9**
– Pro- and mesocoxae yellowish, contrasting distinctly in color to metacoxa **15**

9(8) Flagellum with at least fl_3–fl_5 yellowish (fl_2 brownish yellow); propodeum with dense white setae obscuring sculpture, and metacoxa densely setose dorsally, the seta obviously denser than on gaster laterally [Costa Rica (1♀ INBIO; 1♀ UCDC)] . . . . ***Proshizonotus* n. sp. #8**
– Flagellum uniformly dark; propodeum and metacoxa dorsally with setae not so conspicuously dense **10**

10(9) Legs with femora black, similar in color to body **11**

– Legs with femora yellow to extensively dark brown, but at least distinctly lighter in color than body **12**

11(10) Eye superficially bare; protibia dark, similar in color to femur; head with scrobal channel bare above interantennal region [Panama (1♀ RMNH)] . . . . ***Proshizonotus* n. sp. #9**

– Eye densely and conspicuously setose; protibia yellowish-brown, much lighter than femur; head with narrow band of setae extending vertically through scrobal channel from apex of interantennal region [Brazil (1♀ BMNH)] . . . . ***Proshizonotus* n. sp. #10**

12(10) Propodeum comparatively long and pentagonal in shape, with posterior margin of foramen obviously posterior to level of posterior margin of callus, and plical region longitudinally rugulose with distinct reticulate-coriaceous sculpture (Fig. 323); prepectus triangular [Chile (2♀♀ CASC, 2♀♀, 2♂♂ CNCI)] . . . . ***Proshizonotus* n. sp. #11**

– Propodeum strongly transverse with posterior margin of foramen and callus at about same level, and plical region quite smooth and shiny except for longitudinal or ∧-like median carina (Fig. 322); prepectus lunate (Fig. 315) to pedunculate (Fig. 316), the posteroventral margin more or less distinctly incurved **13**

13(12) Gaster with ∪-like anterior margin of Gt_1 carinately margined (Fig. 327); Gt_5 uniformly punctate and convex; Gt_6 punctate, similar to Gt_5 [Costa Rica (1♀ INBIO)] . . . . ***Proshizonotus* n. sp. #12**

– Gaster with ∪-like anterior margin of Gt_1 rounded into dorsal surface; Gt_5 with median, posteriorly widened band of finer punctures, and slightly concave paramedially over more coarsely sculptured regions; Gt_6 coriaceous, much more finely sculptured than Gt_5 . . . . **14**

14(13) Mesonotum, including scutellum, flat (apex of scutellum not obviously downcurved) and coriaceous-granular with quite shallow and relatively obscure punctures; lower metapleuron coriaceous; metafemur yellow; vertex bright bluish-green to level of anterior ocellus and dark posterior to anterior ocellus [Brazil (1♀ CNCI)] . . . . ***Proshizonotus* n. sp. #13**

– Mesonotum, including scutellum, obviously convex, with distinct shiny punctures and rosetteform subsculpture on interstices; lower metapleuron extensively punctate (*cf*. Fig. 315) metafemur brownish except lighter in color basally and apically; vertex more or less evenly dark with dull metallic green luster under some angles of light [Brazil (1♀ CNCI)] . . . ***Proshizonotus* n. sp. #14**

15(8) Interantennal region covered with white lanceolate setae, the setae so dense as to form reflective surface and obscure cuticle; axilla coriaceous, with fine lines differentiating more or less triangular sculpture, and with setae arising from micropunctures [Brazil (1♀ BMNH), Paraguay (1♀ CNCI)] . . . . ***Proshizonotus* n. sp. #15**

– Interantennal region with unmodified setae, similar to setae on lower face and parascrobal region; axilla distinctly punctate, similar to scutellum **16**

16(15) Flagellum with one or more segments yellow to yellowish-brown **17**
– Flagellum uniformly brown to black **19**

17(16) Flagellum with at least fl_2 and fl_3 yellow, and often fl_2–fl_5 yellow, but dark apically [Costa Rica (1♀ INBIO), Ecuador (1♀ CNCI, 1♀ UCDC, 2♀♀ USNM)] . . . . ***Proshizonotus* n. sp. #16**
– Flagellum with funicle almost entirely yellow or at least yellow apically and darker basally **18**

18(17) Mesonotum with distinct rufous luster; head with scrobal depression bare; flagellum with fl_5–fl_7 yellow, but other segments dark [Costa Rica (1♀ INBIO)] . . . . ***Proshizonotus* n. sp. #17**
– Mesonotum green; head with narrow band of setae extending vertically through scrobal channel from apex of interantennal region; flagellum with most segments yellowish, except fl_8 and some basal segments darker brown [Brazil (1♀ CNCI)] . . . . ***Proshizonotus* n. sp. #18**

19(16) Frontovertex rugulose, with irregular sculpture; head with very shallow Λ-like scrobes and with narrow band of setae extending vertically through scrobal channel from apex of interantennal region; occiput variably distinctly concave with shallow paramedial depressions, and at least partly smooth, shiny and more sparsely setose behind eye toward foramen [Ecuador (1♀ USNM), Peru (1♀ USNM)] . . . . ***Proshizonotus* n. sp. #19**
– Frontovertex with distinct setiferous punctures and rosetteform subsculpture; scrobes variably deep, but at least abruptly margined relative to parascrobal region, and with channel bare; occiput in single plane and uniformly sculptured and setose **20**

20(19) Gena with carinate margin only immediately adjacent to base of mandible; syntergum in lateral view with suture dividing syntergum developed as sulcate line extending distinctly posterior to level of cercus; scrobal channel smooth and shiny; Gt_5 uniformly punctulate; POL and LOL slightly less than minimum diameter of posterior ocellus [Costa Rica (1♀ MUCR), Ecuador (1♀ USNM)] . . . . ***Proshizonotus* n. sp. #20**
– Gena with slender flange extending above level of lower orbit; syntergum in lateral view with suture dividing syntergum developed as deep furrow extending posteriorly only to level of cercus; scrobal channel transversely strigose; Gt_5 with median, posteriorly widened region of minute punctures, and anterolateral regions of much larger punctures; POL and LOL greater than minimum diameter of posterior ocellus [Peru (1♀ USNM)] . . . . ***Proshizonotus* n. sp. #21**

LYCISCINI: Genera restricted to the New World

Composite description. *Head* variable, but eye less than twice as high as broad.

Antenna with pedicel about as long as clava; funicle with 8 segments; preclaval segment without differentiated sensory region; clava 1-segmented with apical or apicoventral sensory region.

Mesosoma. Pronotum with median line. Mesoscutum with entire, sulcate notauli. Scutellum with distinct, variably structured marginal rim differentiated by crenulate furrow; without axillar carina; and with frenal arm at most evident as very short, smooth and shiny line projecting from posterolateral margin of scutellum. Dorsellum bare (except female *Hadroepistenia erwini* with very few long setae, Fig. 359), and at least partly overlain by scutellar lip (e.g., Figs 349, 383). Prepectus pedunculate (Figs 348, 349, 383, 416, 417, 426, 444). Upper mesepimeron variably setose; lower mesepimeron bare. Metapleuron uniformly punctate and setose.

Legs. Protibia without dorsal spicules; metacoxa with exterior surface bare; metafemur neither enlarged or ventrally dentate; metatibial spurs only about as long as apical width of tibia.

Metasoma. Petiole of male in dorsal view transverse; in ventral view broadly membranous. Gaster with several terga margined laterally. Syntergum of female without continuous suture anterior to cerci (e.g., Fig. 355).

Amazonisca Hedqvist
Figs 336–343

Amazonisca Hedqvist, 1959: 196. Type species: *Amazonisca batesi* Hedqvist, by original designation and monotypy.

Diversity. One described and at least 11 undescribed species known from the Neotropical region [Brazil, Colombia, *Costa Rica, *Panama, *Paraguay, Peru, *Venezuela].

***Amazonisca batesi* Hedqvist**, 1959: 197–198; ♀ holotype (OXUM; missing according to C. O'Toole, *in lit.*). DISTRIBUTION: Brazil, Colombia?, Peru?.

Biology. Unknown.

Description. *Head* (Figs 336–340). Scrobal depression extending to within about 1 OD of anterior ocellus, with outer margin carinate above level of interantennal region and with ∩-like to somewhat m-like dorsal margin (Figs 336–339) abruptly recurved from channel surface to form smooth and shiny vertical face above transversely striate-reticulate to punctate-reticulate scrobes and channel. Face with parascrobal region punctate-reticulate to rugulose. Interantennal region abruptly margined, acutely angled dorsally with dorsal angle gradually sloped to bottom of scrobal depression. Vertex with posterior ocellus distinctly separated from inner orbit but by distance less than 1 OD. Occiput with occipital carina laterally (Fig. 340). Gena without genal flange evident in lateral view when head appressed to prothorax. Eye conspicuously microsetose; in dorsal view with upper inner orbits subparallel or slightly recurved toward each other behind posterior ocelli.

Antenna inserted below level of lower orbits, with dorsal margin of torulus at or slightly below lower margin of eye.

Mesosoma variably green to cupreous dorsally, or distinctly bicolored with mesonotum and sometimes pronotum having abruptly delineated cupreous/black regions contrasting with metallic blue or green regions. Pronotum bell-shaped, and about as long as wide or only slightly wider (Fig. 340). Mesoscutum punctate with rosetteform interstices. Scutellum, at least in female, with dorsal surface moderately convex in lateral view, curved down to reflexed marginal rim not projecting distinctly over propodeum (Fig. 341). Dorsellum usually mostly concealed under scutellar lip. Prepectal panel flat. Upper mesepimeron with non-setose region smooth to finely aciculate-coriaceous; lower mesepimeron coriaceous to punctate-reticulate. Propodeum (Figs 342, 343) with variably distinct postspiracular furrow, with longitudinal paraspiracular furrow differentiating callus from plical region, and with variably distinct crenulate furrow along at least lateral quarter of anterior margin; callus variably setose but at least bare within postspiracular furrow; plical region bare, with inverted Y-like (Fig. 343) or sinuately ∧-like median carinal complex (Fig. 342), the obliquely angled posterior carinae delineating lunate region along foramen (Figs 342, 343), and with panel sometimes having oblique carina(e) extending from posterolateral margin, but otherwise smooth and shiny or variably distinctly coriaceous (meshlike sculpture defined by impressed lines, not by raised ridges).

Forewing variably distinctly infuscate, at least female without separate dark brown regions behind parastigma and stigmal vein and with or without distinct hyaline regions having white setae behind marginal vein.

Legs. Profemur with distinct subapical ventral angulation; protibia with sinuate, carinate ventral margin over about basal half. Metacoxa variably densely setose but at least indistinctly carinate dorsally.

Metasoma. Gaster with Gt_1 smooth and shiny; Gt_2 at least very narrowly exposed (Figs 342, 343), usually evident for distance about equal to one-third to half length of Gt_1 or Gt_3, and usually transverse-striate to coriaceous at least basally. Hypopygium extending to level only slightly beyond apex of metacoxa, about to level of posterior margin of Gt_3.

Remarks. The unique female holotype of *A. batesi* was not found. I have not seen a female that I recognize as *A. batesi* or the specimens on which De Santis (1979) based his Colombia and Peru distribution records for this species. Based on the original description, *A. batesi* probably is most similar to the species keyed below as *Amazonisca* n. sp. #8. Hedqvist (1959, fig. 7*n*) illustrated the gaster of *A. batesi* as having Gt_2 entirely concealed in dorsal view and Gt_4 (apparent Gt_3) as transverse, about 1.5 times as wide as long. The single female identified as *Amazonisca* n. sp. #8 has Gt_2 distinctly exposed in dorsal view and Gt_4 about 1.3 times as long as wide, in addition to having Gt_5 and the syntergum longer than illustrated for *A. batesi*.

Species I classify in *Amazonisca* share a characteristic scrobal structure. The scrobal depression does not extend to the anterior ocellus and it has a distinct ∩- or somewhat m-like dorsal margin so that there is at least a very slender, vertical, smooth and shiny dorsal rim relative to the bottom of the scrobal channel (Figs 336–339). In some species (e.g., *Amazonisca* n. sp. #1) the extreme dorsal part of the channel is also smooth, shiny, and somewhat undulating (Fig. 337), whereas in other species the channel is flat and uniformly reticulate to transversely striate below the reflexed dorsal rim (Figs 338, 339). This suggests a grade of structure intermediate between the smooth, undulating scrobal channel characteristic of *Epistenia*, *Shedoepistenia* and *Urolycisca*, and the uniformly sculptured and flat channel characteristic of such genera as *Hedqvistia*, *Lycisca*, *Neoepistenia* and *Romanisca*. Different species of *Amazonisca* also have sculpture patterns of the propodeum similar to those exhibited by members of the other two groups of genera listed above. Females of some species of *Amazonisca* have only a very short median carina anteriorly, which divides posteriorly into a sinuately Λ-like composite structure, and smooth and shiny plical panels except sometimes for short crenulae along the anterior margin and/or oblique carinae posterolaterally on the plical region (Fig. 342). This propodeal sculpture pattern is similar to that of most *Epistenia*, *Shedoepistenia* and *Urolycisca* females. Females of other *Amazonisca* species have a propodeum with a longer median carina so that the composite structure is in the form of an inverted Y, and some of these females have the plical panels quite distinctly sculptured (Fig. 343). The latter sculpture pattern is more similar most *Lycisca*, *Hedqvistia*, *Neoepistenia* and *Romanisca* females. The scrobal and propodeal character transformations may indicate *Amazonisca* comprises a grade of structure, consisting of species having some sort of relationship among such genera as *Epistenia*, *Shedoepistenia* and *Urolycisca*, as well as *Lycisca*, *Hedqvistia*, *Neoepistenia* and *Romanisca*. Some species of *Amazonisca* have a band of white lanceolate setae across the face near the level of the toruli, as does *Hedqvistia* n. sp. #2. This latter species also has a scrobal structure very similar to that characteristic of species of *Amazonisca* and has infuscate forewings with an anterior and posterior hyaline spot having white setae, similar to those species of *Amazonisca* with a setal band on the face. These shared features further suggest a possible relationship between *Amazonisca* and *Hedqvistia*.

When Hedqvist (1959) established *Amazonisca* he stated that the genus is in some respects similar to *Heydenia* and, like *Paralycisca*, has “the second segment of the abdomen triangular” (i.e., triangular in lateral view and not exposed dorsally). However, Gt_2 is exposed in at least female *Amazonisca*, though this is not always obvious because the exposed region is sometimes smooth and shiny similar to Gt_1 (usually some coriaceous sculpture is evident basally on Gt_2, under or just beyond the apex of Gt_1). Parsimony analyses retrieved *Paralycisca* as the sister group of *Amazonisca* + *Scaphepistenia*, as one of very few resolved relationships within the New World Clade of genera prior to successive weighting (Fig. 1*a*). This relationship probably was retrieved because these three genera share a smooth and shiny Gt_1 (56:0, 57:0) as well as an only narrowly exposed Gt_2 (58:1, 59:1). Propodeal structure of *Paralycisca* (Fig. 392) is very similar to that of some *Amazonisca*, and individuals differ from *Amazonisca* primarily by their raised, cristate upper parascrobal region (Figs 388, 389).

Two species groups can be recognized within *Amazonisca* based on the lower face being uniformly setose (Fig. 336) or having a variably distinct region of dense, silvery white lanceolate setae on the interantennal region and/or lower parascrobal regions (Figs 337–339). The male keyed below as *Amazonisca* sp. M#1 has a distinctively flat scutellum and Gt_2 is extensively exposed and strongly sculptured compared with males of other species. The tergum is quadrangular, exposed for a distance equal to about half the length of Gt$_1$ or Gt$_3$, and strongly coriaceous to subreticulate medially. Because of these features and structure of its scrobal depression, this male resembles a male of *Hedqvistia*; however, the propodeum has an inverted Y-like median carinal complex and the plical panels are quite shiny with fine coriaceous sculpture, similar to females of some species of *Amazonisca*. Furthermore, known species of *Hedqvistia* have Gt$_2$ more distinctly reticulate-punctate.

Key to species of *Amazonisca* Hedqvist

1 Female **2**

– Male **12**

2(1) Head without distinct patch of white lanceolate setae on lower parascrobal region or interantennal region (Fig. 336); forewing with variably distinct mediolongitudinal infuscate region, but infuscate region not recurved to touch parastigma **3**

– Head with patch of white lanceolate setae on lower parascrobal region and/or interantennal region (Figs 337–339); forewing more extensively infuscate, with infuscate region at least recurved to touch parastigma and wing often having distinct hyaline region with white setae behind part of marginal vein **5**

3(2) Flagellum uniformly dark; mesosoma with pronotum, mesoscutal lateral lobes and axillae blue, mesoscutal medial lobe and scutellum cupreous [Venezuela (3♀♀ USNM)] . . . . ***Amazonisca* n. sp. #1**

– Flagellum partly light-colored; mesosoma with pronotal collar and mesonotum almost uniformly cupreous to red **4**

4(3) Mesosoma with pronotum and mesoscutum uniformly punctate-reticulate; gaster conspicuously elongate, at least 8 times as long as wide and about 3 times as long as mesosoma, with Gt$_4$ about 1.7 times as long as wide and Gt$_5$ about 2.9 times as long as wide; syntergum elongate, about as long as combined length of Gt$_1$–Gt$_3$, with postcercal and precercal length subequal; flagellum with middle segments yellowish; hind leg with extreme base of tibia and apex of femur dark; scrobal channel uniformly, transversely strigose, and with surface flat below recurved smooth dorsal margin [Costa Rica (2♀♀ INBIO)] . . . . ***Amazonisca* n. sp. #2**

– Mesosoma with lateral panel of pronotum and vertical face of mesoscutal lateral lobe punctate-alveolate, the punctures obviously larger than on dorsal surface of sclerites (*cf*. Fig. 340); gaster less than 5 times as long as wide and only twice as long as mesosoma, with Gt$_4$ slightly wider than long and Gt$_5$ only about 1.3 times as long as wide; syntergum short, only about as long as combined length of Gt$_1$ and Gt$_2$, and with postcercal length about twice precercal length; flagellum with basal segments yellowish; hind leg uniformly yellowish-orange; scrobal channel more or less distinctly undulating and with surface below recurved dorsal margin smoother and shinier than more ventral surface of channel [Costa Rica (1♀ UCDC), Panama (1♀ RMNH)] . . . . ***Amazonisca* n. sp. #3**

5(2) Gaster with brown setae on apical 2 terga, except laterally on penultimate tergum **6**

– Gaster with whitish setae on apical 2 terga **8**

6(5) Body small, about 3.5 mm in length; Gt_5 about 1.4 times as long as wide; head and mesonotum greenish with yellowish-cupreous luster under some angles of light; OOL equal to, and POL greater than, minimum diameter of posterior ocellus [Peru (1♀ USNM)] . . . . ***Amazonisca* n. sp. #4**

– Body larger, about 6 mm in length; Gt_5 twice as long as wide or longer; head with some bright cupreous areas between eyes above scrobal depression and mesonotum with at least anterior half of mesoscutal medial lobe and scutellum cupreous; OOL and POL both distinctly less than minimum diameter of posterior ocellus **7**

7(6) Mesoscutal medial lobe entirely cupreous; pronotal collar with large cupreous region medially; syntergum with cerci at about basal third, precercal: postcercal length about 1:2; gaster without bluish-green regions dorsally on Gt_3–Gt_5; metacoxa with at least apical two-thirds yellow; metapleuron largely cupreous in distinct contrast to mesopleuron [Venezuela (1♀ CNCI)] . . . . ***Amazonisca* n. sp. #5**

– Mesoscutal medial lobe broadly bluish posteriorly; pronotal collar uniformly bluish-purple; syntergum with cerci near base, precercal:postcercal length about 1:8 (precercal length based on length of basal setose area to midpoint of cercus); gaster with bluish-green spot dorsolaterally adjacent to carina on Gt_3, and with longer bands adjacent to carina on Gt_4 and Gt_5; metacoxa with about apical quarter to third yellow; metapleuron greenish, similar to mesopleuron [Brazil (1♀ USNM)] . . . . ***Amazonisca* n. sp. #6**

8(5) Head with very dense, continuous band of white lanceolate setae across interantennal region and lower parascrobal region to malar sulcus, the band seen under any angle of light; Gt_4 quadrate to about 1.2 times wider than long; Gt_5 about 1.25 times as long as basal width between carinae; frontovertex rugulose-reticulate, without distinct pattern of cells or punctures; pedicel and clava dark brown [Brazil (1♀ BMNH), Peru (1♀ USNM)] . . . . ***Amazonisca* n. sp. #7**

– Head without such a dense band of setae across both interantennal region and lower parascrobal region (Fig. 337); other features partly different **9**

9(8) Scape and pedicel dark with metallic green luster, similar to head; mesosoma reddish-cupreous dorsally except pronotal neck, notaular lines, and mesoscutum posteriorly, greenish; metafemur with dark longitudinal band over about ventroapical two-thirds [Gt_2 exposed for distance equal to about one-third length of Gt_1, and Gt_4 about 1.3 times as long as wide] [Brazil (1♀ CNCI)] . . . . ***Amazonisca* n. sp. #8**

– Scape and often pedicel yellow to brownish but at least much lighter in color than head; mesosoma dorsally with different color pattern, without distinct green band along posterior margin of mesoscutum; metafemur entirely yellow or at most with extreme apex dark **10**

10(9) Vertex with distance between anterior ocellus and scrobal depression equal to width of ocellus or POL; lower face with only small patch of silvery white setae on parascrobal region adjacent to torulus (Fig. 338); mesosoma with pronotal collar and mesonotum cupreous; forewing with anterior hyaline region extending length of marginal vein and more or less evenly attenuated posteriorly [Brazil (1♀ CNCI)] . . . . ***Amazonisca* n. sp. #9**

– Vertex with distance between anterior ocellus and scrobal depression distinctly greater than width of ocellus or POL; lower face with dense band of silvery white lanceolate across parascrobal region (Fig. 339); mesosoma with at least mesonotum largely metallic green with only slight cupreous luster; forewing either with hyaline region not extending length of marginal vein or only narrowly along marginal vein over about basal half **11**

11(10) Gaster dark, similar to mesosoma, and only about 4 times as long as greatest width; Gt_4 transverse, about 1.3 times wider than long; forewing with triangular hyaline region extending along about apical half of marginal vein and attenuated posterobasally; head dorsally with distinct cupreous luster [Panama (2♀♀ RMNH)] . . . . ***Amazonisca* n. sp. #10**

– Gaster yellow, contrasting distinctly in color with dark mesosoma, and elongate-lanceolate, about 7 times as long as greatest width; Gt_4 quadrate, slightly longer than wide; forewing with hyaline region extending narrowly along marginal vein basally and widened slightly behind parastigma; head green dorsally, similar to rest of head [Brazil (1♀ CNCI)] . . . . ***Amazonisca* n. sp. #11**

12(1) Mesosoma dorsally with bright cupreous spot medially on pronotal collar and anteriorly on mesoscutal lateral lobe and axilla, and with mesoscutal medial lobe and scutellum entirely bright cupreous, the cupreous regions contrasting distinctly with bright bluish regions elsewhere [Venezuela (1♂ CNCI)] . . . . ***Amazonisca* n. sp. #5**

– Mesosoma usually greenish dorsally, but if dull cupreous then at least without distinctly contrasting cupreous and blue regions **13**

13(12) Scutellum in lateral view flat, virtually in one plane, and with marginal rim not differentiated by distinctly crenulate groove; dorsellum in dorsal view exposed between scutellum and propodeum; pronotal collar and mesonotum dull rufous; Gt_2 exposed for distance equal to about half length of Gt_3, and conspicuously coriaceous to almost reticulate medially [Brazil (1♂ BMNH)] . . . . ***Amazonisca* sp. M#1**

– Scutellum in lateral view distinctly convex, curved down to propodeum and with distinct, crenulate marginal rim; dorsellum in dorsal view concealed under scutellar lip; pronotum and mesonotum variable in color, under some angles of light sometimes greenish with slight cupreous luster; Gt_2 exposed for distance at most equal to about one-third length of Gt_3 and then smooth and shiny to transversely coriaceous **14**

14(13) Mesonotum with distinct umbilicate punctures laterally on vertical face and much smaller punctures dorsally on horizontal surface (*cf*. Fig. 340); metatibia uniformly yellowish-brown; metacoxa with dense band of setae along entire dorsal length [Costa Rica (1♂ UCDC)] . . . . ***Amazonisca* sp. #3**

– Mesonotum uniformly reticulate-punctate; metatibia brown with white band basally; metacoxa setose dorsobasally, but without distinct band of setae along length **15**

15(14) Forewing hyaline or only very slightly infuscate behind parastigma, the wing almost hyaline except for posteriorly widened light brown region behind stigma [Brazil (2♂♂ CNCI)] . . . . ***Amazonisca* sp. M#2**

– Forewing faintly but distinctly infuscate behind parastigma, forming or almost forming ∪-like infuscate region joining parastigma and stigma, with hyaline region behind marginal vein having white setae; pronotal collar and mesonotum dull rufous [Brazil (1♂ BMNH), Paraguay (1♂ CNCI)] . . . . ***Amazonisca* sp. M#3**
[possibly just size and color variant of *Amazonisca* sp. M#2]

***Epistenia* Westwood**
Figs 344–355

Epistenia Westwood *in* Griffith and Pidgeon, 1832: 432. Type species: *Epistenia coeruleata* Westwood, by monotypy.

Dasyglenes Ashmead, 1888*b*: 174–175. Type species: *Dasyglenes osmiae* Ashmead, by monotypy. Synonymy by Viereck (1916: 484).

Idiobia Brèthes, 1927: 330. Type species: *Idiobia schmidti* Brèthes, by monotypy. Synonymy by Bouček (1958: 381).

Epistenia (*Punctepistenia*) Gibson, **new subgenus**. Type species: *Epistenia odyneri* Ashmead *in* Davidson (1896), by present designation.

Diversity. Twenty-one nominal species plus an unknown number of undescribed species known from the New World [*Nearctic* — *Canada, United States. *Neotropical* — *Argentina, *Bolivia, Brazil, Chile, Colombia, Costa Rica, *Dominican Republic, Ecuador, French Guiana, Guyana, *Mexico, *Nicaragua, Panama, Paraguay, Peru, *Suriname, *Trinidad, *Venezuela].

***Epistenia americana* Girault**, 1912[122]: 172–173; ♀ holotype (ZMHB: 31951). Possibly a synonym of *E. scutellata* Brèthes (Hedqvist 1961: 99). DISTRIBUTION: Paraguay.

✓ ***Epistenia* (*Punctepistenia*) *basalis* Walker**, **new status**. *Epistenia basalis* Walker, 1862: 392; ♀ holotype (BMNH: 5.904). DISTRIBUTION: Brazil.

***Epistenia bella* Strand**, 1911*a*: 153; type status uncertain. DISTRIBUTION: Peru.

✓ ***Epistenia* (*E.*) *burksi* Hedqvist**, 1968: 3–4; ♀ holotype (USNM: 69556). DISTRIBUTION: USA.

***Epistenia chilensis* Brèthes**, 1916: 27–28; type status uncertain. DISTRIBUTION: Chile.

✓ ***Epistenia* (*E.*) *coeruleata* Westwood** *in* Griffith and Pidgeon, 1832: 432; ♀ holotype (BMNH). DISTRIBUTION: *Canada, USA.

= ✓ *Epistenia (E.) osmiae* Ashmead, 1888*b*: 174; ♀ holotype (USNM: 41400). Synonymy by Hedqvist (1968: 7).

***Epistenia conica* Brèthes**, 1909: 226; type status uncertain. DISTRIBUTION: Paraguay.

***Epistenia* (*Punctepistenia*) *cyanea* (Fabricius)**, **new status**. *Chalcis cyanea* Fabricius, 1804: 164; ♀ lectotype (ZMUC) designated by Bouček and Delvare (1992: 17). Combination by Bouček and Delvare (1992: 17). DISTRIBUTION: Bolivia, Brazil, Costa Rica, French Guiana, Guyana.

***Epistenia gemmata* Girault**, 1912[122]: 173–174; ♀ holotype (ZMHB: 31952). Possibly a synonym of *E. conica* Brèthes (Hedqvist 1961: 99). DISTRIBUTION: Paraguay.

***Epistenia goethei* Girault**, 1913[157]: 56; ♀ holotype (ZMHB). DISTRIBUTION: Paraguay.

***Epistenia liguensis* Brèthes**, 1916: 28; type status uncertain. DISTRIBUTION: Chile.

✓ ***Epistenia* (*E.*) *media* Hedqvist**, 1968: 5–7; ♀ holotype (USNM: 69557). DISTRIBUTION: USA.

✓ ***Epistenia* (*Punctepistenia*) *odyneri* Ashmead**, **new status**. *Epistenia odyneri* Ashmead *in* Davidson, 1896: 336; ♀ holotype (USNM: 41399). DISTRIBUTION: *Mexico, USA.

✓ ***Epistenia* (*E.*) *polita* (Say)**. *Spalangia politus* Say, 1829: 79; ♀ neotype (USNM) designated by Gahan (1951: 174). Combination by Gahan (1951: 174). DISTRIBUTION: USA.

✓ ***Epistenia* (*E.*) *regalis* Cockerell**, 1934: 228; ♀ holotype (MCZC: 20132). DISTRIBUTION: USA.

✓ ***Epistenia* (*E.*) *rufipes* Cameron**, 1884: 130; ♀ holotype (BMNH: 5.906). DISTRIBUTION: Panama.

✓ ***Epistenia* (*Punctepistenia*) *rufipes* (Cameron)**, **new combination**. *Lycisca rufipes* Cameron, 1913: 123–124; described from both sexes, ♂ syntype remaining in BMNH (5.897). Preoccupied by *Epistenia rufipes* Cameron (1884); a replacement name is not provided at this time until synonymy is clarified. DISTRIBUTION: Guyana.

✓ ***Epistenia* (*E.*) *schmidti* (Brèthes)**. *Idobia schmidti* Brèthes: 1927: 330–331; ♂ holotype (DEIC). Combination by Bouček (1958: 381). DISTRIBUTION: Costa Rica.

***Epistenia scutellata* Brèthes**, 1909: 226–227; type status uncertain. DISTRIBUTION: Paraguay.

***Epistenia westwoodi* (Guérin-Méneville)**; type status uncertain. *Lycisca westwoodi* Guérin-Méneville, 1844: 416. Combination by Hedqvist (1961: 99). DISTRIBUTION: Colombia.

Excluded species:

Epistenia cupreoviridis Brèthes. Transferred to *Lycisca*.

Epistenia imperialis Smith, 1857: 127–128; ♀ holotype, location unknown.

Note: Smith (1857) described *E. imperialis*, apparently from a single female, from Sarawak as follows: “Head and thorax of a rich purple, the metathorax with tints of bright green; the legs black, the apex of the joints rufo-piceous as well as the apical joints of the tarsi. Abdomen: of changeable hues, partaking of tints of blue, purple, violet or green, in different lights; the three basal segments deeply emarginate above, with central longitudinal depression extending to their base; the ovipositor thick and pubescent, two-thirds of the length of the abdomen.” Because of the type locality there is no doubt that this female is incorrectly classified in *Epistenia*, but correct classification, even to tribe or subfamily, is uncertain. No Lyciscini is known to have the basal three segments deeply emarginate. Furthermore, thick, setose ovipositor sheaths protruding for two-thirds the length of the gaster are uncharacteristic of any cleonymine.

Epistenia quadriplagiata Walker. Transferred to *Scaphepistenia*.

Epistenia scutata Walker. Transferred to *Scaphepistenia*.

Biology. Recorded hosts are twig-nesting aculeates of the families Apidae, Eumenidae, Megachilidae and Sphecidae (Noyes 1998).

***Epistenia* (*Epistenia*) Westwood**

Figs 345, 348, 350, 353, 354

Description. *Head* (Figs 344–346). Scrobal depression variably deep, when comparatively shallow then more or less bell-shaped and not extending to anterior ocellus (Fig. 345), with outer margins abrupt but not carinate and with upper parascrobal region on similar plane as interantennal region, but when scrobal depression deep then often with upper parascrobal region above plane of interantennal region and outer margin of channel reflexed into carina that sometimes extends to anterior ocellus (Fig. 344), but in neither instance with carinate dorsal margin below anterior ocellus (*cf. Amazonisca*); scrobal depression with scrobes on slightly higher plane than channel, hence channel surface usually appearing at least very slightly depressed relative to scrobes or undulating above interantennal region, the region sometimes divided medially by carina and with scrobes and channel usually smooth and shiny or with scrobes finely coriaceous to transversely strigose. Face with parascrobal region reticulate-alveolate to rugulose. Interantennal region acutely angled and abruptly to carinately margined dorsally, with dorsal angle often ridgelike or projecting above plane of surface as small process. Vertex with posterior ocellus separated from inner orbit by distance slightly less than to slightly greater than 1 OD. Gena with evident genal flange when head appressed against prothorax, the flange sometimes extending dorsally to level of occipital foramen but occiput without occipital carina laterally (Fig. 346). Eye at least very sparsely microsetose and often densely and conspicuously setose; in dorsal view with upper inner orbits at least slightly and often distinctly divergent from about level of anterior margin of posterior ocellus. Torulus with dorsal margin at or below lower margin of eye.

Mesosoma usually variably green to violaceous or more or less cupreous dorsally, but never with mesoscutal medial lobe entirely and lateral lobe anteriorly bright cupreous, and never with cupreous spots on pronotum. Pronotum with distinctly differentiated transverse-rectangular collar (Fig. 347). Mesonotum punctate with rosetteform interstices. Scutellum in lateral view with marginal rim projecting posteriorly at least to level of base of gaster (Fig. 348) and, if prolonged into a spine, sometimes to about level of posterior margin of Gt_1. Dorsellum usually mostly concealed under scutellum. Prepectal panel flat and uniformly colored. Upper mesepimeron extensively punctate-setose (Fig. 348); lower mesepimeron usually primarily coriaceous and much more finely sculptured than upper mesepimeron. Propodeum (Figs 350, 351) with variably distinct paraspiracular ridge separating postspiracular furrow behind spiracle from longitudinal paraspiracular furrow, which differentiates callus from bare plical region, and with variably distinct crenulate furrow along at least lateral quarter of anterior margin; callus variably setose, but at least bare within postspiracular furrow; plical region of female short and at least partly longitudinally crenulate, but surface otherwise quite shiny with at most obscure coriaceous subsculpture, and either with smooth band along foramen (Fig. 350) or with lunate region delineated by carinae that recurve anteriorly to form short median carinae or that recurve paramedially to delimit smooth medial region (Fig. 351); plical region of male with more distinct, inverted Y-like median carinal complex, and with surface otherwise partly coriaceous and/or longitudinally carinate.

Forewing hyaline or disc extensively and sometimes quite strongly infuscate, but never with conspicuous bimaculate pattern or with white setae in patches.

Legs. Profemur with or without subapical ventral angulation or tooth; protibia without carinate ventral edge (Fig. 354). Metacoxa distinctly carinate dorsally, but bare exterior to carina except often dorsobasally (Figs 348, 353) (inner surface of coxa often with line of sparse setae near dorsal surface, but interior to carina).

Metasoma. Gaster with Gt_1 smooth and shiny; Gt_2 usually either not visible dorsally (Fig. 352) or as only sublinear strip, but if secondarily more extensively exposed due to telescoping then smooth and shiny or at most finely coriaceous and with setose/sculptured region of laterotergite attenuated dorsally to acute angle (Fig. 353). Hypopygium extending to level only slightly beyond apex of metacoxa, to level of posterior margin of apparent Gt_2.

***Epistenia* (*Punctepistenia*) new subgenus**

Figs 344, 346, 347, 349, 351, 352, 355

Description. Similar in structure to nominate subgenus except for following:

Head with dorsal angle of interantennal region sometimes expanded into large, rounded lobe (Fig. 344).

Mesosoma. Scutellum in lateral view with marginal rim sometimes extending only over about basal half of propodeum (Fig. 349); lower mesepimeron often punctate-reticulate or otherwise only slightly less coarsely sculptured than upper mesepimeron (Fig. 349).

Legs. Protibia ventrally sometimes with sinuate, carinate margin over about basal half; metacoxa sometimes setose dorsally along length exterior to dorsal carina (Fig. 352).

Metasoma. Gaster with Gt_1 extensively to entirely punctate (Fig. 351).

Etymology. Combination of the Greek word *punctum* (small hole, dot) and *Epistenia*, in reference to the sculpture of the first gastral tergum.

Type species. *Epistenia odyneri* Ashmead, 1896 (in Davidson 1896), by present designation.

Remarks. My concept of *Epistenia* includes those New World species of Lyciscini that have an evident genal flange (Fig. 346) and Gt_2 in dorsal view either entirely concealed under Gt_1 or with only a sublinear smooth strip exposed (Fig. 352). In some specimens, Gt_2 is further exposed because the gaster is inflated and the terga are distended, but in such instances the secondarily exposed dorsal region of Gt_2 is smooth and shiny. More significantly, in lateral view the sculptured/setose region is triangular, attenuated dorsally to an acute angle at the posterior margin of the tergum (Fig. 353). I recognize the subgenus *E.* (*Epistenia*) for species with Gt_1 smooth and shiny, and the new subgenus *E.* (*Punctepistenia*) for species with Gt_1 distinctly sculptured. Parsimony analysis retrieved *E.* (*Epistenia*) and *E.* (*Punctepistenia*) as sister taxa (Fig. 1*a*), though this relationship was lost after successive weighting (Figs 1*b*, 1*c*).

Individuals of both subgenera are quite variable in scrobal structure. The scrobal depression may or may not extend to the anterior ocellus and the outer margin of the channel may or may not be carinately reflexed, but at least the lateral carinae never merge dorsally to form an entirely carinate dorsal margin below the anterior ocellus. Those species with quite shallow scrobes have a uniformly weakly convex head reminiscent of some species of NW *Proshizonotus* (*cf*. Figs 345, 301). All known species of *E.* (*Epistenia*) also have the scutellum projecting posteriorly at least to the base of the gaster (Fig. 348), the metacoxa bare exterior to a distinct dorsal carina, and the protibia without a sinuate carina ventrobasally. A few species have the pro- or mesocoxae yellow, but at least females of the very few species with both coxae distinctly yellowish also have the gaster ventrally yellowish. I have seen females of only two species of *E.* (*Epistenia*) with the lower mesepimeron punctate rather than coriaceous, one from Ecuador (CNCI) that also has the mesocoxa yellow and one from Venezuela (CNCI) that has all coxae dark. The two are morphologically quite similar and the one with the yellow mesocoxae is very similar to *E.* (*Punctepistenia*) n. sp. #1 except for its smooth and shiny Gt_1.

Within *E.* (*Punctepistenia*), females of three known species do not have the scutellum projecting posteriorly to the base of the gaster (Fig. 349) and they differ from females of other species of the subgenus by having yellowish mesocoxae. Females of two of the species have both the pro- and mesocoxae yellowish and differ from all other species assigned to *Epistenia* by having the metacoxa setose along its dorsal length (Fig. 352) and by having the protibia ventrally carinate over about its basal half. Because of their scrobal structure, longitudinal crenulate propodeum and sculptured Gt_1, individuals of *E.* (*Punctepistenia*) resemble those of *Urolycisca* and *Proglochin*, but both the latter genera have Gt_2 exposed to a varying extent and distinctly sculptured. Females of *Protoepistenia* share a smooth Gt_1 and concealed Gt_2 with *E.* (*Epistenia*), but differ by lacking an evident genal flange and by having the metacoxa setose dorsally. Females of *Scaphepistenia* share a smooth Gt_1, evident genal flange and dorsally bare metacoxa with *E.* (*Epistenia*), but have Gt_2 variably extensively exposed and finely, transversely strigose-coriaceous if only narrowly exposed. Individuals of *Shedoepistenia* also always have Gt_1 smooth and some have an evident genal flange and posteriorly protuberant scutellum similar to *E.* (*Epistenia*), but they always have Gt_2 exposed and punctate-reticulate, and the metacoxa setose dorsally. Individuals of *Amazonisca* are differentiated primarily by their dorsally carinate and sculptured scrobal depression as well as by Gt_2 being at least narrowly exposed, whereas individuals of *Paralycisca* are distinguished by their cristate upper parascrobal region. Because these genera simply represent different combinations of features, some or all of the genera almost certainly represent grades of structure; however, I was unable to resolve likely relationships because transformation of none of the features seem congruent. The generic concepts proposed, although undoubtedly oversplit, serve to compartmentalize the known morphological diversity. In the future, more comprehensive collections may help resolve evolution of the features and lead to a more natural generic classification.

Epistenia is the only genus of Lyciscini in America north of Mexico. Hedqvist (1968) recognized six species from the Nearctic region, including *E. coeruleata*, which extends as far north as southern Ontario and Quebec in Canada. Though *E. osmiae* is listed as a valid species by Noyes (1998), Hedqvist (1968) synonymized the name with *E. coeruleata* and I concur with Hedqvist. An additional 16 species of *Epistenia* have been described from 8 countries in the Neotropical region (Noyes 1998). I have seen specimens representing at least 12 species of *E.* (*Punctepistenia*) and an undetermined number of species of *E.* (*Epistenia*) from Central America, the Caribbean and South America. Only a key to the morphospecies of *E.* (*Punctepistenia*) is presented here; except for the type species, I did not attempt to place the four described species of *E.* (*Punctepistenia*) into the key, which will require a formal revision and association of sexes.

Key to species of *Epistenia* (*Punctepistenia*) new subgenus

1 Female **2**
– Male **15**

2(1) Legs with mesocoxa and sometimes also procoxa yellowish, similar in color to rest of respective leg and conspicuously different from metallic blue-green metacoxa; scutellum in lateral view with apical margin extending only slightly over base of propodeum, about half distance to base of gaster (Fig. 349) **3**
– Legs with all coxae metallic blue-green, conspicuously darker than rest of respective leg; scutellum in lateral view with apical margin extending slightly to conspicuously over base of gaster **5**

3(2) Procoxa metallic and mesocoxa yellowish; metacoxa bare exterior to dorsal carina; protibia not carinate ventrally; scrobal channel separated from anterior ocellus by more than 2 OD; profemur without subapical ventral angulation or tooth [Brazil (1♀ CNCI), Suriname (1♀ RMNH)] . . . . ***E.* (*Punctepistenia*) sp. #1**
– Pro- and mesocoxae yellowish; metacoxa distinctly setose dorsally, largely obscuring dorsal carina (Fig. 352); protibia ventrally with sinuate carina over about basal half; scrobal channel separated from anterior ocellus by at most about 1 OD; profemur with acute subapical ventral angulation **4**

4(3) Mesonotum almost uniformly cupreous or greenish with some cupreous luster; vertex and occiput uniformly dark posterior to level of anterior ocellus [Costa Rica (1♀ CNCI, 1♀ INBIO, 2♀♀ MUCR)] . . . . ***E.* (*Punctepistenia*) sp. #2**
– Mesonotum distinctly bicolored, bluish-purple anteriorly and greenish to more distinctly cupreous posteriorly over about posterior half; vertex often with distinct blue or purple band behind posterior ocelli [Colombia (1♀ CNCI), Costa Rica (3♀♀ INBIO, 2♀♀ MUCR, 9♀♀ UCDC), Panama (1♀ RMNH), Peru (1♀ CDFA), Trinidad (1♀ BMNH)] . . . . ***E.* (*Punctepistenia*) sp. #3**

5(2) Metatibia with dense, long, spinelike setae dorsally; legs with at least femora brown or even with slight metallic luster . . . . ***E.* (*Punctepistenia*) *odyneri* Ashmead**
– Metatibia with only very short, inconspicuous spines and setae; legs often uniformly yellowish-orange **6**

6(5) Scutellum with truncate marginal flange, the transverse apical margin slightly emarginate; lower mesepimeron smooth and shiny; eye very sparsely and inconspicuously microsetose [Colombia (1♀ BMNH), Guyana (1♀ BPBM), Peru (1♀ USNM)] . . . . ***E.* (*Punctepistenia*) sp. #4**

– Scutellum with triangular marginal flange convergent to a rounded point; lower mesepimeron often extensively punctate; eye usually distinctly and often densely microsetose **7**

7(6) Scrobal depression separated from anterior ocellus by distance equal to about 2 OD; legs with femora and at least metatibia dark brown [Paraguay (2♀♀ CDFA)] . . . . ***E.* (*Punctepistenia*) sp. #5**

– Scrobal depression separated from anterior ocellus by distance equal to about maximum diameter of ocellus; legs either uniformly yellowish-orange or with anterior surface of pro- and mesofemora yellowish **8**

8(7) Legs with femora distinctly bicolored, pro- and mesofemora having anterior surfaces yellowish and posterior surfaces dark with metallic luster, and metafemur largely dark with metallic luster but yellowish dorsally; mesonotum greenish-purple but with notauli, median band on medial lobe, and anterior spot on scutellum, black; eye superficially bare; lower mesepimeron mostly smooth [Ecuador (1♀ USNM)] . . . . ***E.* (*Punctepistenia*) sp. #11**

– Legs entirely yellowish-orange; mesonotal color pattern variable, but not as described above; eye often conspicuously setose; lower mesepimeron often entirely punctate **9**

9(8) Mesonotum almost uniformly bluish-purple; POL almost twice OOL; head dorsally bluish-purple without black areas; apparent Gt_3 uniformly bluish-purple; Gt_1 distinctly sculptured apically, with well delineated cells defined by impressed lines [Argentina (1♀ CNCI)] . . . . . . ***E.* (*Punctepistenia*) sp. #6**

– Mesonotum with at least mesoscutal medial lobe largely or entirely black to cupreous; POL only about 1.3 times OOL; apparent Gt_3 partly black medially; Gt_1 sometimes shiny and almost smooth apically **10**

10(9) Forewing uniformly brownish; body slightly less than 5 mm in length [Venezuela (1♀ USNM)] . . . . ***E.* (*Punctepistenia*) sp. #7**

– Forewing hyaline or if with slight brownish tinge then body distinctly longer than 5 mm **11**

11(10) Mesoscutum with medial lobe entirely, and about inner half of lateral lobe anterior to preaxillar margin, cupreous **12**

– Mesoscutum at most with medial lobe cupreous **13**

12(11) Syntergum elongate, in lateral view precercal length about 1.5 times height measured at level of cerci, and total length at least 3 times height measured at apex of Gt_8 and at least as long as basal 4 metatarsal segments [Costa Rica (1♀ MUCR), Venezuela (1♀ RMNH)] . . . . ***E.* (*Punctepistenia*) sp. #8A**

– Syntergum short and stubby, in lateral view precercal length less than height of syntergum measured at level of cerci, and total length less than twice height measured at apex of Gt_8 and only slightly longer than basal 2 metatarsal segments [Suriname (1♀ USNM), Trinidad (1♀ BMNH)] . . . . ***E.* (*Punctepistenia*) sp. #8B**

13(11) Mesoscutal medial lobe largely cupreous/black, but at least narrowly green or bluish along notaulus and sometimes quite extensively so posterolaterally; scrobal depression with entire outer edge reflexed as carinate margin [Peru (2♀♀ CDFA), Suriname (1♀ RMNH)] . . . . ***E.* (*Punctepistenia*) sp. #9**

– Mesoscutal medial lobe entirely cupreous; scrobal depression not distinctly carinate except dorsally for length at most about equal to length of pedicel **14**

14(13) POL virtually twice OOL [Trinidad (1♀ BMNH), Venezuela (1♀ UCDC)] . . . . ***E.* (*Punctepistenia*) sp. #10A**

– POL only slightly longer than OOL (26:22) [Argentina (1♀ BMNH)] . . . . ***E.* (*Punctepistenia*) sp. #10B**

15(1) Metatibia with dense, long, spinelike setae dorsally . . . . ***E.* (*Punctepistenia*) *odyneri* Ashmead**

– Metatibia with only very short, inconspicuous spines and setae **16**

16(15) Pro- and mesocoxae yellowish, distinctly contrasting in color with dark, metallic metacoxa; metacoxa setose dorsally along length **17**

– Pro-, meso- and metacoxae all dark, metallic; metacoxa bare dorsally along length **18**

17(16) Mesonotum purple with some areas more distinctly blue, but black anteriorly on lateral lobe and linearly along notauli; head with face and upper parascrobal region greenish, but vertex black medially from along abrupt line directed diagonally from dorsolateral margin of scrobal channel to inner orbit of eye at about level of posterior ocellus [eye densely microsetose; Gt_1 broadly smooth laterally and apically] [Brazil (1♂ USNM)] . . . . ***E.* (*Punctepistenia*) sp. M#1**

– Mesonotum distinctly bicolored, with about posterior half cupreous to more lime green; head with face and vertex blue to purple without abruptly delineated black region as described above [Costa Rica (8♂♂ UCDC)] . . . . ***E.* (*Punctepistenia*) sp. #3**

18(16) Mesoscutum with medial lobe entirely, and broad band on lateral lobe anterior to preaxillar margin, cupreous [Venezuela (1♂ CNCI)] . . . . ***E.* (*Punctepistenia*) sp. #8A**

– Mesoscutum at most with medial lobe entirely cupreous **19**

19(18) Mesoscutal medial lobe entirely cupreous to lime green, contrasting with blue or bright green lateral lobes [Guyana (2♂♂ BMNH), Paraguay (4♂♂ CDFA), Peru (2♂♂ UCDC)] . . . . ***E.* (*Punctepistenia*) sp. M#2**

– Mesoscutal medial lobe more or less evenly green to blue or purple or with some black, but either not uniformly colored or colored differently from lateral lobes **20**

20(19) Dorsellum reticulate-rugulose; scutellum in lateral view weakly convex, apically recurved to marginal rim at about 45° angle or less; eye very densely setose, the distance between setae mostly about half or less length of setae [Argentina (3♂♂ CDFA, 1♂ UCDC), Bolivia (1♂ USNM), Brazil (1♂ CNCI)] . . . . ***E.* (*Punctepistenia*) sp. M#3** [? = ***E.* (*Punctepistenia*) sp. #6**]

– Dorsellum smooth and shiny, at least medially, and otherwise finely coriaceous; scutellum in lateral view distinctly convex, apically abruptly recurved to marginal rim at almost 90° angle; eye moderately setose, the distance between setae similar to length of setae [Bolivia (2♂♂ USNM), Ecuador (3♂♂ CNCI)] . . . ***E.* (*Punctepistenia*) sp. M#4** [? = ***E.* (*Punctepistenia*) sp. #9**]

Hadroepistenia new genus

Figs 356–363

Etymology. Combination of the Greek word *hadros* (bulky, stout) and *Epistenia*, in reference to the females broadly attached metasoma and their similarity to *Epistenia*.

Type species. *Hadroepistenia erwini* Gibson, by present designation.

Diversity. Two species known from the Neotropical region [*Ecuador, *Peru].

Biology. Unknown.

Description. *Head* (Figs 356, 357, 362). Scrobal depression extending to anterior ocellus, with outer margins of channel carinate and extending to about posterior margin of anterior ocellus so ocellus indistinctly within channel; scrobal channel with surface undulating near ocellus (Fig. 356), and both channel and scrobes smooth and shiny. Face with parascrobal region punctate-alveolate. Interantennal region abruptly margined and dorsally ridgelike, the ridgelike portion projecting above plane of surface as low, convex flange in female (Fig. 356). Vertex with posterior ocellus separated from inner orbit by distance slightly less than 1 OD. Male with short genal flange only near mouth margin (Fig. 362), but female with distinct genal flange extending most of height of propleuron (Fig. 357) and both sexes with occipital carina (Figs 357, 362), either as dorsal continuation of sinuate genal flange or as separate arcuate carina on posterior of head. Eye superficially bare (very sparsely and inconspicuously microsetose) to densely and conspicuously setose; in dorsal view with upper inner orbits subparallel for short distance behind posterior ocelli, the orbits neither distinctly convergent or divergent. Torulus with dorsal margin obviously below lower margin of eye.

Mesosoma distinctly bicolored, with mesonotum and pronotum having abruptly delineated cupreous/black regions contrasting with metallic blue or green regions, though mesoscutal medial lobe never entirely cupreous/black. Pronotum with strongly transverse collar (Figs 358, 360). Mesoscutum punctate with variably distinct rosetteform subsculpture. Scutellum in lateral view weakly convex, variably distinctly curved down to marginal rim projecting only slightly over base of propodeum. Dorsellum with a few long setae in female of one known species. Prepectal panel flat and uniformly colored. Upper mesepimeron extensively punctate-setose dorsally and ventrally smooth to very finely coriaceous; lower mesepimeron coriaceous to punctate-reticulate. Propodeum of female strongly transverse, with (Fig. 359) or without (Fig. 361) distinct crenulae along anterior margin, but with short paraspiracular ridge or furrow differentiating callus from broad plical region, and with at least slight indication of transverse band of crenulae delineating smooth strip along foramen (Figs 359, 360); callus setose laterally to level equal with inner margin of spiracle and along posterior margin to plical region; plical region bare, very finely coriaceous over most of non-crenulate surface. Propodeum of single known male longer than for female (Fig. 363), with more distinct, crenulate paraspiracular furrow, and with much narrower foramen; plical region with inverted Y-like median carinal complex, the posteriorly divergent carinae delineating lunate region along foramen and longitudinal carina subdivided by fine line, with panel surface otherwise shiny with very obscure coriaceous sculpture.

Forewing hyaline in male, almost hyaline in female but with variably distinct brownish region behind parastigma and at most with very slightly infuscate ∪-like region between parastigma and stigma.

Legs. Profemur with subapical ventral angulation; protibia with sinuate, carinate ventral margin over about basal half. Metacoxa of female distinctly carinate dorsally and bare except for extreme dorsobasal surface; male with dorsal carina less distinct but coxa more conspicuously setose over about basal half.

Metasoma. Gaster with Gt_1 extensively reticulate-punctate to transversely reticulate-strigose in female (Figs 359, 361) and posteromedially reticulate-punctate in male (Fig. 363); Gt_2 exposed for distance at least equal to half length of Gt_3, in female with sculpture similar to that on Gt_1 and Gt_3 (Figs 359, 361), but in male mostly aciculate-coriaceous except for inconspicuous, transverse line of shallow punctures near posterior margin. Hypopygium extending beyond level of apex of metacoxa, about to level of posterior margin of Gt_4.

Remarks. *Hadroepistenia* is known from two females belonging to two species and a single male. The male differs from females by having a much shorter genal flange (Fig. 362), Gt_2 much less coarsely and conspicuously sculptured (Fig. 363), and the metacoxa less distinctly carinate and more extensively setose dorsally over about its basal half.

Relationships of *Hadroepistenia* are not resolved with maximum parsimony prior to successive weighting (Fig. 1*a*) and different relationships are indicated depending on whether or not NW *Proshizonotus* is segregated as a taxonomic unit (Figs 1*b*, 1*c*). Superficially, females of *Hadroepistenia* are similar to females of the Old World genus *Riekisura* because of their robust habitus and broadly attached metasoma. *Hadroepistenia erwini* is unique among New World Clade species because at least females have a transverse row of long setae on the dorsellum (Fig. 359). The dorsellum is always extensively setose in NW *Proshizonotus*, whereas it is bare in other New World Clade species, including *H. glabra* (Fig. 361). Females of *Hadroepistenia* are additionally similar to species of *Proshizonotus* because they have Gt_2 distinctly exposed, both Gt_1 and Gt_2 extensively sculptured, and the propodeum strongly transverse (Figs 359, 361). I interpret all of these as likely symplesiomorphic features within the New World Clade of genera and my intuitive analysis suggests *Hadroepistenia* may represent a basal clade or grade within the New World Clade. Female *H. erwini* n. sp. and many *Proshizonotus* also have a very similar propodeum, the anterior margin of the callus is differentiated by a crenulate furrow and the crenulae extend mesal to a distinct postspiracular furrow and paraspiracular carina (Fig. 359). The female of *H. glabra* n. sp. does not have distinct crenulae on the propodeum and there is only a narrow flattened region between the spiracle and plical region differentiating an obscure postspiracular and paraspiracular furrow (Fig. 361). The undulating type of scrobal structure possessed by *Hadroepistenia* (Fig. 356) may indicate the genus is most closely related to the classical genera *Epistenia* and *Urolycisca*, plus several other non-speciose genera differentiated by various combinations of a genal flange, concealed or exposed and sculptured Gt_2, and dorsally setose or bare metacoxa. However, character polarity of scrobal structure is uncertain and the undulating structure may be symplesiomorphic relative to a non-undulating or dorsally carinate scrobal depression. Only members of *Hadroepistenia*, *E.* (*Punctepistenia*), *Urolycisca* and *Proglochin* share a sculptured G_1, which could also be symplesiomorphic if inherited from a common ancestor with *Proshizonotus*. However, males of the three last taxa as well as females of *E.* (*Punctepistenia*) have Gt_2 normally concealed. This could support an hypothesis that the sculptured and exposed Gt_2 of females of the last three taxa is not homologous to that of female *Hadroepistenia*. The exposed and sculptured Gt_2 of female *Urolycisca* and *Proglochin* may have secondarily re-evolved from a concealed Gt_2 similar in structure to that of *E.* (*Punctepistenia*) females. Both sexes of *Urolycisca* and *Proglochin* lack an externally evident genal flange, unlike *Hadroepistenia* (Figs 357, 362). The propodeum of the male described as *H. glabra* is similar to that of some males assigned to *Shedoepistenia* because the longitudinal portion of the inverted Y-shape carinal complex is subdivided by a fine line (Fig. 363). The propodeum of female *H. erwini* is similar to that of females assigned to *Shedoepistenia* and some *Epistenia* because the transverse band of crenulae across the plical region is incomplete medially, leaving a smooth central region (Fig. 359).

Key to species of *Hadroepistenia* new genus

1 *Male*: metacoxa dorsally setose without distinct carina over about basal half [eye densely and conspicuously setose; mesoscutal medial lobe dark/cupreous except for longitudinal bluish-green band adjacent to each notaulus near transscutal articulation; mesoscutal lateral lobe with region anterior and lateral to paraaxillar margin bluish-green, but dorsal surface anterior to preaxillar margin dark/cupreous except for bluish-green spot lateral to mark on medial lobe . . . . ***Hadroepistenia glabra* n. sp.**

– *Female*: metacoxa dorsally bare exterior to distinct dorsal carina except at extreme base [eye superficially bare **or** mesonotum cupreous anteriorly and bluish-green posteriorly excluding notauli] **2**

2(1) Syntergum short, only slightly longer than greatest width and about half combined length of Gt_5 and Gt_6; eye superficially bare (Fig. 357); propodeum with only very obscure band of crenulae across plical region (Fig. 361); dorsellum bare; all coxae with metallic luster similar to mesosoma; posterior of head with arcuate carina ventrolateral to occipital foramen not smoothly merging with genal carina (Fig. 357) .... ***Hadroepistenia glabra*** **n. sp.**

– Syntergum long, about 3 times as long as greatest width and about as long as combined length of Gt_5 and Gt_6; eye densely and conspicuously microsetose (Fig. 356); propodeum with distinct band of crenulae across plical region medially and anterolaterally (Fig. 359); dorsellum with a few long setae (Fig. 359); procoxa yellowish; posterior of head with single, sinuate composite genal and occipital carina .... ***Hadroepistenia erwini*** **n. sp.**

Hadroepistenia erwini new species

Figs 358, 359

Type material. *Holotype* ♀ (USNM) — Insecticidal fogging of mostly bare green leaves, some with covering of lichenous or bryophytic plants in terra firme forest At Trans 6, Sta. 10 Project MAXUS Lot 929 / ECUADOR: NAPO, Res. Ethnica Waorani, 1 km S. Onkone Gare Camp, Trans. Ent. 9 Oct. 1994, 220 m, 00°39'10"S 076°26'W, T.L. Erwin, et al.

Etymology. Named in honour of Dr. Terry Erwin, who collected both known females of the genus during canopy fogging.

Description. FEMALE. Head with face metallic green or with bluish luster under some angles of light, but upper parascrobal region and indistinctly delineated region on vertex posterior to ocelli and on occiput more bluish-violaceous; gena uniformly and distinctly setose posterior to malar sulcus. Eye densely and conspicuously microsetose (Fig. 356). Genal and occipital carinae forming single sinuate carina from side of occipital foramen to base of mandible.

Mesosoma with pronotum bluish to violaceous except for slender cupreous band on median line. Mesonotum with obscure rosetteform subsculpture, the interstices smooth and shiny except for sparse, obscurely engraved lines, and with comparatively long and conspicuous, whitish setae; mesoscutal medial lobe bluish to violaceous posteriorly, but with cupreous region over about anterior half of medial lobe, the region attenuated posteromedially; mesoscutal lateral lobe with punctures similar to those on medial lobe in region anterior to paraaxillar margin, but rugulose anterior of preaxillar margin, bluish to violaceous except for anteromedial cupreous spot continuous with cupreous region of medial lobe, and with notaulus linearly cupreous under some angles of light; axilla blue to violaceous; scutellum cupreous anteriorly, but posteriorly with anteriorly convergent cupreous region. Dorsellum with 2 paramedial and 2 paralateral, long white setae. Propodeum greenish-blue; callus separated from plical region by ridgelike paraspiracular carina; plical region with transverse band of distinct crenulae across middle and along anterior margin laterally (Fig. 359). Forewing with small but distinct infuscate region behind parastigma. Legs yellowish-orange except meso- and metacoxae dark with bluish to green luster.

Gaster extensively dark or brownish with slight cupreous luster dorsally but Gt_1, except for lateral and posterior margins, with medially divided bluish-green band, Gt_3 and Gt_4 with bluish-green medial band, and Gt_5 and Gt_6 with longitudinal bluish-green band laterally along carinate margin; Gt_1 punctate laterally to punctate-strigose medially, except nonmetallic regions coriaceous to smooth; Gt_2–Gt_5 punctate, with some punctures coalesced into transverse furrows. Syntergum elongate-triangular, about as long as combined length of Gt_5 and Gt_6, and about 3 times as long as basal width.

Remarks. The holotype is point-mounted; it is complete, but the right tarsus of the foreleg is detached and glued to the point. The descriptions given for *H. erwini* and *H. glabra* emphasize those features that differ most conspicuously between the two species.

Hadroepistenia glabra new species

Figs 356, 357, 360–363

Type material. *Holotype* ♀ (USNM) — PERU: Madre de Dios, Rio Tambopata Res., 30 km (air) SW Pto. Maldonado, 290 m., 12°50'S 069°17'W / Smithsonian Institution Canopy Fogging Project, T.L. Erwin et al. colls., 10 Sept.84, 02/02. *Allotype* ♂ (USNM) — Tumupasa, Bolivia, Wm M Mann.

Etymology. From the Latin, *glabra*, hairless, in reference to the bare dorsellum and superficially bare eyes that help to distinguish females of this species from *H. erwini*.

Description. FEMALE. Head with lower face green, upper face extensively bluish-violaceous except more distinctly green near margins of parascrobal region and interantennal region; vertex, including upper parascrobal region and broad band on posterior surface of head to level of occipital foramen and on either side of foramen to base of mandible, nonmetallic, black; gena with sculptured but bare triangular region posterior to malar sulcus. Eye bare (Fig. 357). Genal carina separated from occipital carina (Fig. 357).

Mesosoma with anterior, vertical face of pronotum black with cupreous luster under some angles of light, but with extreme posterodorsal margin and panels of pronotum blue to violaceous. Mesonotum with distinct rosetteform subsculpture (*cf*. Fig. 161) and with comparatively short and inconspicuous, dark setae; mesoscutal medial lobe black except for narrow bluish band adjacent to about posterior half of notaulus; mesoscutal lateral lobe with smaller and shallower punctures anterior of preaxillar margin than paraaxillar margin, but both region obviously punctate, bluish to violaceous, but with black spot anteromedially, the region continued posteriorly as linearly black notauli, and with black band projecting anterolaterally from anteromedial angle of axilla; axilla bluish to violaceous except anterior margin black; scutellum black with extreme posterior margin bluish to violaceous. Dorsellum bare. Propodeum greenish; callus separated from plical region by weakly convex surface; plical region finely coriaceous and with at most very obscure line of crenulae across plical region medially (Fig. 361). Forewing with small and inconspicuous infuscate region behind parastigma. Legs yellowish-orange except all coxae dark with bluish to green luster and metafemur with violaceous spot ventrobasally on outer surface.

Gaster dorsally brownish with slight cupreous luster under some angles of light, except Gt_1 basolaterally bright green. Gt_1 extensively punctate-strigose, except nonmetallic regions smooth; Gt_2–Gt_5 punctate, with some punctures coalesced into transverse furrows. Syntergum short and stubby, only about half as long as combined length of Gt_5 and Gt_6, and about 1.25 times as long as basal width.

MALE. Color pattern similar to female, with only slender metallic band along outer orbit on posterior of head dorsally; mesoscutal lateral lobe with surface anterior to preaxillar margin black except for small metallic spot posteriorly; scutellum entirely dark except for indistinct metallic spots posteromedially; pro- and mesocoxae brown without distinct metallic luster. Head with genal carina very short and obscure, only present immediately above mandibular base (Fig. 362); plical region of propodeum much longer than for female, with inverted Y-like median carinal complex, with surface otherwise smooth and shiny except for extremely fine and obscure coriaceous sculpture (Fig. 363); metacoxa with dorsal carina much less distinct basally. Setal pattern similar to female except eye densely and conspicuously microsetose (Fig. 356). Sculpture similar to female except mesoscutal lateral lobe punctate-alveolate anterior to paraaxillar margin and punctulate anterior to preaxillar margin; Gt_1 with medial punctate region; Gt_2 transversely aciculate basally, but with irregular row of minute punctures subapically; Gt_3–Gt_5 each with basal, transversely aciculate-coriaceous band, shorter smooth apical band, and conspicuously punctate median band.

Remarks. The holotype and allotype are both point-mounted and in good condition except the male is missing the apical four tarsal segments of the hind leg. The male is associated with the female based on a similar mesonotal color pattern and bare dorsellum, though it has distinctly setose eyes similar to *H. erwini*.

Hedqvistia new genus

Figs 364–371

Etymology. Named in honor of Karl-Johan Hedqvist, who has contributed substantially to the study of Neotropical Lyciscini.

Type species. *Hedqvistia reticulata* Gibson, by present designation.

Diversity. At least 3 species known from the Neotropical region [*Brazil, *Ecuador, *Guatemala, *Peru].

Biology. Unknown.

Description. *Head* (Figs 364–368). Scrobal depression (Fig. 364) extending to within about 1 OD of anterior ocellus and entirely carinately margined, or at least with outer margin carinate and dorsally abruptly angled relative to vertex so as to form ∩-like to m-like dorsal margin; scrobes and channel surface entirely transversely striate-reticulate. Face with parascrobal region punctate-reticulate to rugulose and less than 1 OD in width dorsally. Interantennal region abruptly to carinately margined, acutely angled dorsally with low median ridge sometimes dividing scrobal channel to dorsal margin, but not expanded into process. Vertex with posterior ocellus subcontiguous with inner orbit (Fig. 365). Occiput without occipital carina (Fig. 366). Gena without genal flange evident in lateral view when head appressed to prothorax (Fig. 367). Eye densely microsetose; in dorsal view upper inner orbits subparallel for short distance or slightly incurved toward each other behind posterior ocellus (Fig. 365). Torulus with dorsal margin, to about middle, in line with lower margin of eye.

Mesosoma greenish with variably extensive dull rufous or cupreous lusters, but pronotal collar, mesoscutum and scutellum without abruptly delineated regions of contrasting bright metallic colors. Pronotum bell-shaped to pentagonal, but about as wide as long (Figs 366, 368). Mesoscutum punctate-reticulate with variably distinct rosetteform subsculpture. Scutellum in lateral view with dorsal surface weakly convex to almost flat and with reflexed marginal rim appressed to base of propodeum (Fig. 369). Dorsellum normally concealed under scutellar lip. Prepectal panel flat. Upper mesepimeron setose dorsally and elsewhere finely aciculate; lower mesepimeron aciculate dorsally to entirely punctate-reticulate. Propodeum with postspiracular furrow behind spiracle, with much more conspicuous crenulate paraspiracular furrow differentiating callus from plical region (Fig. 370), and with variably distinct crenulate furrow over at least lateral quarter of anterior margin, the crenulae sometimes continuing obscurely to median carina (Figs 369, 370); callus sometimes largely bare behind spiracle but with some setae extending to paraspiracular furrow; plical region bare and uniformly punctate-reticulate except for median carina.

Forewing subhyaline with variably distinct mediolongitudinal infuscate band or more distinctly infuscate with hyaline region(s) behind marginal vein having white setae.

Legs. Profemur with distinct subapical ventral angulation; protibia with sinuate, carinate ventral margin over basal half to three-quarters. Metacoxa not carinately margined but variably densely and conspicuously setose dorsally.

Metasoma. Gaster with Gt_1 smooth and shiny or at most only obscurely coriaceous medially; Gt_2 exposed, punctate-reticulate (Figs 369–371). Hypopygium extending at most about 0.4 length of gaster, about to level of posterior margin of Gt_4.

Remarks. *Hedqvistia* is newly established for a group of species that share a confusing mixture of features with members of *Romanisca*, *Neoepistenia*, *Amazonisca*, *Lycisca* and *Paralycisca*. Structure of the scrobal depression is most similar to members of *Amazonisca*; furthermore, *Hedqvistia* n. sp. #2 has a setal band across the face and a forewing setal color pattern similar to one species group of *Amazonisca*. Upper inner orbits that are subparallel to slightly convergent behind the posterior ocelli (Fig. 365) are shared with members of *Amazonisca* as well as with members of *Lycisca* and *Paralycisca*, but this structure may be symplesiomorphic compared with the divergent upper inner orbits of *Neoepistenia* + *Romanisca*. Individuals of *Amazonisca* and *Paralycisca* differ from the other genera by having Gt_2 at most very finely coriaceous, if distinctly exposed, and by their quite smooth and shiny propodeal plical panels. Individuals of *Hedqvistia*, *Neoepistenia*, *Romanisca* and *Lycisca* have Gt_2 both distinctly exposed and reticulate to punctate and, except for some species of *Lycisca*, have the propodeal plical panels entirely punctate-reticulate. Members of all the genera except

Neoepistenia have Gt_1 smooth and shiny, but this is very likely symplesiomorphic compared to the strongly coriaceous to somewhat reticulate Gt_1 of *Neoepistenia*. Structure and sculpture of the propodeum indicate *Hedqvistia* likely is most closely related to *Neoepistenia* and *Romanisca*. Length of the hypopygium in the three taxa might form a transformation series, with females of *Hedqvistia* always having a shorter hypopygium than females of the three known species of *Neoepistenia*, but with females of some species of *Hedqvistia* having a longer hypopygium than the two known species of *Romanisca*. *Neoepistenia* and *Romanisca* may be most closely related based on their dorsally divergent eyes and somewhat shorter or more buccate malar space, but individuals of *Romanisca* and *Hedqvistia* share a somewhat flatter scutellum and mesoscutum. Color patterns of the forewings and antennae are variable in all three genera. Parsimony analyses did not resolve relationships of *Hedqvistia* under any of the constraint options employed (Figs 1*a*, 1*b*, 1*c*), but my intuitive analysis indicates *Hedqvistia* likely is closely related to *Neoepistenia* and *Romanisca*. These three taxa may eventually be united into a single genus, but until character-state transformation is better resolved I prefer to recognize three genera to emphasize the differences among the groups of species.

Key to species of *Hedqvistia*

1 Male **2**
– Female **3**

2(1) Flagellum or at least funicle entirely brown; pro- and mesocoxae dark brown with slight metallic luster; metacoxa dorsally uniformly reticulate and entirely setose (Fig. 369) . . . . ***Hedqvistia reticulata* n. sp.**
– Flagellum yellowish except basal 1 or 2 segments and clava brown; pro- and mesocoxae yellow; metacoxa dorsally coriaceous, and bare except basally (line of setae also on inner surface dorsally) [Ecuador (1♂ USNM)] . . . . ***Hedqvistia* n. sp. #2**

3(1) Forewing with curved mediolongitudinal infuscate band from stigmal vein to near parastigma delineating hyaline region having brown or very few white setae along entire length of marginal vein; antenna with pedicel and most of flagellum brown, though fl_3–fl_5 slightly lighter in color; metatibia orange without distinct basal white band [Guatemala (1♀ CNCI)] . . . . ***Hedqvistia* n. sp. #1**
– Forewing more extensively infuscate behind marginal vein, delineating large anterior and posterior hyaline spot having white setae behind about apical half of marginal vein; antenna with at least fl_4–fl_8 yellow and sometimes entirely yellow; metatibia orange to brown but with distinct basal white band **4**

4(3) Face with horizontal, white, lanceolate setae forming band on either side of median bare strip on interantennal region and on parascrobal region immediately above level of torulus; metacoxa with outer surface coriaceous and shiny dorsobasally, and not setose dorsally except at extreme base [Brazil (1♀ USNM), Ecuador (1 ♀ CNCI, 4♀♀ USNM)] . . . . ***Hedqvistia* n. sp. #2**
[♀ from Brazil with antenna entirely yellow except for extreme apex of clava; ♀♀ from Ecuador with flagellum more extensively brown apically and basally]

– Face without differentiated setal band as described above; metacoxa with exterior surface entirely reticulate and setose along dorsal length (Figs 369, 370) . . . . ***Hedqvistia reticulata* n. sp.**

Hedqvistia reticulata new species

Figs 368–370

Type material. *Holotype* ♀ — ECUADOR, Napo, Limoncocha, 250 m, 15-28.VI.1976, S. & J. Peck (CNCI). *Allotype* ♂ — ECUADOR: Napo: 20 km E. Puerto Napo, Alinahui, 1°0'S 77°25'W, 450 m, 1996, E.S. Ross (CASC). *Paratypes* — same data as holotype (1♀ CNCI). ECUADOR: Napo: Reserva Etnica Waorani, Transect Ent. 1 km S. Okone Gare Camp, 00 39' 10" S 076 26' 00" W, 220 m, 6.X.1995, T. Erwin *et al.*, canopy fogging, Lot #1225 (1♀, 1♂ USNM). Peru, Iquitos, Mar. Apr. 1931, R.C. Shannon (1♀ USNM).

Etymology. In reference to the entirely reticulate outer surface of the metacoxa, which differentiates the species from the most similar species.

Description. FEMALE. Head green; face without evident band of lanceolate setae across interantennal region or lower parascrobal region. Antenna entirely yellow.

Mesosoma primarily green, but with variably extensive dull rufous to cupreous luster dorsally, and at least scutellum and propodeum between paraspiracular furrows dull rufous to cupreous. Forewing infuscate beyond parastigma but with large anterior and posterior hyaline spot having white setae behind about apical half of marginal vein and extreme base of postmarginal vein. Fore- and middle legs yellowish with brown hue on coxae at least laterally. Metacoxa dark with dull rufous luster under some angles of light except about apical two-thirds of lateral and ventral surfaces green, with exterior surface uniformly reticulate, and dorsally dark, densely setose, and without carina (Figs 369, 370); metafemur with inner surface extensively brown, outer surface variably extensively yellow dorsally and brown ventrally; metatibia narrowly white basally and apically, but extensively brown medially; metatarsus white except for apical segment.

Gaster dark brown with slight cupreous luster under some angles of light, except Gt_1 bright green basolaterally, Gt_3–Gt_5 with apical greenish spot on laterotergite dorsally, and postcercal surface of syntergum inconspicuous green. Syntergum short, precercal portion only about half length of Gt_6, and with whitish setae contrasting in color to brown setae of Gt_6.

MALE. As described for female except flagellum or at least funicle brown and all gastral terga with brown setae.

Remarks. The point-mounted holotype is complete except the left mesotibia and tarsus are missing. Sculpture and setal pattern of the metacoxa of *Hedqvistia* n. sp. #1 may be the same as for *H. reticulata* (concealed by femora), but this species is differentiated by a distinctly different forewing color pattern.

Lycisca Spinola
Figs 372–379

Lycisca Spinola, 1840: 14–18. Type species: *Lycisca raptoria* Spinola, by monotypy.

Diversity. Thirteen nominal and at least seven undescribed species known from the Neotropical region [Argentina, Bolivia, Brazil, Colombia, *Costa Rica, Ecuador, French Guiana, *Guatemala, Guyana, *Mexico, *Nicaragua, Panama, Paraguay, Peru, *Trinidad].

✓ ***Lycisca amazonica* Roman**, 1920: 17–18; 5♀ (3 examined), 2♂ (examined) syntypes (NHRS). DISTRIBUTION: Brazil, Colombia, *Costa Rica (CNCI, INBIO, MUCR, UCDC), *Mexico (CNCI, EMEC), *Nicaragua (MUCR), Peru.

✓ ***Lycisca auripyga* Strand**, 1911*b*: 25; ♀ holotype (ZMHB). **Reestablished status**. Synonymy with *L. maculipes* by Hedqvist (1959: 186); synonymy with *L. ignicaudata* by Roman (1920: 15). DISTRIBUTION: Bolivia, *Brazil (CNCI).

***Lycisca cupreoviridis* (Brèthes)**, **new combination**. *Epistenia cupreoviridis* Brèthes, 1908: 11–12; ♂ holotype (MACN?). DISTRIBUTION: Paraguay.

✓ ***Lycisca cyaniceps* Roman**, 1920: 19; 2♀ (1 examined) syntypes (NHRS). DISTRIBUTION: Brazil, *Guyana (EMEC).

✓ ***Lycisca decora* Strand**, 1911*b*: 26; 2♀ syntypes (ZMHB). Tentatively syonymized with *L. amazonica* by Roman (1920: 17). DISTRIBUTION: Paraguay.

✓ ***Lycisca ignicaudata* Westwood**, 1874: 148; ♀ lectotype (OXUM: T. 671 1/4) designated by Hedqvist (1959: 184). DISTRIBUTION: Argentina, Bolivia, Brazil, Colombia, *Ecuador (USNM), Peru.
= ✓ *Lycisca signipennis* Strand, 1911*b*: 26; 3♀ syntypes (ZMHB). Synonymy by Hedqvist (1959: 184); tentative synonymy by Roman (1920: 15).

✓ ***Lycisca maculipes* (Cameron)**. *Epistenia maculipes* Cameron, 1884: 130; 3♀, 2♂ syntypes (BMNH: 5.896). Combination by Hedqvist (1959: 186). DISTRIBUTION: Brazil, Colombia, *Costa Rica (INBIO), Panama.

✓ ***Lycisca nebulipennis* Strand**, 1911*b*: 25–26; ♀ holotype (ZMHB). DISTRIBUTION: *Bolivia (USNM),*Brazil (BMNH, USNM), Peru.

***Lycisca ogloblina* Hedqvist**, 1961: 100–101; ♀ holotype (KHPC). DISTRIBUTION: Argentina, Brazil.

***Lycisca raptoria* Spinola**, 1840: 18–19, pl. 43; ♀ holotype (MRSN, lost, see Remarks). DISTRIBUTION: Brazil, French Guiana.

✓ ***Lycisca romandi* Westwood**, 1841: 84; ♀ lectotype (OXUM: T. 670) designated by Hedqvist (1959: 182). DISTRIBUTION: Brazil, French Guiana.
= ✓ *Lycisca cyanata* Strand, 1911*b*: 25; ♀ holotype (ZMHB). Synonymy by Hedqvist (1959: 181).

Excluded species:

Lycisca rufipes Cameron. Transferred to *Epistenia* (*Punctepistenia*).

Biology. Unknown, but likely parasitoids of wood-boring beetle larvae.

Description. *Head* (Figs 372–374). Scrobal depression with outer margins extending dorsally to level between ventral and dorsal margin of ocellus, hence anterior ocellus often partly or entirely within depression, with outer margin abrupt ventrally to carinate above level of interantennal region but surface evenly shallowed toward anterior ocellus or at most with only very slender horizontal strip abruptly angled from channel below anterior ocellus; scrobes and channel uniformly punctate-reticulate and sometimes channel subdivided longitudinally by low ridge or carina (Figs 372, 373). Face with parascrobal region reticulate-alveolate to rugulose (Fig. 372). Interantennal region acutely angled and abruptly margined dorsally, the ridgelike dorsal margin right-angled or abruptly sloped to bottom of scrobal depression, but not expanded into process. Vertex with posterior ocellus distinctly separated from inner orbit, but by distance less than 1 OD. Occiput without occipital carina (Fig. 374). Gena without genal flange evident in lateral view when head appressed to prothorax. Eye distinctly microsetose; in dorsal view upper inner orbits subparallel for short distance or slightly incurved toward each other behind posterior ocellus. Torulus with dorsal margin in line with or slightly below lower margin of eye.

Mesosoma variable in color, but one or more of pronotal collar, mesoscutum and scutellum usually with abruptly delineated regions of contrasting bright metallic colors. Pronotum at least as long and often conspicuously longer than wide (Fig. 374). Mesoscutum punctate with rosetteform subsculpture. Scutellum in lateral view usually with dorsal surface convex and distinctly above level of propodeum, but at least with marginal rim extending over dorsellum and with scutellar lip normally touching base of propodeum (Figs 376–378). Dorsellum usually entirely concealed under marginal rim of scutellum. Prepectal panel flat. Upper mesepimeron smooth to finely coriaceous over bare region; lower mesepimeron entirely punctate-reticulate, to strigose ventrally. Metapleuron uniformly punctate-reticulate and setose. Propodeum with variably distinct, sometimes arcuate or sinuate postspiracular furrow behind spiracle (Figs 377, 378), with more distinct crenulate paraspiracular furrow differentiating callus from plical region (Figs 376–379), and with variably distinct crenulate furrow over at least lateral quarter of anterior margin, the crenulae sometimes continuing obscurely to median carina; callus setose to level of paraspiracular furrow; plical region with at least a few setae medially and uniformly punctate-reticulate (Figs 378, 379) or somewhat smoother and shiny anterolaterally (Figs 376, 377), but Λ-like carinate along foramen and usually with median carina so as to form inverted Y-like carinal complex.

Forewing of female at least very slightly infuscate behind parastigma and stigmal vein and often with variably distinct ∪-like infuscate region connecting parastigma and stigmal vein; forewing of male hyaline to similarly infuscate as female.

Legs. Profemur with subapical ventral angulation or tooth (Fig. 375); protibia with sinuate, carinate margin along entire ventral edge (Fig. 375). Metacoxa only sometimes ridged and not distinctly carinate, but setose dorsally (Fig. 379).

Metasoma. Gaster with Gt_1 smooth and shiny or at most very finely coriaceous in female (Figs 376, 378), but in male smooth and shiny (Fig. 377) or variably coriaceous to extensively punctate-reticulate (Fig. 379); Gt_2 exposed and reticulate-punctate (Figs 376–379). Hypopygium extending beyond level of apex of metacoxa by distance at most equal to length of coxa, about to level of posterior margin of Gt_3 or midlength of Gt_4.

Remarks. Hedqvist (1959, 1961) provided keys to both sexes of the species of *Lycisca*, but did not include the type species, *L. raptoria*, because he had not seen the type specimen. Spinola (1840) established *L. raptoria* based on a single female, which he stated was collected "from the interior of Cayenne" (French Guiana) by "M. Le Prieur" and received through "M. Buquet" (Spinola 1840: 19). According to Casolari and Casolari Moreno (1980), the Spinola collection contains a single specimen of *L. raptoria* bearing the following information: "*Lycisca raptoria*, m. ♀ D. Ghiliani, Para, 1846." The presumed collector, locality [Brazil], and date do not support this as the type specimen.

It bears an additional label with the information “not type of *Lycisca raptoria* Spin., Bouček 1969” (M. Daccordi, *in lit*.). Hedqvist (1959: 190) stated that there was a single specimen in the BMNH labelled as “sp. of Spinola” that is very similar to *L. ignicaudata* except the distance between the eyes was larger and the punctures of the face coarser. The original color description and dorsal habitus of *L. raptoria* given in Spinola (1840) suggest that the name is a senior synonym of *L. ignicaudata* Westwood.

Parsimony analyses did not resolve relationships of *Lycisca* regardless of whether or not NW *Proshizonotus* was treated as a separate taxonomic unit (Figs 1*a*, 1*b*, 1*c*). Presence of a medially setose propodeum distinguishes *Lycisca* from all other New World Clade genera except for *Paralycisca*. Females of *P. cristata* have at least a couple of setae paramedially on the plical region, but the propodeum is otherwise shiny and carinate. Individuals of *Lycisca* have the propodeal plical region reticulate-punctate to rugulose-reticulate at least medially. Individuals also have Gt_2 exposed and distinctly sculptured, the scrobal depression uniformly sculptured and extending to the anterior ocellus in a continuous flat plane, and the pronotum at least as long as wide. Individuals of *Paralycisca* differ conspicuously in structure of the scrobal depression, by having Gt_2 concealed, and by having a transverse pronotal collar. I consider presence of a setose plical region as convergent in *Lycisca* and *Paralycisca*, but otherwise am uncertain of relationships of *Lycisca* relative to other New World Clade members.

Females of *Lycisca* do not have Gt_1 conspicuously sculptured whereas males often do, and the sculpture appears to be variable within what I interpret as species. Males of one species I tentatively identify as *L. amazonica* have Gt_1 smooth and shiny or variably extensively and conspicuously sculptured. Females I identify as *L. amazonica* are also quite variable in color pattern and the specimens may represent a species complex. Males of *Lycisca* often have the gaster curved ventrally, somewhat reminiscent of males of Agaonidae *sensu stricto*. A female of an undescribed species has a flat scutellum similar to species of *Romanisca*, but this is undoubtedly convergent because the marginal rim is also ‘flat’, being horizontal rather than vertical.

Key to species of *Lycisca* Spinola

1 Female **2**
– Male **17**

2(1) Legs with all coxae dark and with metallic luster **3**
– Legs with at least procoxa and usually mesocoxa yellow **11**

3(2) Mesoscutal lateral lobe with large cupreous region attenuated to point at anteromedial angle of axilla, but greenish/blue along mesoscutal, parascutal and paraaxillar margins, and along length of notaulus (almost linearly so over about anterior half of notaulus but more broadly so posteriorly, by width about equal to preaxillar margin); Gt_4 obviously longer than wide (at least about 1.5 times); scrobal depression with scrobes bluish-green and channel cupreous except near interantennal region . . ***Lycisca romandi*** **Westwood**
– Mesoscutal lateral lobe variable in color, usually cupreous/dark only over about anterior half and not greenish/blue along length of notaulus, but if similar to above then Gt_4 transverse to subquadrate (at most about 1.3 times as long as

wide); scrobal depression more or less uniformly bluish-green or blue ventrally and green dorsally, but without dorsal cupreous region except sometimes lateral to anterior ocellus **4**

4(3) Flagellum with fl$_2$ less than 1.5 times as long as wide, less than twice as long as fl$_1$, and shorter than pedicel; scutellum with large posteromedial bluish area, the ∧-like area narrowed anteriorly to about middle of scutellum; pronotum bluish-green with 2 distinctly separated lateral cupreous/black spots; head in frontal view obviously transverse, about 1.25 times as wide as high, and with lower face and lower parascrobal region almost in same flat plane lateral to torulus . . . . ***Lycisca cyaniceps* Roman**

– Flagellum with fl$_2$ at least twice as long as wide or fl$_1$, and longer than pedicel; scutellum sometimes uniformly colored or with bluish band along posterior margin or with somewhat ⊥-like posteromedial pattern; pronotum either more or less uniformly dull green or with transverse black/cupreous band dorsally; head in frontal view subquadrate, at most only about 1.1 times as wide as high, and with lower parascrobal region distinctly convex relative to lower face lateral to torulus **5**

5(4) Pronotal collar more or less uniformly dull olive green to black with obscure cupreous luster except usually for almost linear brighter green/blue band along posterior margin; mesoscutal lateral lobe with only about posterior 0.2–0.3 bright metallic green, the region not extending anterior to parascutal margin **6**

– Pronotal collar broadly bright metallic along posterior margin and with distinct, transverse cupreous/black band or paramedial spots centrally; mesoscutal lateral lobe with at least about posterior half metallic green, the region extending along parascutal margin and at least partly along mesoscutal margin **8**

6(5) Mesoscutum green along entire posterior margin except sometimes narrowly medially on medial lobe; tegula dark brown; Gt$_6$ and syntergum with whitish setae . . . . ***Lycisca maculipes* (Cameron)**

– Mesoscutum green only along part or all of posterior margin of lateral lobe; tegula sometimes yellow; Gt$_6$ and syntergum sometimes with dark setae **7**

7(6) Tegula yellow; posterior of head with large cupreous spot dorsally and on postgena, the spots narrowly separated by green band near posterodorsal margin of eye; Gt$_5$ with shiny, mostly smooth, more or less ⊥-like region apically; Gt$_6$ and syntergum with whitish setae [Brazil (2♀♀ BMNH)] . . . . ***Lycisca* n. sp. #1**

– Tegula dark brown; posterior of head uniformly green; Gt$_5$ with large, more or less ∧-like, shinier but finely coriaceous region extending most of length of tergum; Gt$_6$ and syntergum with dark setae [Guatemala (1♀ USNM)] . . . . ***Lycisca* n. sp. #2**

8(5) Gaster subequal in length to combined length of head and mesosoma, with syntergum less than twice as long as basal width and shorter than hind basitarsus; head with distinct yellowish-reddish luster on interantennal region, lower parascrobal region and lower face; scutellum with more or less $\perp$-like bluish-green mark posteriorly . . . . ***Lycisca nebulipennis*** **Strand**

– Gaster distinctly longer than combined length of head and mesosoma, with syntergum obviously more than twice as long as basal width and longer than hind basitarsus; head with distinct yellowish-reddish luster only sometimes on interantennal region and lower parascrobal region; scutellum uniformly cupreous or at least without median stripe if posterior margin blue/green **9**

9(8) Syntergum distinctly longer than Gt$_5$, at least 9 times as long as wide measured dorsally from apex of Gt$_6$, and with precercal length fully twice postcercal length; scutellum with large posteromedial bluish spot or anteriorly convergent triangular region [Brazil (1♀ USNM), Peru (1♀ UCDC)] . . . . ***Lycisca*** **sp. #3**

– Syntergum shorter than Gt$_5$, less than 5 times as long as wide, and with precercal length at most only slightly greater than postcercal length; scutellum uniformly cupreous or only narrowly bluish along posterior margin . . . **10**

10(9) Mesoscutal lateral lobe with reversed J-like metallic blue region along margins, the cupreous region extending posteromedially at least to level about equal with middle of tegula; metapleuron almost entirely cupreous, only linearly blue-green ventrally; propodeal plical panels cupreous, similar to scutellum; Gt$_5$ with only about posterior 0.2 distinctly shinier and greenish over posterior smooth band . . . . ***Lycisca auripyga*** **Strand**

– Mesoscutal lateral lobe with anterior cupreous/dark region extending posteriorly only to level about equal with base of tegula, with mesoscutal margin sometimes broadly blue but without distinct, reversed J-like pattern; metapleuron with at most about dorsal half cupreous, broadly blue-green ventrally; propodeal plical panels mostly bluish-green/purple, contrasting in color with scutellum; Gt$_5$ with about posterior half distinctly shinier and brighter rufous to green, including both apical smooth band and punctate region . . . . ***Lycisca*** **?** ***raptoria*** **Spinola**
. . . . ***Lycisca ignicaudata*** **Westwood**

11(2) Gaster with one or more of Gt$_2$–Gt$_4$ bright metallic green to blue medially, but nonmetallic laterally; scutellum at most with slender metallic line medially; pronotum dorsally with transverse cupreous/black band on collar; femoral depression extensively cupreous, at least in larger specimens; legs yellowish except apical 2 tarsal segments of middle and hind legs brown . . . . ***Lycisca ogloblina*** **Hedqvist**

– Gaster with one or more of Gt$_2$–Gt$_4$ metallic green to blue laterally and nonmetallic medially, or with lateral and medial metallic spots, or with complete transverse metallic green band; scutellum often broadly metallic blue medially; pronotum dorsally often with only lateral cupreous/black spots; femoral depression green to purple; legs variable, but sometimes tarsi of middle or hind leg uniformly brownish **12**

12(11) Mesonotum strongly flattened, scutellum in lateral view flat and with marginal rim horizontal rather than vertical and not distinctly differentiated by crenulae; head almost uniformly setose anterior and posterior of malar sulcus; pronotum obviously longer than wide (45:40) and with small cupreous spot paramedially [Costa Rica (1♀ MUCR)] . . . . ***Lycisca* sp. #4**

– Mesonotum moderately convex, scutellum in lateral view with apex obviously curved down to vertical, or at least obliquely angled, marginal rim; head often with setae conspicuously longer and denser posterior to malar sulcus and along outer orbit than on lower face; pronotum variable **13**

13(12) Gt_3 with transverse-rectangular greenish region over at least half length of punctate portion of tergum; Gt_4 with lateral greenish regions contiguous or subcontiguous basomedially **14**

– Gt_3 with basolateral triangular spots, or with lateral spots plus medial spot, or sometimes with all spots narrowly connected basally; Gt_4 with lateral greenish regions separated basomedially by dark/cupreous region at least as wide as basal width of greenish region **15**

14(13) Scutellum with elongate greenish mark dorsally, but broadly cupreous along posterior margin anterior to marginal rim; pronotal collar dorsally with large, only narrowly separated cupreous spots; vertex cupreous except along inner orbit to level of posterior ocellus . . . . ***Lycisca decora* Strand**

– Scutellum with large, anteriorly convergent bluish region extending from and including marginal rim; pronotal collar dorsally without distinct cupreous spots; vertex mostly blue/green with cupreous spot only posterior to ocelli [Colombia (1♀ BMNH)] . . . . ***Lycisca* n. sp. #5**

15(13) Body only about 5 mm in length; Gt_2 entirely dark and Gt_3 at most with small lateral metallic spot; meso- and metatarsi with apical 2 segments dark brown, distinctly contrasting with basal yellow segments; pronotum entirely bluish to purple [Peru (1♀ CDFA, 1♀ USNM)] . . . . ***Lycisca* sp. #6**

– Body about 10 mm in length; Gt_2 and sometimes Gt_3 with medial green or blue mark, and/or meso- and metatarsi almost uniformly brownish-yellow to dark brown; pronotum sometimes with paramedial cupreous/dark spots . . . **16**

16(15) Mesoscutal medial lobe entirely cupreous/black between notauli . . . . ***Lycisca amazonica* Roman**

– Mesoscutal medial lobe with posterior margin broadly green [Trinidad (1♀ BMNH, 1♀ USNM)] . . . . ***Lycisca* n. sp. #7** [possibly just color form of *L. amazonica*, but two males from Trinidad with same mesoscutal color pattern, see couplet 25]

17(1) Gt_1 punctate to reticulate, at least medially (Fig. 379) **18**
– Gt_1 at most finely coriaceous (Fig. 377) **24**

18(17) Head with frontovertex extensively black/cupreous and with elongate bright cupreous region behind eye on gena and postgena; pronotum largely black/cupreous dorsally except anteriorly on neck and narrowly along posterior margin; mesoscutal lateral lobe with large cupreous region attenuated to point at anteromedial angle of axilla, with lateral margins narrowly blue-green and with more extensive triangular blue-green region anterior to preaxillar margin adjacent to notaulus . . . . ***Lycisca*** ? ***romandi*** **Westwood**
– Head at least without bright cupreous region behind eye; pronotum either mostly dull olive green except for slender posterior margin **or** mesoscutal lateral lobe with at least posterior half blue to bright green **19**

19(18) Pronotum more or less uniformly dark to dull olive green with only very obscure cupreous luster under some angles of light, except for bright green line along posterior margin and often anteriorly on neck; mesoscutal lateral lobe with only about posterior 0.2–0.3 bright green, the region not extending anteriorly beyond level of tegula . . . . ***Lycisca maculipes*** **(Cameron)**
– Pronotum with different color pattern, usually blue or with transverse, medial black/cupreous band; mesoscutal lateral lobe with at least about posterior half bright green or blue, the region extending anteriorly along mesoscutal margin beyond level of tegula **20**

20(19) Legs with pro- and mesocoxae yellow, similar in color to rest of legs but contrasting distinctly with metallic metacoxa; propodeum with variably distinct median carina extending almost to anterior margin . . . . ***Lycisca*** ? ***amazonica*** **Roman** (in part, see couplet 24)
– Legs with all coxae dark brown to metallic in distinct contrast with rest of legs; propodeum with median carina at extreme posterior margin, if at all . . **21**

21(20) Head with lower parascrobal region lateral to torulus in almost same flat plane as lower face; scutellum with large posteromedial bluish region extending linearly to anterior margin; pronotum entirely blue-purple . . . . ***Lycisca cyaniceps*** **Roman**
– Head with lower parascrobal region lateral to torulus distinctly convex relative to lower face; scutellum entirely cupreous/black except sometimes linearly along posterior margin; pronotum with variably large medial cupreous/black spot or transverse band **22**

22(21) Lower face, including interantennal region and lower parascrobal region, with bright yellowish-rufous luster, and with comparatively large and distinct punctures on lower parascrobal region and lower face between malar sulcus and torulus . . . . ***Lycisca nebulipennis*** **Strand**
– Lower face mostly greenish below toruli, and rugulose-strigose on lower parascrobal region and lower face between malar sulcus and torulus . . **23**

23(22) Gt_1 punctulate; metatarsus uniformly yellowish-brown to dark brown; specimen at least 6 mm in length . . . . ***Lycisca ignicaudata* Westwood**

– Gt_1 reticulate; metatarsus with apical 2 segments dark brown and basal 3 segments yellowish; specimen tiny, only about 3 mm in length [Brazil (1♂ USNM)] . . . . ***Lycisca* sp. M#1**

24(17) Mesoscutal medial lobe entirely cupreous/dark or at most only extreme posterolateral margins bluish-green . . . . ***Lycisca* ? *amazonica* Roman** (in part, see couplet 20)

– Mesoscutal medial lobe broadly bluish-green along posterior margin **25**

25(24) Scutellum comparatively broad, flat, and with large anteriorly convergent bluish region [Colombia (1♂ USNM)] . . . . ***Lycisca* ? n. sp. #5**

– Scutellum distinctly convex and with ⊥-like bluish region along posterior margin and posteromedially [Trinidad (1♂ CNCI, 1♂ USNM)] . . . . ***Lycisca* n. sp. #7**

***Neoepistenia* Hedqvist**

Figs 380–387

Neoepistenia Hedqvist, 1959: 194–196. Type species: *Neoepistenia flavoscapus* Hedqvist, by original designation and monotypy.

Diversity. One described and at least two undescribed species based on females; known from the Neotropical region [Brazil, *Ecuador, *French Guiana, *Guyana, *Peru, *Suriname].

✓ ***Neoepistenia flavoscapus* Hedqvist**, 1959: 196; ♀ holotype (NHRS). DISTRIBUTION: Brazil, *Ecuador (CNCI, UCDC, USNM), *French Guiana (CNCI), *Peru (UCDC, USNM), *Suriname (RMNH).

Biology. Unknown.

Description. *Head* (Figs 380–382). Scrobal depression extending to within about 1 OD of anterior ocellus (Fig. 381), with outer but not dorsal margin carinate (Fig. 380); scrobes and channel uniformly transversely coriaceous-reticulate. Face with parascrobal region punctate-reticulate to rugulose (Fig. 380). Interantennal region narrow, abruptly margined, and acutely angled dorsally, with dorsal angle gradually sloped toward bottom of scrobal depression. Vertex with posterior ocellus separated from inner orbit by distance at most subequal to minimum diameter of ocellus. Occiput without occipital carina (Fig. 382). Gena without genal flange evident in lateral view when head appressed to prothorax. Eye superficially bare to densely microsetose; in dorsal view upper inner orbits of eyes divergent posteriorly from about level of posterior ocelli (Fig. 381). Torulus with about middle in line with lower margin of eye.

Mesosoma variable in color but pronotal collar, mesoscutum and scutellum without abruptly delineated regions of contrasting bright metallic colors. Pronotum bell-shaped, and slightly wider than long (Fig. 382). Mesoscutum punctate with rosetteform subsculpture. Scutellum in lateral view with dorsal surface comparatively flat, with marginal rim extending over base of propodeum by distance less than half length of propodeum (Fig. 383). Dorsellum at least partly concealed under scutellar lip. Prepectal panel flat. Upper mesepimeron smooth and shiny to finely aciculate over bare region; lower mesepimeron entirely punctate-reticulate. Propodeum (Figs 386, 387) with postspiracular furrow behind spiracle, with more distinct, crenulate paraspiracular furrow differentiating callus from plical region, and with comparatively obscure crenulate furrow along anterior margin continuing along either side of complete median carina; callus setose to level of paraspiracular furrow; plical region bare and uniformly punctate-reticulate except for median carina.

Forewing variably distinctly infuscate, with or without hyaline region(s) behind marginal vein having white setae.

Legs. Profemur with distinct subapical ventral angulation; protibia with sinuate, carinate ventral margin over about basal half (Fig. 384). Metacoxa with (Fig. 387) or without dorsal carina but setose dorsally.

Metasoma. Gaster with Gt_1 strongly coriaceous to reticulate; Gt_2 exposed, reticulate to reticulate-punctate (Figs 385–387). Hypopygium extending beyond level of apex of metacoxa by distance about twice length of metacoxa and half length of gaster, to or slightly beyond level of posterior margin of Gt_4 (Fig. 385).

Remarks. Hedqvist (1959) stated that *Neoepistenia* is related to *Urolycisca*, but did not give any reasons for this conclusion. In his key to genera, both *Neoepistenia* and *Urolycisca* were segregated from other genera around *Lycisca* based on members having bare eyes and Gt_2 exposed. However, some species I classify in *Urolycisca* have sparsely microsetose eyes and some species of *Neoepistenia* have densely microsetose eyes. Parsimony analyses indicated different relationships of *Neoepistenia* depending on whether or not NW *Proshizonotus* was treated as a separate taxonomic unit (Figs 1*b*, 1*c*). My intuitive analysis suggests *Neoepistenia* most likely is closely related to *Romanisca* and/or *Hedqvistia* based on similar propodeal sculpture patterns, a comparatively flat scutellum, and a uniformly sculptured scrobal depression. A strongly coriaceous to reticulate Gt_1 distinguishes *Neoepistenia* from both *Hedqvistia* and *Romanisca*. Additionally, scrobal structure differentiates *Neoepistenia* from *Romanisca*, and dorsally divergent upper inner orbits (*cf*. Figs 365, 381) differentiates *Neoepistenia* from *Hedqvistia*. Further similarities and differences among the three genera are discussed under ‘Remarks’ for *Hedqvistia*.

Individuals of *N. flavoscapus* vary slightly in whether the fore and middle legs, and the hind legs beyond the coxae, are uniformly yellowish or whether the procoxa, profemur and metafemur are darker brown apically, and whether in females fl_1 is partly or entirely yellow. Males have entirely yellow antennae, whereas females have only the scape, pedicel, fl_1 partly to entirely, and sometimes the extreme base of fl_2 yellow. I have seen males that may represent three species in addition to *N. flavoscapus*. One or both of the males identified as *N*. sp. M#2 and *N*. sp. M#3 might be the opposite sex of *Neoepistenia* n. sp. #1, based on the flagellum being partly yellowish and the forewing having a hyaline region with white setae behind the marginal vein. However, the forewing and flagellar color patterns of both males differ somewhat from that described for the single known female of *Neoepistenia* n. sp. #1. More material is required to determine whether the differences described for the single individuals identified as *N*. sp. M#2 and *N*. sp. M#3 represent infraspecific variation and to associate the sexes.

Key to species of *Neoepistenia* Hedqvist

1 Female **2**

– Male **4**

2(1) Flagellum dark basally and apically, but with at least fl_5 and fl_6 light colored; forewing with discrete anterior and posterior hyaline spots behind marginal vein having white setae; eye densely microsetose, though setae very short [Brazil (1♀ CNCI), Ecuador (1♀ USNM)] . . . . ***Neoepistenia* n. sp. #1**

– Flagellum entirely dark or with at most fl_1 and fl_2 partly yellow; forewing with variably distinct longitudinal infuscate band contiguous with apex of stigma delineating more hyaline region behind marginal vein, but the lighter region with brown setae; eye bare or superficially bare, at most only very sparsely microsetose (Figs 380, 381) **3**

3(2) Antenna with pedicel and at least fl_1 yellow; scutellum with vertical (Fig. 383) or posteroventrally faced, transversely aciculate-coriaceous (Fig. 386) marginal rim; gaster, excluding ovipositor sheaths, subequal in length to combined length of head and mesosoma; ovipositor sheaths projecting for distance subequal to length of hind basitarsus . . . . ***Neoepistenia flavoscapus* Hedqvist**

– Antenna with pedicel and flagellum dark brown; scutellum with posterodorsally faced, obscurely coriaceous, shiny marginal rim (Fig. 387); gaster, excluding ovipositor sheaths, about 1.3 times combined length of head and mesosoma; ovipositor sheaths projecting for distance subequal to combined length of basal 3 or 4 segments of metatarsus [Ecuador (1♀ USNM), French Guiana (2♀♀ CNCI), Guyana (1♀ CNCI)] . . . . ***Neoepistenia* n. sp. #2**

4(1) Forewing almost hyaline, at most with longitudinal infuscate band and without hyaline regions having white setae; eye superficially bare (Figs 380, 381), only very sparsely and inconspicuously setose **5**

– Forewing distinctly infuscate behind marginal vein and with anterior and posterior hyaline spots or almost complete hyaline band behind marginal vein having white setae; eye distinctly microsetose **6**

5(4) Antenna entirely yellow; scutellum in lateral view with marginal rim projecting as thin shelf above and over base of propodeum (Fig. 383) . . . . ***Neoepistenia flavoscapus* Hedqvist**

– Antenna with pedicel and flagellum dark; scutellum in lateral view with marginal rim appressed to base of propodeum and not shelflike [Brazil (1♂ CNCI), Ecuador (1♂ USNM)] . . . . ***Neoepistenia* sp. M#1**

6(4) Flagellum with fl_5–fl_7 whitish; forewing with hyaline line behind length of marginal vein, the line only about as wide as marginal vein, and with apical, attenuated hyaline region narrowly continuous with distinct posterior hyaline spot; scutellum in lateral view weakly convex, distinctly curved down posteriorly [Peru (1♂ CNCI)] . . . . ***Neoepistenia* sp. M#2**

– Flagellum with fl_5 and fl_6 whitish, though apex of fl_4 and base of fl_7 also slightly lighter in color; forewing with much broader hyaline band behind marginal vein, and apical hyaline region distinctly separated from indistinct posterior hyaline spot; scutellum in lateral view almost flat, not distinctly curved down to marginal rim [Brazil (1♂ CNCI)] .... ***Neoepistenia* sp. M#3**

Paralycisca Hedqvist

Figs 388–395

Paralycisca Hedqvist, 1959: 192. Type species: *Paralycisca cristata* Hedqvist, by original designation and monotypy.

Diversity. One described and one undescribed species based on males; known from the Neotropical region [Brazil, *Ecuador, Panama, *Peru].

✓ ***Paralycisca cristata* Hedqvist**, 1959: 192–193; ♀ holotype (NHRS). DISTRIBUTION: Brazil, *Ecuador (USNM), Panama, *Peru (USNM).

Biology. Unknown, but the type material of *P. cristata* was originally collected on felled tree trunks.

Description. *Head* (Figs 388–390). Scrobal depression deep ventrally and abruptly angled dorsally relative to vertex, with anterior ocellus superficially within depression if upper parascrobal region cristate to level of anterior margin of posterior ocellus (Fig. 388); scrobes and channel smooth and shiny (Fig. 388) or uniformly punctulate-reticulate (Fig. 389). Face with upper parascrobal region convex, raised distinctly above plane of eye and with coarse cristate sculpture extending to level about equal with either anterior (Fig. 389) or posterior (Fig. 388) ocellus. Interantennal region abruptly margined, acutely angled dorsally with ridgelike dorsal margin abruptly angled to bottom of scrobal depression. Vertex with posterior ocellus subcontiguous with inner orbit or separated by distance subequal to minimum diameter of posterior ocellus or POL. Gena without evident genal flange when head appressed to prothorax and occiput without occipital carina (Fig. 390). Eye sparsely (Fig. 389) to densely (Fig. 390) microsetose; in dorsal view upper inner orbits parallel to slightly incurved toward each other behind posterior ocelli. Torulus with dorsal margin in line with or slightly below lower margin of eye.

Mesosoma of female with mesonotum having dark regions abruptly contrasting with bluish-green regions, but neither sex having abruptly delineated, distinctly cupreous regions. Pronotum (Figs 391, 394) bell-shaped, and at least slightly wider than long. Mesoscutum punctate with rosetteform subsculpture. Scutellum in lateral view with dorsal surface moderately convex, with marginal rim extending over dorsellum and with scutellar lip normally touching base of propodeum. Dorsellum usually concealed under marginal rim of scutellum. Prepectal panel flat. Upper mesepimeron with bare region transversely aciculate, to coriaceous ventrally; lower mesepimeron strigose to reticulate-strigose. Propodeum of female (Fig. 392) with postspiracular furrow behind spiracle, with obscurely crenulate furrow along lateral quarter to third of anterior margin, and with much deeper paraspiracular furrow recurved posteriorly from anterior crenulate furrow differentiating callus from plical region; callus largely bare behind spiracle, but with at least a few setae along posterior margin to level of paraspiracular furrow; plical region with at least a few setae anteromedially, with median carina, and posteriorly with distinct, transverse, arcuate carina differentiating subdivided lunate region anterior to foramen, with surface of panel otherwise mostly shiny or at most very obscurely coriaceous excluding short crenulae radiating from carina of lunate region. Propodeum of male (Figs 393, 395) with median carina and transverse arcuate carina near foramen, but with plical region bare and more extensively reticulate-strigose to longitudinally carinate.

Forewing hyaline.

Legs. Profemur with distinct subapical ventral angulation; protibia with sinuate, carinate ventral margin over about basal half. Metacoxa carinate dorsally and setose exterior to carina.

Metasoma. Gaster with Gt_1 smooth and shiny (Figs 392, 393, 395); Gt_2 normally concealed under Gt_1 (Fig. 393) or with only sublinear smooth band evident in female (Fig. 392), but if more extensively exposed then smooth and shiny (Fig. 395). Hypopygium extending beyond level of apex of metacoxa by distance less than length of metacoxa, about to level of posterior margin of Gt_3.

Remarks. In addition to the type female, I have seen four females and one male from Brazil (BMNH) I identify as *P. cristata*; Gt_2 varies from entirely concealed under Gt_1 to extensively exposed, but I suspect the latter structure is an artifact of preservation. The male, which is only about 2 mm in length, differs most conspicuously from the females by having brown pro- and mesocoxae; it also has only a very obscure metallic luster rather than having distinctly contrasting dark and metallic bluish-green regions dorsally on the mesonotum, though this latter feature might be correlated with its small size. The male also has Gt_2 exposed as a strongly transverse (sublinear) smooth and shiny band (Fig. 393), which may represent the normal state for females of the species, and a non-setose plical region. I have also seen two other males from Brazil (CNCI) and Peru (USNM) that represent a second species, *Paralycisca* n. sp. #1. These two males also have a bare plical region and the pro- and mesocoxae dark, but differ from the male identified as *P. cristata* by having the upper parascrobal region raised and cristate only to a level about equal with the anterior margin of the anterior ocellus (Fig. 389) rather than to the posterior ocellus (Fig. 388), the scrobal depression uniformly punctulate-reticulate rather than smooth and shiny, the posterior ocellus separated from the inner orbit by a distance about equal to the diameter of an ocellus or POL, and Gt_3–Gt_5 with more regular, isodiametric reticulate-punctate sculpture. Furthermore, Gt_2 is a rectangular sclerite in both specimens, being exposed for a distance about equal to one-third to half the length of Gt_1 (Fig. 395). The unknown females of *Paralycisca* n. sp. #1 probably have a head structure similar to males of the species; they may have Gt_2 distinctly exposed, but likely it is smooth and shiny.

Paralycisca is differentiated from all other New World Clade genera by the presence of a convex, cristate parascrobal region similar to the Old World genus *Marxiana*. When Hedqvist (1959) established *Paralycisca* he stated that the genus is similar to *Lycisca* and in propodeal structure to *Epistenia*. Females of *P. cristata* do share a setose propodeal plical region with *Lycisca*, but plical setae apparently evolved independently in *Marxiana* and in *Parepistenia*. Both sexes of the last three genera have a setose plical region, whereas known males of *Paralycisca* have a bare plical region. The sexual dimorphism may support an hypothesis that a setose plical region evolved independently in female *P. cristata*. *Paralycisca* is otherwise morphologically similar to *Protoepistenia* and *Amazonisca*. Parsimony analyses retrieved *Paralycisca* as the sister group of *Amazonisca* + *Scaphepistenia*, as one of the very few resolved relationships within the New World Clade of genera prior to successive weighting (Fig. 1*a*) (see Remarks for *Amazonisca*). Discovery of the female of *Paralycisca* n. sp. #1 is important for determining monophyly and relationships of the genus. It is necessary to determine whether females have a reticulate scrobal channel and exposed Gt_2 similar to males, and whether the plical region has setae similar to females of *P. cristata*. Absence of plical setae would indicate presence of setae in *P. cristata* females is secondary. Females of *P. cristata* have the scrobal channel shiny with a definite recurved dorsal margin forming the dorsal limit of the 'true' scrobal channel anterior to the anterior ocellus (Fig. 388), as well as having Gt_2 normally concealed. These features are not indicative of *Lycisca*, though they are shared with several other New World Clade genera. Because males of *Paralycisca* n. sp. #1 have a reticulate scrobal depression and an exposed Gt_2, it is possible their raised, cristate upper parascrobal region (Fig. 389) evolved independently to *P. cristata*. If so, *Paralycisca* n. sp. #1 and *P. cristata* likely are not closely related.

***Proglochin* Philippi**

Figs 396–403

Proglochin Philippi, 1871: 288–289, figs 3a–3c. Type species: *Proglochin maculipennis* Philippi, by monotypy. Synonym of *Lycisca* Spinola (Westwood 1874: 147); synonym of *Epistenia* Westwood (Hedqvist 1959: 177) by implication through transfer of type species; reestablished as valid genus by De Santis (1960: 117).

Neolycisca Hedqvist, 1959: 198–199. Type species: *Neolycisca maculata* Hedqvist, by original designation. **New synonymy**.

Diversity. Two described and probably at least three undescribed species based on females; known from the Neotropical region [Argentina, Chile].

✓ ***Proglochin maculata* (Hedqvist), new combination**. *Neolycisca maculata* Hedqvist, 1959: 199–200; ♂ holotype (USNM: 64837). DISTRIBUTION: Argentina.

***Proglochin maculipennis* Philippi**. *Proglochin maculipennis* Philippi, 1871: 288–289, figs 3a–3c; ♀ type (location uncertain). *Lycisca maculipennis* (Westwood 1874: 149), *Epistenia maculipennis* (Hedqvist 1959: 177; 1961: 99). DISTRIBUTION: Chile.

Biology. Unknown.

Description. *Head* (Figs 396–399). Scrobal depression variable in structure and sculpture: either with distinct, uniformly margined, ∩-like depression (dorsal margin sometimes more or less m-like) separated from anterior ocellus by up to 1 OD, with channel abruptly recurved to dorsal margin but surface otherwise flat and punctate-reticulate, similar to scrobes (Fig. 397), or with outer margin of channel reflexed into carina and extending to or almost to anterior ocellus, with channel surface more or less distinctly undulating near ocellus and dorsal concave portion somewhat smoother and shinier than transversely striate-reticulate scrobes and ventral portion of channel (Fig. 396). Face with parascrobal region reticulate to reticulate-alveolate. Interantennal region abruptly margined, acutely angled dorsally with ridgelike dorsal margin (Fig. 396) abruptly angled or gradually sloped to bottom of scrobal depression. Vertex with posterior ocellus separated from inner orbit by distance about equal to maximum diameter of posterior ocellus. Gena without evident genal flange when head appressed to prothorax; occiput with (Fig. 399) or without (Fig. 398) fine carina laterally near occipital foramen. Eye densely microsetose (Figs 396, 397); in dorsal view with upper inner orbits subparallel for short distance behind posterior ocelli. Torulus with dorsal margin obviously below lower margin of eye.

Mesosoma variably extensively rufous dorsally with pronotal neck sometimes bright green, but pronotal collar, mesoscutum and scutellum without abruptly delineated regions of contrasting bright metallic colors. Pronotum conspicuously wider than long in female (Figs 398, 399) and at least slightly wider than long in male. Mesoscutum punctate with coriaceous subsculpture. Scutellum in lateral view with dorsal surface convex, distinctly curved down to marginal rim projecting over dorsellum and extreme base of propodeum (Fig. 403). Dorsellum at least partly concealed by scutellar rim. Prepectal panel flat and uniformly metallic. Upper mesepimeron extensively punctate-rugulose over bare region and ventrally smooth to finely aciculate-coriaceous; lower mesepimeron entirely punctate-reticulate. Propodeum with paraspiracular carina or ridge, extending anteriorly from posterior margin mesal to spiracle, differentiating callus from convex plical region (Figs 400–402), and variably extensively crenulate along anterior margin; callus setose to level of paraspiracular carina; plical region of female bare or at most with a few setae posterolaterally and variable in structure and sculpture, sometimes with strong median, paramedial or other irregular carinae, though otherwise relatively shiny with faint coriaceous sculpture becoming more distinct laterally (Fig. 400), and sometimes with only obscure Λ-like convergent or inverted Y-like median carinal complex, and then with surface more strongly coriaceous to slightly reticulate (Fig. 401); plical region of known males with median carina, with transverse, arcuate carina differentiating subdivided lunate region anterior to foramen, and with panel otherwise reticulate-rugulose with some longitudinal or irregular fine rugae (Fig. 402).

Forewing at least with distinct brown infuscation, either bimaculate with brown region behind parastigma and stigmal vein or with ∪-like brown band connecting parastigma and stigmal vein.

Legs. Profemur with subapical ventral angulation or tooth; protibia without sinuate carinate ventral margin. Metacoxa with or without distinct carina dorsally but with only extreme dorsobasal surface setose (coxa setose for most of length on inner surface interior to any carina) (Figs 400, 403).

Metasoma. Gaster of recognized males with Gt_1 strongly and entirely punctate-reticulate except for smooth posterior margin (Figs 402, 403), but Gt_1 of female sometimes quite smooth and shiny with variably extensive, often very fine coriaceous sculpture (Fig. 401); Gt_2 in male either entirely concealed under Gt_1 or only exposed as very short, smooth strip (Figs 402, 403), but in female both exposed and reticulate to punctate-reticulate (Figs 400, 401). Hypopygium extending only slightly beyond level of apex of metacoxa, to level of posterior margin of Gt_3.

Remarks. I was unable to locate the type specimen of *Proglochin maculipennis*. My concept of the genus and species is based on the description and color dorsal habitus of the female type specimen provided with the original description.

Proglochin, *Urolycisca*, and at least *Scaphepistenia scutata*, are sexually dimorphic in the structure of Gt_2. Females have Gt_2 exposed and variably conspicuously sculptured, but males have Gt_2 concealed. *Proglochin* and *Urolycisca* differ from *Scaphepistenia* by having Gt_1 variably conspicuously sculptured in both sexes and Gt_2 distinctly punctate-reticulate in females, as well as by lacking a genal flange and having the metacoxa at least sparsely setose dorsally exterior to a dorsal carina. All *Proglochin* have the mesonotum dull green to rufous, to a greater or lesser extent, but at least they lack the distinctly bicolored mesonotal color pattern of *Urolycisca*. Known *Proglochin* also differ from *Urolycisca* by having the metacoxa bare dorsally, the eye densely microsetose, and probably differ by not having the protibia ventrally carinate, though this last feature cannot be observed in most available specimens because the femur and tibia are closely appressed. *Proglochin* females also have Gt_6 quite distinctly ridged mediolongitudinally. At least females of *Proglochin* can be segregated into two species groups based on several features given in couplet 2 of the following key. One species group, the *maculipennis*-group, most closely resembles *Urolycisca* and several other New World Clade genera because they have a scrobal channel whose outer margin is reflexed into a carina and has an undulating surface (Fig. 396), as well as an at least medially longitudinally carinate propodeum (Fig. 400). Furthermore, all *maculipennis*-group species have Gt_1 extensively and coarsely sculptured. The other unnamed species group consists entirely of undescribed species known only from females. Females of this latter species group are more similar to several other New World Clade genera that have the scrobal channel uniformly carinately margined and sculptured (Fig. 397) and a conspicuously coriaceous-reticulate propodeal plical region (Fig. 401). Females of this species group also have Gt_1 much more finely sculptured (Fig. 401) than those of the *maculipennis*-group. Consequently, *Proglochin* may represent a grade of structure having some sort of intermediate relationships between *Urolycisca* and one or more other genera with scrobal and propodeal sculpture patterns similar to the unnamed species group. Parsimony analyses indicated some sort of relationship with *Urolycisca*, but only after successive weighting (Figs 1*b*, 1*c*).

Key to species of *Proglochin* Philippi

1 Female **2**
– Male **7**

2(1) Gt_1 coriaceous to finely reticulate, much less extensively and distinctly sculptured than Gt_2 (Fig. 401); propodeum with plical region extending posterior to level of posterior margin of callus and coriaceous-reticulate with some fine, oblique, irregular rugae (Fig. 401), but otherwise at most with 1 fine median carina; scrobal depression with distinct ∩-like dorsal margin separated from anterior ocellus, and with surface of channel flat and uniformly sculptured (Fig. 397); metacoxa dorsally angulate but without distinct carinate margin; postocciput with fine occipital carina laterally (Fig. 399) **3**

– Gt_1 strongly punctate-reticulate, somewhat more densely so than on Gt_2 (Fig. 400); propodeum with plical region transverse, not extending posterior to level of posterior margin of callus, and with at least 3 strong longitudinal carinae medially (Fig. 400); scrobal depression with outer margin of channel carinately reflexed, and with surface undulating and smoother and shinier dorsally (Fig. 396); metacoxa with smooth carinate margin along dorsal length; postocciput without evident occipital carina (Fig. 398) **5**

3(2) Forewing with ∪-like brown band extending between parastigma and stigmal vein, and with white setae in hyaline region behind marginal vein; Gt_1 with some shallow reticulations basomedially [Chile (1♀ CASC)] . . ***Proglochin* n. sp. #1**

– Forewing bimaculate, with separate brown regions behind parastigma and stigmal vein, and with setae behind marginal vein brown; Gt_1 coriaceous **4**

4(3) Body large, about 10 mm in length; Gt_4 obviously elongate-rectangular, about 1.4 times as long as wide; legs with metafemur dark, but otherwise orange beyond coxae [Chile (1♀ CNCI)] . . . . ***Proglochin* n. sp. #2**

– Body small, about 5 mm in length; Gt_4 only about 1.2 times as long as broad; legs almost uniformly brown beyond coxae, but somewhat lighter in color apically [Chile (1♀ CNCI)] . . . . ***Proglochin* n. sp. #3**
[the two females may represent only a single variable species]

5(2) Syntergum elongate, precercal distance almost or fully twice postcercal distance [Chile (2♀♀ CNCI, 1♀ CASC)] . . . . ***Proglochin* ? *maculipennis* (Philippi)**

– Syntergum relatively short, precercal and postcercal distance subequal **6**

6(5) Gaster elongate, about 7 times as long as wide; profemur uniformly orange [Argentina (1♀ BMNH)] . . . . ***Proglochin maculata* (Hedqvist)**

– Gaster less than 5 times as long as wide; profemur dark dorsally and orange along ventral length [Chile (2♀♀ CNCI, 1♀ UCDC)] . . . . ***Proglochin* n. sp. #4**

7(1) Profemur uniformly dark with slight greenish luster, similar to mesosoma [Argentina (1♂ BMNH)] . . . . ***Proglochin maculata* (Hedqvist)**

– Profemur variably extensively orange ventrally [Chile (2♂♂ CASC, 1♂ UCDC)] . . . . ***Proglochin* sp. M#1**

***Protoepistenia* new genus**

Figs 404–411

Etymology. Combination of the Greek word *protos* (first) and *Epistenia*, in reference to the possibility species assigned to this genus may represent species within a monophyletic lineage basal to species classified in *Epistenia*.

Type species. *Protoepistenia melanocara* Gibson, by present designation.

Diversity. The type species and possibly seven undescribed species based on females; known from the Neotropical region [*Brazil, *Colombia, *Ecuador, *Panama, *Peru].

Biology. Unknown.

Description. *Head* (Figs 404–406). Scrobal depression extending to anterior ocellus; scrobal channel with outer margin carinately reflexed but without distinct dorsal margin, the channel surface at least slightly depressed or undulating near anterior ocellus and smooth and shiny dorsally; scrobes shiny or finely coriaceous (Fig. 404). Face with parascrobal region reticulate to reticulate-alveolate. Interantennal region acutely angled and abruptly margined dorsally, the carinate or ridgelike dorsal margin sometimes projecting slightly above plane of surface as convex process (Fig. 404). Vertex with posterior ocellus separated from inner orbit by distance at least equal to 1 OD and/or POL. Gena without evident genal flange when head appressed against prothorax and occiput without occipital carina, though sometimes with oblique groove near occipital foramen (Fig. 406). Eye moderately to densely microsetose; in dorsal view with upper inner orbits at least very slightly divergent behind posterior ocelli. Torulus with dorsal margin at or slightly below lower margin of eye.

Mesosoma variably yellowish-green to cupreous dorsally, or distinctly bicolored with mesonotum and sometimes pronotum having abruptly delineated cupreous/black regions contrasting with metallic blue or green regions. Pronotum with distinctly differentiated transverse-rectangular collar (Fig. 407). Mesoscutum punctate with interstices smooth and shiny or with variably distinct rosetteform subsculpture. Scutellum in lateral view with dorsal surface distinctly convex and above level of propodeum, and with marginal rim projecting for variable distance over propodeum, sometimes to base of gaster. Dorsellum often mostly concealed under scutellum. Prepectal panel flat. Upper mesepimeron extensively punctate-setose dorsally and smooth to finely aciculate-coriaceous ventrally; lower mesepimeron mostly smooth and shiny to entirely punctate-reticulate. Propodeum with variably distinct paraspiracular ridge separating postspiracular furrow behind spiracle from longitudinal paraspiracular furrow, which differentiates callus from bare plical region, and with variably distinct crenulate furrow along at least lateral quarter of anterior margin; callus variably setose, but at least bare within postspiracular furrow; female with plical region short and at least partly longitudinally carinate (Figs 408–410), often with median smooth region delineated between paramedially recurved carinae that parallel foramen (Fig. 410); male with more distinct, inverted Y-like median carinal complex (Fig. 411), and with panels otherwise partly coriaceous and/or longitudinally carinate.

Forewing hyaline or with mediolongitudinal or ∪-like infuscate band.

Legs. Profemur with (Fig. 405) or without subapical ventral angulation or tooth; protibia with or without sinuate, carinate ventral edge over about basal half. Metacoxa not carinate but setose dorsally (Fig. 409).

Metasoma. Gaster (Figs 408–411) with Gt_1 smooth and shiny; Gt_2 normally concealed dorsally or exposed for distance at most about equal to length of apical smooth band on Gt_3 (Fig. 410), but if secondarily more extensively exposed (Fig. 411) then smooth and shiny. Hypopygium at most extending only slightly beyond level of apex of metacoxa, to level of posterior margin of Gt_3.

Remarks. When NW *Proshizonotus* was treated as a separate taxonomic unit, parsimony analysis indicated *Protoepistenia* as the sister group of *E.* (*Epistenia*) within an assemblage including *E.* (*Punctepistenia*), *Proglochin* and *Urolycisca* (Fig. 1*c*). Both sexes of species I classify in *Protoepistenia* have Gt_1 smooth and shiny, Gt_2 concealed or only very narrowly exposed but entirely smooth and shiny, the metacoxa setose dorsally but without a carina, and they lack an evident genal flange. Both sexes of *Urolycisca* also lack a distinct genal flange and have the metacoxa setose dorsally, but have at least some punctures Gt_1; female *Urolycisca* also have Gt_2 exposed. Individuals of *E.* (*Epistenia*) resemble *Protoepistenia* because Gt_2 normally is concealed and Gt_1 is smooth and shiny, but are differentiated by a distinct genal flange and a metacoxa that is bare dorsally exterior to a distinct carina. Individuals of *Protoepistenia* are also similar to individuals of *Shedoepistenia*, particularly in propodeal sculpture pattern, but species assigned to *Shedoepistenia* have a genal flange and an extensively exposed and sculptured Gt_2. All of these genera may well represent grades of structure or render one another paraphyletic within a single lineage.

The features listed above as diagnostic for *Protoepistenia* are also diagnostic for *Paralycisca* and, except for a concealed Gt_2, for *Amazonisca*. Individuals of *Paralycisca* are differentiated by their convex, cristate parascrobal region, whereas individuals of *Amazonisca* have the dorsal margin of the scrobal channel abruptly recurved and margined (Figs 336–339). Females of *P. cristata* and *Amazonisca* also have a somewhat different propodeal sculpture pattern from *Protoepistenia* females (see Remarks for respective genera), though the single known female of *Protoepistenia* n. sp. #4 has a continuous Λ-like carina with a strong longitudinal carina on either side (Fig. 408), similar to some *Amazonisca* females (Fig. 342). The propodeal sculptural pattern of female *Protoepistenia* is variable. Females of *Protoepistenia* n. sp. #1 have a medial band of crenulae and an arcuate smooth band along the foramen (Fig. 410), which is unique in the genus. This structure is similar to females of *Hadroepistenia* (Fig. 359) and might represent the groundplan sculpture for *Protoepistenia*. Females of other species have a distinct transverse carina posteriorly, which delineates a groove or more distinct lunate region along the foramen (Figs 408, 409). The carina is recurved toward the anterior margin of the propodeum paramedially so as to delimit a medial smooth region or at least more weakly longitudinally carinate region (except *Protoepistenia* n. sp. #4).

I differentiate eight morphospecies below based on only eight females. Some of the observed differences are correlated with size and may represent infraspecific rather than interspecific variation.

Key to species of *Protoepistenia* new genus

1 Female **2**

– Male **9**

2(1) Pro- and mesocoxae metallic blue, conspicuously darker than rest of respective leg and similar to metacoxa; syntergum with precercal length about 1.2 times as long as postcercal length; propodeal plical region longitudinally crenulate with transverse smooth band along foramen (Fig. 410) [Ecuador (1♀ CNCI)] . . . . **Protoepistenia n. sp. #1**

– Pro- and mesocoxae yellowish, similar in color to rest of respective leg and conspicuously different from metacoxa; syntergum with precercal length at most equal to postcercal length; propodeal plical region with transverse, arcuate carina along foramen (Figs 408, 409), the carina often incomplete medially so as to delimit a medial smooth region (*cf.* Figs 436, 438) . . . **3**

3(2) Mesonotum distinctly bicolored, with bright cupreous regions abruptly differentiated from bluish-green regions **4**

– Mesonotum more or less uniformly greenish to cupreous without abruptly contrasting regions **7**

4(3) Forewing hyaline; Gt_3 with small basomedial greenish spot, but gaster otherwise dark dorsally; vertex with distinctly delineated black band between eyes at level of ocelli; metacoxa with about apical half yellowish . . . . ***Protoepistenia melanocara*** **n. sp.**

– Forewing bimaculate or with infuscate regions behind stigma and parastigma joined into ∪-like band; Gt_3 and Gt_2 both with large greenish spot or transverse band; vertex without distinctly delineated black band; metacoxa entirely metallic, at least laterally **5**

5(4) Eye densely microsetose; Gt_3 with transverse greenish band over about medial two-thirds and Gt_4 with only subcircular basomedial greenish spot; vertex distinctly cupreous on upper parascrobal region lateral to reflexed margin of scrobal channel and around anterior ocellus [Brazil (1♀ USNM)] . . . . ***Protoepistenia*** **n. sp. #2**

– Eye sparsely microsetose; Gt_3 and Gt_4 both with transverse greenish band over almost entire width; vertex with upper parascrobal region and around anterior ocellus blue to purple **6**

6(5) Propodeal plical region with complete, transverse, arcuate carina delineating linear furrow along foramen, and with irregular longitudinal crenulae; syntergum about 3 times as long as greatest width; laterotergite of Gt_5 with posteriorly attenuated cupreous region over about dorsal and anterior half, elsewhere greenish to blue [Brazil (1♀ USNM)] . . ***Protoepistenia*** **n. sp. #3**

– Propodeal plical region with more distinct Λ-like carina bounded by strong, paramedial longitudinal carina (Fig. 408); syntergum only about twice as long as greatest width; laterotergite of Gt_5 with oblique greenish-blue band separating anterodorsal and posteroventral cupreous regions [Panama (1♀ RMNH)] . . . . ***Protoepistenia*** **n. sp. #4**

7(3) Gaster with bright greenish bands laterally on Gt_3–Gt_5; face with parascrobal region dark, similar to vertex; interantennal region with dorsal angle distinctly projecting as rounded flange [Panama (1♀ CNCI)] . ***Protoepistenia*** **n. sp. #5**

– Gaster dorsally dark bronze with at most a medial green spot on Gt_3; face with parascrobal region entirely or extensively blue to green; interantennal region with dorsal angle not projecting conspicuously **8**

8(7) Gaster dorsally dark bronze without bright greenish regions; antenna with scape and fl$_1$–fl$_3$ yellowish (fl$_3$ more brownish-yellow) [Ecuador (1♀ USNM)] . . . . ***Protoepistenia* n. sp. #6**

– Gaster with green spot medially on Gt$_3$; antenna uniformly dark except for metallic green luster on scape and pedicel [Ecuador (1♀ USNM)] . . . . ***Protoepistenia* n. sp. #7**

9(1) Mesosoma dorsally uniformly bluish-green without cupreous regions [Peru (1♂ CNCI)] . . . . ***Protoepistenia* sp. M#1**

– Mesosoma dorsally almost entirely cupreous/rufous or with conspicuous bicolored pattern **10**

10(9) Face rufous except along mouth margin and within scrobal channel, and without dense lanceolate setae; mesonotum rufous, similar to face, except posterior margin of collar, notauli linearly, mesoscutal and parascutal margins of lateral lobe narrowly, axilla posteriorly, and apical margin of scutellum narrowly, blue; forewing bimaculate, with dark brown regions extending from stigma and parastigma; mesonotum punctulate [Brazil (1♂ CNCI)] . . . . ***Protoepistenia* sp. M#2**

– Face uniformly blue to green; mesonotum sometimes entirely cupreous, but usually conspicuously bicolored with extensive blue to green regions; forewing hyaline or with only very faint infuscation; mesonotum punctate to umbilicate-punctate **11**

11(10) Mesonotum uniformly cupreous; face covered by dense lanceolate setae forming white reflective surface to dorsal level of scrobal channel; eye densely and conspicuously microsetose [Ecuador (2♂♂ USNM)] . . . . ***Protoepistenia* n. sp. #7**

– Mesonotum bicolored; other features variable **12**

12(11) Lower mesepimeron entirely punctulate; eye relatively sparsely microsetose, distance between setae about equal to length of seta; mesoscutal medial lobe entirely cupreous [Brazil (1♂ USNM), Ecuador (1♂ CNCI)] . . . . ***Protoepistenia* sp. M#3**

– Lower mesepimeron largely smooth or finely coriaceous to transversely strigose, though more coarsely sculptured ventrally; eye densely and conspicuously microsetose and/or mesoscutal medial lobe partly bluish-green **13**

13(12) Gt$_2$ and sometimes Gt$_3$ with large greenish region medially; forewing with faint ∪-like infuscate band connecting stigma and parastigma; mesonotum umbilicate-punctate; eye very densely and conspicuously microsetose; face with white lanceolate setae well separated, not forming reflective surface [Ecuador (4♂♂ USNM)] . . . . ***Protoepistenia* sp. M#4**

– Gt$_2$ and Gt$_3$ uniformly dark; forewing uniformly hyaline; mesonotum punctate; eye either relatively inconspicuously microsetose or face with dense lanceolate setae forming reflective surface **14**

14(13) Eye densely microsetose; face covered with conspicuous white lanceolate setae to level of dorsal margin of scrobal depression; mesonotum with mesoscutal medial lobe quite broadly bluish-green along notauli and without cupreous region anteriorly on lateral lobe . . . . . . ***Protoepistenia melanocara*** **n. sp.**

– Eye sparsely microsetose; face without conspicuous setae, the setae only slightly lanceolate and not obscuring cuticle [Colombia (1♂ CNCI)] . . . . ***Protoepistenia*** **sp. M#5**

Protoepistenia melanocara new species

Type-material. *Holotype* ♀ (USNM) — BRASIL: Amazonas, Hwy ZF 2, km 19.5, ca 60 km N. Manaus, 02°30'S 060°15'W, 18 Aug.79 - Terra firme / CANOPY FOGGING PROJECT TRS#10, Col. by hand, Adis, Erwin, Montgomery, et al. collectors. *Allotype* ♂ (USNM) — same data as holotype except collected "Tray #691."

Etymology. From the Greek words *melanos* (black, dark) and *kara* (head, top), in reference to the black band on the vertex that differentiates both sexes of this species from other known species.

Description. FEMALE. Head with face green to level of anterior ocellus, vertex black between anterior margin of anterior ocellus and posterior margin of posterior ocelli, with region behind posterior ocelli more violaceous, and posterior of head green except dark around occipital foramen. Face with inconspicuously lanceolate, white setae not obscuring cuticle. Antenna with scape green, pedicel with obscure green luster under some angles of light, but flagellum dark. Eye very densely and conspicuously microsetose (*cf*. Fig. 404).

Mesosoma green to violaceous under some angles of light except following bright cupreous: mesoscutal lobe entirely, large spot on mesoscutal lateral lobe anteromesally excluding linear notauli; and scutellum except for posteromedial spot on scutellum. Mesonotum reticulate, punctures much larger than interstices, and interstices with only very fine, subeffaced rosetteform subsculpture. Scutellum in lateral view with marginal rim extending over propodeum to level equal with base of gaster, with rim not distinctly longer medially than laterally. Lower mesepimeron almost smooth, but finely coriaceous (largely concealed by middle leg). Propodeum with distinct, complete paraspiracular carina between anterior and posterior margins; plical region with several long white setae adjacent to paraspiracular carina, and with broad medial smooth region delineated between carinae recurved from along foramen (*cf*. Fig. 436). Forewing hyaline. Legs yellow except about basal third and lateral half of metacoxa green to violaceous under some angles of light; profemur without preapical angulation; protibia not carinate ventrobasally; metacoxa with exterior surface punctate-reticulate, the reticulations aligned into oblique rows, except dorsally near line of setae.

Gaster dark dorsally, but Gt_1 with shiny cupreous luster and Gt_3 with green spot medially; Gt_1–Gt_4 with laterotergites extensively green, and Gt_5 with about dorsal half of laterotergite green; Gt_2 narrowly exposed for distance about equal to length of apical smooth margin on Gt_3; Gt_5 sculptured to posterior margin, not smooth and shiny apically. Syntergum about 1.3 times length of Gt_5, with precercal:postcercal length about 1:1.2.

MALE. Color pattern similar to female except occiput with indistinct black spot behind posterior ocelli; pronotum with transverse cupreous band medially, dorsally on vertical surface; mesoscutal medial lobe with triangular cupreous region not extending to notauli or transscutal articulation; mesoscutal lateral lobe with only very small and obscure cupreous spot; scutellum with posteromedial greenish spot larger than in female, comprising about posterior third of scutellum, and distinctly convergent anteriorly; metacoxa entirely and mesocoxa laterally dark with metallic luster; Gt_2 with only very small and obscure green spot. Setal pattern similar to female except face with distinctly lanceolate setae to level of dorsal angle of interantennal region, the setae so dense as to form a white-reflective surface under some angles of light. Structure and sculpture similar to female except propodeum with plical region longer, with distinct, inverted Y-like median carinal complex, and with panels otherwise rugulose (*cf*. Fig. 411); Gt_2 more completed concealed under Gt_1, with only extreme posterior margin exposed laterally.

Remarks. The point-mounted holotype lacks the right metatarsus, and the antennae and right half of the face are largely encased in glue. The allotype lacks the right flagellum, but otherwise is entire. I saw another male from Brazil (USNM: Amazonas, 18.1 km e. Campinas field sta. Km 60 n. Manaus, 02°30'S - 060°15'W, 22 Feb. 1979 / Montgomery, Erwin, Schimmel, Krischik, Date, Bacon cols. / Terra firme forest canopy fogging with Pyrethrum, Sample #6) I exclude from the type series, but which may represent a second male of the species. This male differs from the allotype because the scape is yellow, the head has the vertex black to a level equal with the posterior margin of the eye, the pronotum lacks the cupreous band, the mesonotal ‘cupreous’ regions are dark rather than distinctly cupreous, with the region on the medial lobe extending to the transscutal articulation, and the legs have a color pattern more similar to female *P. melanocara*.

***Romanisca* Hedqvist**

Figs 412–419

Romanisca Hedqvist, 1959: 194. Type species: *Romanisca annulicornis* Hedqvist, by original designation and monotypy.

Diversity. One described and one undescribed species known from the Neotropical region [Brazil, *Costa Rica, *Ecuador, *Guyana, *Peru, *Trinidad].

✓ ***Romanisca annulicornis* Hedqvist**, 1959: 194; ♀ holotype (USNM: 64836). DISTRIBUTION: Brazil, *Ecuador (USNM), *Guyana (BMNH), *Peru (USNM), *Trinidad (CNCI).

Biology. Unknown.

Description. *Head* (Figs 412, 413, 416, 417). Scrobal depression with carinate outer margins extending to level about equal with posterior margin of ocellus, hence anterior ocellus within depression; scrobal channel constricted and abruptly angled about midway between apex of interantennal region and anterior ocellus so as to differentiate transversely striate-reticulate vertical surface from horizontal, reticulate-coriaceous to rugulose, setose, dorsal surface (Figs 412, 413). Face with parascrobal region punctate-reticulate to rugose. Interantennal region abruptly to carinately margined, acutely angled dorsally with ridgelike dorsal margin gradually sloped toward anterior ocellus. Vertex with posterior ocellus separated from inner orbit by distance less than 1 OD. Occiput without occipital carina. Gena sometimes with very short genal flange near mandible (Fig. 416). Eye relatively conspicuously microsetose; in dorsal view upper inner orbits of eyes slightly divergent posteriorly behind posterior ocelli. Torulus with dorsal margin, to about middle, in line with lower margin of eye.

Mesosoma variable in color but pronotal collar, mesoscutum and scutellum without abruptly delineated regions of contrasting bright metallic colors. Pronotum bell-shaped, and slightly wider than long. Mesoscutum punctate with rosetteform subsculpture. Scutellum in lateral view almost flat and in same plane as base of propodeum, extending over dorsellum and normally touching base of propodeum. Dorsellum usually concealed under marginal rim of scutellum. Prepectal panel flat to variably distinctly concave posterodorsally (Fig. 416). Upper mesepimeron smooth and shiny to transversely aciculate-coriaceous over bare region; lower mesepimeron shiny dorsally to entirely coriaceous-reticulate. Propodeum (Figs 414, 415) with postspiracular furrow behind spiracle, more distinct crenulate paraspiracular furrow differentiating callus from plical region, and with variably distinct crenulate furrow along about lateral third of anterior margin; callus setose to level of paraspiracular furrow; plical region bare, with or without distinct median carina, and variably coriaceous-reticulate anterolaterally, to punctate-rugulose medially.

Forewing subhyaline or with variably distinct mediolongitudinal infuscate band.

Legs. Profemur with distinct subapical ventral angulation; protibia with sinuate, carinate ventral margin over basal half to three-quarters. Metacoxa with at least an obscure dorsal carina and bare dorsally (a few setae on inner surface).

Metasoma. Gaster with Gt_1 smooth and shiny to very finely and obscurely coriaceous; Gt_2 exposed and punctate (Figs 418, 419). Hypopygium extending beyond level of apex of metacoxa by distance at most equal to about length of metacoxa, to about middle of Gt_4.

Remarks. When Hedqvist (1959) established *Romanisca* for *R. annulicornis* he differentiated the genus in a key to genera “grouping around *Lycisca*.” An exposed Gt_2, hairy eyes, pronotum as long or longer than wide, and smooth Gt_1 were used to distinguish *Romanisca* and *Lycisca* from other genera. He noted the scutellum “was somewhat flattened” in *Romanisca* and used insertion point of the antenna, length of the malar space, and features of the pro- and metafemora to distinguish the genus from *Lycisca*. Hedqvist (1959, fig. 6r) illustrated but did not mention in his diagnosis or key the most distinctive feature of *R. annulicornis*, the anterior ocellus being within the scrobal depression, with the depression constricted and abruptly angled dorsally so that there is a horizontal portion that includes the anterior ocellus. This scrobal structure is autapomorphic for *Romanisca*, which is indicated to be closely related to *Neoepistenia*, *Hedqvistia*, and possibly *Lycisca*, based on their shared propodeal structure and sculpture, and sculptured scrobal depression (see Remarks for *Hedqvistia*). Upper inner orbits of the eyes that diverge behind the posterior ocelli may support a *Romanisca* + *Neoepistenia* sister-group relationship, though *Romanisca* and *Hedqvistia* share a relatively flat mesonotum.

Key to species of *Romanisca* Hedqvist

1 Prepectal panel smoothly curved from pronotum and reticulate-rugulose (Fig. 417); female Gt_4 transverse, about 0.75 times as long as wide, and Gt_2–Gt_5 punctate-rugulose with irregular interstices (Fig. 418); gena without evident genal flange (Fig. 417); male unknown . . . . ***Romanisca annulicornis*** **Hedqvist**

– Prepectal panel with about posterior half (excluding peduncle) concave, smooth, shiny, and right-angled relative to anteriorly faced anterior portion (Fig. 416); female Gt_4 quadrate to slightly longer than wide and Gt_2–Gt_5 punctate with punctures separated by flat shiny interstices having very fine coriaceous subsculpture (Fig. 419); gena with very short but evident genal flange near mouth margin (Fig. 416); male flagellum dark with clava light-colored [Brazil (1♀ CNCI), Costa Rica (1♀ CNCI, 35♀♀ MUCR, 16♀♀, 4♂♂ INBIO)] . . . . ***Romanisca*** **n. sp. #1**

Scaphepistenia new genus

Figs 420–426, 428–431

Etymology. Combination of the Greek word *skaphe* (hollowed out) and *Epistenia*, in reference to the concave prepectal panel and morphological similarity to *Epistenia*.

Type species. *Epistenia scutata* Walker, 1862, by present designation.

Diversity. Two described and one undescribed species known from the Neotropical region [Brazil, *Costa Rica, *Ecuador, *Peru, *Venezuela].

✓ ***Scaphepistenia quadriplagiata*** **(Walker)**, **new combination**. *Epistenia quadriplagiata* Walker, 1872: 87; ♀ holotype (BMNH: 5.905). DISTRIBUTION: Brazil, *Venezuela (CNCI).

✓ ***Scaphepistenia scutata*** **(Walker)**, **new combination**. *Epistenia scutata* Walker, 1862: 391–392; ♀ holotype (BMNH: 5.903). DISTRIBUTION: Brazil, *Costa Rica (INBIO, MUCR), *Ecuador (CNCI, USNM), *Peru (CASC).

Biology. Unknown.

Description. *Head* (Figs 420–426). Scrobal depression deep and extending to or within 1 OD of anterior ocellus; scrobal channel with outer margin carinately reflexed, but channel smoothly rounded dorsally to anterior ocellus and with surface at least slightly depressed or undulating and smoother with less distinct sculpture near anterior ocellus (Figs 420, 421). Face with parascrobal region reticulate to punctate-alveolate. Interantennal region abruptly margined and acutely angled dorsally, but dorsal angle not projecting above plane as process. Vertex with posterior ocellus distinctly separated from inner orbit. Gena with genal flange evident when head appressed against prothorax (Figs 425, 426) and with occipital carina evident either as separate vertical carina or as dorsal continuation of sinuous genal flange (Figs 422, 424). Eye moderately to densely microsetose; in dorsal view with upper inner orbits at least very slightly divergent behind posterior ocelli. Torulus with dorsal margin at or slightly below lower margin of eye.

Mesosoma with abruptly delineated black or cupreous regions contrasting distinctly with bluish-green regions on mesonotum and sometimes pronotum. Pronotum with distinctly differentiated transverse-rectangular collar (Figs 422–424). Mesoscutum punctate with distinct rosetteform subsculpture (Figs 422, 423), to umbilicate-punctate with smooth and shiny interstices (Fig. 424). Scutellum in lateral view with dorsal surface distinctly convex and above level of propodeum, and with marginal rim projecting over base of propodeum to level slightly over base of gaster. Dorsellum usually mostly concealed under scutellar lip. Prepectal panel variably deeply concave over about ventral half to two-thirds (Figs 425, 426), or at least black ventrally if without distinct concavity. Upper mesepimeron smooth to finely aciculate-coriaceous over bare region; lower mesepimeron reticulate-strigose at least ventrally, sometimes coriaceous dorsally. Propodeum (Figs 428–431) with variably distinct paraspiracular ridge separating postspiracular furrow behind spiracle from paraspiracular furrow, which differentiates callus from bare plical region, and with variably distinct crenulate furrow along at least lateral quarter of anterior margin; callus setose lateral to paraspiracular furrow except within postspiracular furrow; plical region of female variable in sculpture, sometimes with broad median smooth region delineated between paramedially recurved carinae that parallel foramen (Fig. 431), and sometimes with median carina or slender smooth region delineated between transverse band of crenulae or between crenulae and transverse posterior carina (Figs 428, 430); male with inverted Y-like median carinal complex and with panels otherwise shiny with at most obscure coriaceous sculpture (Fig. 429).

Forewing hyaline or with variably distinct brownish region behind stigma and parastigma.

Legs. Profemur with variably distinct subapical ventral angulation; protibia with or without sinuate, carinate ventral margin over about basal third to two-thirds. Metacoxa carinate dorsally and bare exterior to carina (Fig. 430).

Metasoma. Gaster with Gt_1 smooth and shiny; Gt_2 of female in dorsal view at least narrowly exposed and smooth and shiny (Fig. 430) to finely, transversely strigose-coriaceous (Figs 428, 431), and in lateral view with sculptured-setose region of laterotergite dorsally truncate (Fig. 430); Gt_2 of male similar to female or entirely concealed under Gt_1 in dorsal view. Hypopygium extending only slightly beyond level of apex of metacoxa, to level of posterior margin of Gt_3.

Remarks. I recognize *Scaphepistenia* for those New World Clade species having Gt_1 smooth and shiny, the metacoxa bare dorsally exterior to a distinct dorsal carina, the gena with an evident genal flange, and Gt_2 narrowly exposed in at least females. Except for the narrowly exposed Gt_2 of females, these features are also characteristic of *E.* (*Epistenia*).

One of three males of *S. scutata* I saw has Gt_2 extensively rather than narrowly exposed (Fig. 429), but the other two have Gt_2 entirely concealed under Gt_1. I believe the latter condition to be normal for males of *S. scutata* because the setose region of the laterotergite narrows dorsally to an angle (Fig. 429) rather than being dorsally truncate. If so, *S. scutata* is sexually dimorphic for this feature, similar to species of *Urolycisca* and *Proglochin*. A single male I identify as the male of *Scaphepistenia* n. sp. #1 has Gt_2 distinctly though narrowly exposed. A smooth Gt_1, dorsally bare metacoxa and evident genal flange are likely all symplesiomorphies at the level of the three species I classify in *Scaphepistenia*. Two of the three species also have a distinctly concave prepectal panel. Although the third species does not have the prepectal panel obviously concave, it is black ventrally. Some species of *Urolycisca* also have a shallowly concave prepectal panel (Fig. 444), as do males of two species I tentatively classify in *Shedoepistenia* because of an exposed and punctate-reticulate Gt_2. I do not have associated females for these males, but one I identify as *Shedoepistenia* sp. M#5 is quite similar to males of *Scaphepistenia scutata* except it has a punctate-reticulate mesonotum, lacks an evident genal flange and does not have the unusually long metatibial setae of this species. The other male, identified as *Shedoepistenia* sp. M#2, might also be incorrectly classified and be the male of *Scaphepistenia quadriplagiata*; it has a distinct genal flange and a prepectal structure (Fig. 427) similar to female *S. quadriplagiata*. It differs from female *S. quadriplagiata* somewhat in color pattern (mesoscutal medial lobe entirely dark and all coxae and femora dark), the metacoxa is dorsally setose over its basal half (Fig. 427), and the scutellum projects to a level only about half the distance to the base of the gaster.

It is quite possible the three species I classify in *Scaphepistenia* represent a polyphyletic assemblage. *Scaphepistenia quadriplagiata* may be most closely related to species I classify in *Shedoepistenia* or *Epistenia*, whereas one or both of *S. scutata* and *Scaphepistenia* n. sp. #1 may be more closely related to species I classified in *Paralycisca* or *Amazonisca*, based on differences in propodeal sculpture pattern and projection of the scutellum. Parsimony analysis indicated *Scaphepistenia* as most closely related to *Paralycisca* and *Amazonisca*, as discussed under 'Remarks' for *Amazonisca*.

Key to species of *Scaphepistenia* new genus

1 Mesonotum umbilicate-punctate with shiny interstices (Fig. 424); mesoscutal medial lobe, and scutellum except apically, distinctly cupreous; metatibia dorsally with conspicuously long setae, much longer than length of dorsal spines; prepectal panel strongly concave ventrally (Fig. 425). *Female*: forewing with light brownish region behind stigma and parastigma and propodeal plical region with narrow smooth region delineated between transverse band of crenulae (Fig. 428). *Male*: Gt_2 normally entirely concealed dorsally . . . . **Scaphepistenia scutata (Walker) n. comb.**

– Mesonotum punctate-reticulate with rosetteform interstices (Figs 422, 423); mesoscutal medial lobe and scutellum with dark but not cupreous regions; metatibia with short setae only about as long as dorsal spines; prepectal panel at most shallowly concave ventrally (Fig. 426). *Female*: forewing either hyaline or propodeum with broad medial smooth region delineated between carinae that are recurved paramedially from along foramen (Fig. 431). *Male*: Gt_2 narrowly exposed dorsally, smooth and shiny **2**

2(1) *Female only*: legs entirely yellowish except meso- and metacoxae dark basolaterally; mesoscutal medial lobe with posteriorly attenuated medial black region and broadly bluish-green along notauli; mesoscutal lateral lobe bluish green with large black spot anteriorly, and with smaller black region posteriorly along anteromedial angle of axilla; parascrobal region uniformly punctate-reticulate and bluish-green; propodeum with carinae recurved paramedially from along foramen delineating broad medial smooth region (Fig. 431); scutellum in lateral view with marginal rim projecting to level slightly over base of gaster; forewing with light brownish region behind stigma and parastigma . . . . **Scaphepistenia quadriplagiata (Walker) n. comb.**

Both sexes: Legs with all coxae dark (black laterally to bright green ventrally) and femora extensively dark; mesoscutal medial lobe black with paramedial bluish-green spots anteriorly; mesoscutal lateral lobe broadly black along notaulus; parascrobal region with almost smooth, bluish-green band at level of dorsal angle of interantennal region, and with black band dorsal and ventral to colored band; scutellum in lateral view with marginal rim projecting only slightly over base of propodeum; forewing hyaline. *Female*: propodeum with median carina and posterior, transverse carina bounded anteriorly by crenulae (Fig. 430) [Brazil (1♀, 1♂ USNM)] .... ***Scaphepistenia* n. sp. #1**

***Shedoepistenia* new genus**

Figs 427, 432–439

Etymology. Combination of the Greek word *shedon* (near, close) and *Epistenia*, in reference to the morphological similarity and presumed relationships with *Epistenia*.

Type species. *Shedoepistenia noyesi* Gibson, by present designation.

Diversity. The type species and 19 undescribed species based on females; known from the Neotropical region [*Argentina, *Brazil, *Costa Rica, *Dominica, *Ecuador, *Guatemala, *Mexico, *Nicaragua, *Panama, *Peru, *Trinidad, *Venezuela].

Biology. Unknown.

Description. *Head* (Figs 432–435). Scrobal depression extending to or within less than 1 OD from anterior ocellus; scrobal channel with outer margin at least carinate and usually more or less distinctly reflexed (Fig. 433), sometimes abruptly angled dorsally to form distinct ∩-like or somewhat m-like margin below anterior ocellus (Fig. 432) but without carinate dorsal margin, and with surface of channel at least slightly depressed or undulating near anterior ocellus, the dorsal portion smoother and shinier than coriaceous to transversely striate-reticulate scrobes. Face with parascrobal region reticulate-alveolate. Interantennal region abruptly margined and acutely angled dorsally, and sometimes carinate or ridgelike dorsal angle projecting slightly above plane of surface as small process (Fig. 433). Vertex with posterior ocellus separated from inner orbit by distance at least equal to 1 OD and/or POL. Gena with (Figs 434, 435) or without evident genal flange when head appressed against prothorax, but postocciput at least sometimes with short toothlike angulation or carinate rim (Fig. 435). Eye superficially bare to densely microsetose; in dorsal view with upper inner orbits at least very slightly divergent behind posterior ocelli. Torulus with dorsal margin at or slightly below lower margin of eye.

Mesosoma variably green to cupreous dorsally, or distinctly bicolored with mesonotum and sometimes pronotum having abruptly delineated cupreous/black regions contrasting with metallic blue or green regions. Pronotum with distinctly differentiated transverse-rectangular collar. Mesoscutum punctate with distinct rosetteform subsculpture. Scutellum in lateral view with dorsal surface distinctly convex and above level of propodeum, with marginal rim projecting for variable distance over propodeum, sometimes to base of gaster. Dorsellum usually mostly concealed under scutellum. Prepectal panel flat in known females but sometimes concave in males (Fig. 427). Upper mesepimeron smooth to finely aciculate-coriaceous over bare region; lower mesepimeron coriaceous to punctate-reticulate. Propodeum with variably distinct paraspiracular ridge separating postspiracular furrow behind spiracle from paraspiracular furrow, which differentiates callus from bare plical region, and with variably distinct crenulate furrow along at least lateral quarter of anterior margin; callus variably setose but at least bare within postspiracular furrow; plical region of female (Figs 436, 438) short and with a lunate, sometimes longitudinally crenulate, furrow along foramen delineated anteriorly by variably distinct carinae that recurve toward anterior margin paramedially, hence plical region with a variably wide and distinct smooth region medially rather than a median carina, and with panel otherwise mostly shiny though sometimes with some longitudinal crenulae or coriaceous sculpture; plical region of male rarely coarsely rugose (Fig. 439), usually with panels extensively smooth and shiny or partly coriaceous excluding inverted Y-like median carinal complex (Fig. 437), the posteriorly divergent carinae paralleling foramen and median carina sometimes divided by fine longitudinal sulcus.

Forewing without conspicuous infuscate patterns, though sometimes slightly infuscate or with light brown mediolongitudinal band.

Legs. Profemur with or without subapical ventral angulation or tooth; protibia without carinate ventral edge. Metacoxa usually setose along entire dorsal length in both sexes (Fig. 437), though rarely bare (Fig. 439) or with only 1 line of sparse setae exterior to carina.

Metasoma. Gaster with Gt_1 smooth and shiny; Gt_2 distinctly exposed dorsally and punctate-reticulate (Figs 436–439). Hypopygium at most extending only slightly beyond level of apex of metacoxa, to level of posterior margin of Gt_3.

Remarks. I recognize *Shedoepistenia* for those New World Clade species having Gt_1 smooth and shiny, Gt_2 exposed and reticulate-punctate, and that have an undulating type of scrobal channel. Females are quite similar to females of *Urolycisca* except for their entirely smooth and shiny Gt_1; however, some *Urolycisca* females have Gt_1 only inconspicuously punctate or reticulate. The different sculpture patterns may constitute a single transformation series, which would indicate one genus renders the other paraphyletic. Females of *Shedoepistenia* are also differentiated by a characteristic propodeal sculpture pattern. Posteriorly on the plical region is a variably distinct carina that parallels the foramen laterally, but which recurves toward the anterior margin paramedially to delineate a variably wide and distinct smooth region medially (Figs 436, 438) rather than a median carina. Females of *Urolycisca* always have the carinae that parallel the foramen meeting medially to form a single median carina (usually as sinuately Λ-like carinal complex, Fig. 445). Females of most species of *Protoepistenia*, *Scaphepistenia quadriplagiata* and some species of *E.* (*Epistenia*) have the same or a similar propodeal sculpture pattern as for *Shedoepistenia*. Females of *Hadroepistenia, Protoepistenia* n. sp. #1, and *Scaphepistenia scutata* and *S.* n. sp. #1, have a somewhat similar structure, though the median region is differentiated between transverse medial bands of crenulae rather than distinct, recurved carinae. Females of *Hadroepistenia* differ by having Gt_1 reticulate-punctate, whereas those of *Epistenia* and *Protoepistenia* have

Gt$_2$ concealed or at least shiny and very finely sculptured if secondarily exposed. Females of *Scaphepistenia* have Gt$_1$ smooth and Gt$_2$ exposed, similar to *Shedoepistenia*, but at most very finely sculptured, coriaceous to punctulate-strigose. Further, at least females of *Scaphepistenia* as well as those of *Hadroepistenia* and *E.* (*Epistenia*) have the metacoxa bare dorsally exterior to a dorsal carina. Females *Protoepistenia* have the metacoxa setose dorsally, as for females of *Shedoepistenia*, but lack a genal flange and at most have an inconspicuous postoccipital flange very close to the occipital foramen.

Females of *Shedoepistenia* are variable in presence or absence of an evident genal flange. I am unsure whether or not there always is a carinate ridge on the postocciput because the posterior surface of the head is not visible in all specimens. Females also vary in degree to which the scutellar marginal rim projects posteriorly and in structure of the scrobal depression. In some species the scrobal channel is abruptly angled relative to the vertex so that there is quite a distinct ∩-like or m-like dorsal margin below the anterior ocellus (Fig. 432). This is very similar to the structure that characterizes *Amazonisca*, but the dorsal margin is not distinctly carinate as in *Amazonisca*. Individuals of *Amazonisca* also differ by having Gt$_2$ at most finely, transversely strigose (usually smooth or finely coriaceous), and females of *Amazonisca* have an inverted Y-like median carinal complex on the propodeum.

Parsimony analysis did not resolve relationships of *Shedoepistenia* under any options employed. It seems likely that *Shedoepistenia* represents a grade of structure and either renders or is rendered paraphyletic by one or more of the other genera discussed above. It is also possible some males I key below in *Shedoepistenia*, based primarily on presence of an exposed and punctate to reticulate Gt$_2$, are incorrectly classified in the genus. Males of one of the species, *Shedoepistenia* sp. M#4, have a coarsely rugose propodeum (Fig. 439) rather than having an inverted Y-like carinal complex (Fig. 437) and they have the metacoxa bare dorsally. Males of two other species, *S*. sp. M#2 and *S*. sp. M#5, have the prepectal panel concave medially or ventrally (Fig. 427) and might represent the opposite sex of females I classify in *Scaphepistenia*. If the sexes are sexually dimorphic in structure and sculpture of Gt$_2$, then some males keyed below as *Shedoepistenia* may in fact represent the opposite sex of females I classify in *Scaphepistenia* or *Protoepistenia*.

Key to species of *Shedoepistenia* new genus

1 Pro- and mesocoxae with metallic blue-green luster, conspicuously darker than rest of respective leg and similar to metacoxa **2**
– Procoxa and mesocoxae at least ventrally yellowish, similar in color to rest of respective leg and conspicuously different from metacoxa **7**

2(1) Male (scutellum only slightly protuberant over base of propodeum in observed specimens) **3**
– Female **6**

3(2) Mesonotum bicolored, with mesoscutal medial lobe and scutellum dark/cupreous except for posteromedial spot on scutellum; metacoxa variably setose dorsally for entire length **4**

– Mesonotum uniformly dark with at least slight dull metallic green luster; metacoxa at most setose dorsally over about basal half **5**

4(3) Metacoxa dorsally without distinct carina but densely setose along length; gena without evident genal flange; prepectal panel flat, uniformly setose and colored; mesoscutal lateral lobe uniformly punctate-reticulate; head with scrobal channel not extending to anterior ocellus, with short, transversely rugulose or reticulate-rugulose region between depression and ocellus; malar space about 0.5 eye height and 0.7 eye length; mesoscutal lateral lobe with variably distinct cupreous/black band attenuated to anteromedial angle of axilla [Venezuela (2 ♂♂ CNCI)] . . . . ***Shedoepistenia* sp. M#1**

– Metacoxa dorsally with distinct carina but with only 1 line or very slender band of setae exterior to carina; gena with genal flange extending from oral margin; prepectal panel with about ventral half differentiated as shallowly concave, more finely sculptured and mostly bare black depression; mesoscutal lateral lobe umbilicate-punctate laterally on vertical surface, the punctures much larger than punctures dorsally on horizontal surface; head with outer margin of scrobal channel carinate to anterior ocellus, on either side of short smooth and shiny region near ocellus; malar space about 0.4 eye height and 0.6 eye length; mesoscutal lateral lobe mostly bright metallic blue-green, but with small black/cupreous spot anteromesally and posteriorly adjacent to preaxillar margin [Brazil (1♂ BMNH)] . . . . ***Shedoepistenia* sp. M#2**
[? = ♂ *Scaphepistenia quadriplagiata* (Walker)]

5(3) Propodeal plical region with inverted Y-like median carinal complex, but panel otherwise smooth and shiny with very slight coriaceous sculpture posteriorly (Fig. 437); metacoxa setose dorsally over about basal half; gena along outer orbit with distinct smooth and shiny region attenuated dorsally from malar sulcus [Brazil (1♂ USNM)] . . . . ***Shedoepistenia* sp. M#3**

– Propodeal plical region extensively, irregularly carinate to rugose (Fig. 439); metacoxa with only small setose region dorsobasally; gena with only narrow smooth and shiny region along outer orbit [Brazil (1♂ USNM)] . . . . ? ***Shedoepistenia* sp. M#4**

6(2) Gt_5 with large punctures of similar size to preceding two segments; mesoscutal medial lobe with posteriorly convergent, cupreous triangular region extending about two-thirds length; scutellum cupreous except for extreme apical margin; profemur without subapical ventral angulation [Brazil (1♀ BMNH)] . . . . ***Shedoepistenia* n. sp. #1**

– Gt_5 punctulate, the punctures much smaller than large punctures of preceding 2 segments; mesoscutal medial lobe entirely cupreous; scutellum apically with large, anteriorly convergent, bluish triangular region; profemur with distinct subapical angulation or tooth [Mexico (1♀ CNCI)] . . . . ***Shedoepistenia* n. sp. #2**

7(1) Mesoscutum uniformly cupreous with yellowish or greenish tints under some angles of light, but at least without contrasting metallic blue regions [Panama (2♀♀ RMNH)] . . . . ***Shedoepistenia*** **n. sp. #3**

– Mesoscutum with at least lateral lobe partly blue or green posteriorly, or posteromedially and laterally, hence mesonotum distinctly bicolored . . **8**

8(7) Female **9**

– Male **25**

9(8) Mesoscutal medial lobe distinctly bicolored, with posteriorly convergent cupreous region anterior to metallic blue region of similar color as lateral lobe posteriorly; vertex and posterior surface of head black, except narrowly along outer orbits [Peru (1♀ USNM)] . . . . ***Shedoepistenia*** **n. sp. #4**

– Mesoscutal medial lobe entirely cupreous/dark to transscutal articulation, or at most of different color only very narrowly along notaulus; vertex or posterior surface of head sometimes with extensive metallic luster **10**

10(9) Mesoscutal lateral lobe with anterior cupreous region extending posteriorly to paraaxillar margin or at least attenuated to anteromedial angle of axilla **and** pronotal collar either with transverse cupreous band or with band divided into medial and lateral cupreous regions **11**

– Mesoscutal lateral lobe with anterior cupreous region widely separated from posterior margin of lobe **or** pronotum blue to green at least medially and sometimes entirely without cupreous luster **14**

11(10) Pronotal collar not uniformly punctate, posterolaterally with transverse-oval region of granular sculpture lacking punctures; mesoscutal lateral lobe with distinct band of granular-coriaceous sculpture anteromedially; pronotum cupreous/green anteriorly and with blue/violet band along posterior margin, and mesoscutal lateral lobe with cupreous region extending posteriorly to transscutal articulation medially [Peru (1♀ USNM)] . . . . ***Shedoepistenia*** **n. sp. #5**

– Pronotal collar uniformly punctate over granular subsculpture; mesoscutal lateral lobe uniformly punctate without distinct band of granular-coriaceous sculpture; pronotum and mesoscutal lateral lobe usually with different color pattern **12**

12(11) Gt_3 and Gt_4 with broad rectangular bright greenish regions (narrowly cupreous/dark only along lateral and apical margins), and Gt_5 with bright greenish spot basomedially [Peru (4♀♀ CNCI, 2♀♀ USNM)] . . . . ***Shedoepistenia*** **n. sp. #6**

– Gt_3 and Gt_4 with smaller, more distinctly basomedial blue or greenish spots, and Gt_5 without greenish region **13**

13(12) Interantennal region cupreous and parascrobal region blue to green; flagellum with at least fl_1 (ring segment) and sometimes fl_2 yellow; pronotum with cupreous region more or less distinctly segregated into medial, anteriorly convergent triangular region, and lateral cupreous regions [Mexico (1♀ CASC, 1♀ UCDC)] . . . . ***Shedoepistenia* n. sp. #7**

– Interantennal region mostly green to blue (at most cupreous dorsally) and lower parascrobal region partly cupreous; flagellum uniformly dark brown; pronotum with broad cupreous region dorsally [Argentina (2♀♀ BMNH), Brazil (1♀ BMNH)] . . . . ***Shedoepistenia* n. sp. #8**

14(10) Gt$_4$ with broad green to bluish-purple band extending virtually across tergum **15**

– Gt$_4$ sometimes entirely dark/cupreous, but at least apical half and lateral quarter of tergum dark **18**

15(14) Mesonotum with following lime green: mesoscutal medial lobe except narrowly blue along most of notaulus, scutellum anteriorly, and anterior spot on mesoscutal lateral lobe; scutellum punctulate, with tiny punctures separated by interstices only slightly less than diameter of puncture [Dominica (1♀ USNM)] . . . . ***Shedoepistenia* n. sp. #9**

– Mesonotum with following cupreous/black: mesoscutal medial lobe entirely, scutellum anteriorly, and anterior spot on mesoscutal lateral lobe; scutellum punctate, with relatively large and deep punctures at least twice as large as interstices **16**

16(15) Pronotal collar green to blue or with black/cupreous region medially on vertical surface; head with transverse green to blue band (sometimes interrupted medially) behind posterior ocelli . . . . ***Shedoepistenia noyesi* n. sp.**

– Pronotal collar with distinct cupreous spot posterolaterally on vertical portion of panel and sometimes medially; vertex cupreous behind posterior ocelli, at least in region between ocelli **17**

17(16) Pronotal collar with cupreous region medially on vertical surface and posterolaterally; vertex with at least slender cupreous region between inner orbits behind posterior ocelli [Venezuela (3♀♀ USNM)] . . . . ***Shedoepistenia* n. sp. #10**

– Pronotal collar with cupreous spot only posterolaterally; vertex with bluish to green band extending mesally from inner orbit behind posterior ocellus, but with median cupreous band connecting cupreous ocellar triangle and occiput [Guatemala (1♀ CNCI)] . . . . ***Shedoepistenia* n. sp. #11**

18(14) Gaster with Gt$_2$–Gt$_4$ uniformly cupreous to bronze, and Gt$_5$ subequal in length to combined length of Gt$_3$ and Gt$_4$; scutellum entirely cupreous except narrowly along posterior, vertical surface; frontovertex entirely black between level of dorsal margin of scrobal depression and posterior orbit of eye [Venezuela (1♀ CNCI)] . . . . ***Shedoepistenia* n. sp. #12**

– Gaster with bluish to green spot basomedially on at least two of Gt$_2$–Gt$_4$, and Gt$_5$ often subequal in length to Gt$_2$–Gt$_4$ or Gt$_1$–Gt$_4$; scutellum with large posteromedial bluish to green region, the region usually convergent anteriorly; frontovertex often with some cupreous or blue around ocelli or as transverse band behind posterior ocelli **19**

19(18) Propodeum with distinct carina dividing lunate region along foramen, and each half of lunate region further subdivided by longitudinal paralateral carina [Brazil (1♀ USNM), Panama (1♀ RMNH)] . . . . ***Shedoepistenia* n. sp. #13**

– Propodeum with lunate furrow along foramen not crenulate and smooth medially **20**

20(19) Eye superficially bare, very sparsely microsetose **21**

– Eye distinctly and densely microsetose **23**

21(20) Body without cupreous regions, the typically cupreous regions black, including entire vertex from dorsal limit of scrobes, and occiput except for ventrally expanded blue strip along outer orbit; pronotum black anteriorly and with dorsal surface of collar mostly blue/green; body small, about 5 mm in length [Brazil (1♀ USNM)] . . . . ***Shedoepistenia* n. sp. #14**

– Body with at least mesoscutal medial lobe and anteromedial spot on lateral lobe cupreous; pronotum either with large lateral cupreous spot or with transverse cupreous region on collar anteriorly; body larger, about 8 mm or longer **22**

22(21) Head with region surrounding ocellar triangle cupreous, and pronotal collar with large anterolateral cupreous spot; face mostly bluish/purple except interantennal and clypeal regions greenish [Costa Rica (1♀ MUCR)] . . . . ***Shedoepistenia* n. sp. #15**

– Head without cupreous region, and pronotum with slender, transverse cupreous band on region of curvature distinguishing collar from neck; face uniformly green between eyes to level of anterior ocellus [Brazil (1♀ USNM)] . . . . ***Shedoepistenia* n. sp. #16**

23(20) Pronotal collar at least with transverse cupreous spot anteromedially, and sometimes with small cupreous spot laterally; laterotergite of Gt_5 metallic green, but with distinct, violaceous to dark, posteriorly attenuated triangular region dorsobasally [Costa Rica (2♀♀ INBIO)] . . . ***Shedoepistenia* n. sp. #17**

– Pronotal collar entirely bluish/purple; laterotergite of Gt_5 uniformly metallic green with at most a very small basal violaceous spot **24**

24(23) Meso- and metatarsi almost uniformly yellowish-brown, the apical 1 or 2 segments only slightly darker; prepectal panel uniformly reticulate-rugulose [Costa Rica (1♀ INBIO)] . . . . ***Shedoepistenia* n. sp. #18**

– Meso- and metatarsi with basal 3 segments yellow and apical 2 segments dark brown; prepectal panel with distinct pit medially [Ecuador (1♀ USNM), Venezuela (1♀ USNM)] . . . . ***Shedoepistenia* n. sp. #19**

25(8) Prepectus with panel conspicuously, longitudinally concave medially; pronotal panel with only extreme ventral angle a dark translucent flange [Brazil (1♂ BMNH)] . . . . ***Shedoepistenia* sp. M#5** [? = *Scaphepistenia* sp. ♂]

– Prepectus with panel uniformly flat, sculptured and setose; pronotal panel with about ventral half dark, from level equal with or higher than dorsal margin of prepectus **26**

26(25) Eye superficially bare, very sparsely and inconspicuously microsetose . . . **27**

– Eye conspicuously and densely microsetose **30**

27(26) Head without evident genal flange when head appressed to pronotum; gena uniformly convex **28**

– Head with distinct genal flange when head appressed to pronotum; gena usually with distinct angulation or ridge between outer orbit and genal flange (Fig. 433) **29**

28(27) Head cupreous behind and between posterior ocelli to anterior ocellus, and with cupreous region anterolateral to ocellar triangle, but with bluish-green band along upper inner orbits and with Λ-like band joining anterior and posterior ocelli; Gt_3 and Gt_4 with large bluish-green region occupying most of respective tergum [Peru (2♂♂ CNCI)] . . . . ***Shedoepistenia* n. sp. #6**

– Head with vertex and posterior surface dark except metallic green along outer orbits; Gt_3 and Gt_4 both with only small basomedial bluish-green spot [Brazil (1♂ USNM)] . . . . ***Shedoepistenia* n. sp. #14**

29(27) Pronotal neck with dorsally attenuated dark region, but collar entirely bluish-green to purple; upper parascrobal region greenish-blue lateral to reflexed dorsolateral portion of scrobal channel; scutellum with large bluish region occupying about posterior half [Brazil (1♂ USNM), Colombia (1♂ USNM)] . . . . ***Shedoepistenia* sp. M#6**

– Pronotal neck with dorsally attenuated dark/cupreous region and collar with anterolateral cupreous spots, resulting in more or less W-like mark; upper parascrobal region with dark/cupreous region surrounding anterior ocellus extending anteriorly beside reflexed dorsolateral portion of scrobal channel; scutellum blue only apically, mostly over down-curved portion [Brazil (1♂ BMNH)] . . . . ***Shedoepistenia* sp. M#7**

30(26) Pronotum with transverse cupreous band over almost entire width; mesoscutal lateral lobe with anterior cupreous region attenuated posteriorly and extending to or almost to anteromedial angle of axilla [Argentina (2♂♂ BMNH)] . . . . ***Shedoepistenia* n. sp. #8**

– Pronotum with cupreous region at most over about median third; mesoscutal lateral lobe with anterior cupreous/dark region widely separated from posterior margin of mesoscutum **31**

31(30) Wings uniformly light brown; face with setae yellowish to light brown [Trinidad (1♂ CNCI), Venezuela (1♂ USNM)] . . . . ***Shedoepistenia* sp. M#8**
– Wings hyaline; face with setae white **32**

32(31) Vertex with transverse bluish-green band between inner orbits contiguous with posterior ocelli . . . . ***Shedoepistenia noyesi* n. sp.**
– Vertex dark or with cupreous luster behind posterior ocelli **33**

33(32) Vertex with dark region extending anteriorly of anterior ocellus, with upper parascrobal region dark except for linear metallic region along reflexed portion of scrobal channel extending to anterior ocellus [Panama (1♂ CNCI)] . . . . ***Shedoepistenia* sp. M#9**
– Vertex with upper parascrobal region metallic, the metallic region extending posteriorly along inner orbit to level of or beyond posterior margin of anterior ocellus **34**

34(33) Gt_3 and Gt_4 with transverse bluish-green bands dorsally, and with cupreous spots dorsobasally on laterotergites [Venezuela (1♂ CNCI, 2♀♀ USNM)] . . . . ***Shedoepistenia* n. sp. #10**
– Gt_3 and Gt_4 dark bronze dorsally, without blue or green areas, but with bluish-green spot dorsobasally on laterotergites [Brazil (1♂ USNM)] . . . . ***Shedoepistenia* sp. M#10**

***Shedoepistenia noyesi* new species**

Figs 436, 437

Type material. *Holotype* ♀ (BMNH) — TRINIDAD: St. Geor[ge], St. Augustine, 15.vii-13.viii.1976 / Malaise Trap, J.S. Noyes, B.M. 1976-462. *Allotype* ♂ (BMNH) — same data as holotype. *Paratypes* (13♀♀, 14♂♂) — COSTA RICA: Est. Palo Verde, 10 m., Ref. Nac. Fauna Silv., R.L. Rodriguez, Prov. Guan., Costa Rica U., Chavarria, Jun 1991, L-N-259000, 388400 (1♂ INBIO). Guanacaste P.N., Santa Rosa H30, 200 m., 24.V-14.VI.86 (1♂ MUCR). NICARAGUA: Rivas, San Juan del Sur, 11°15'N 85°52'W, 15.IV.1998 (3♀♀, 1♂), 3.V.1998 (3♂♂), 9.V.1998 (1♀), L.J. Clark, MT (UCDC). TRINIDAD: same data as holotype (3♀♀, 5♂♂ BMNH). St. George, St. Augustine, VIII. 1976 / Malaise Trap, F.D. Bennett, B.M. 1976-568 (1♀ BMNH). W.I., Curepe, Sta. Margarita Circular Rd., 30.XI.1977, W. Mason (1♂ CNCI). Curepe, 14.I.1978 (1♀, 1♂), 29.VI.1979 (1♀), 1978 or 1979 (1♂), Malaise Trap (CNCI); 31.I.1969, F.D. Bennett / B.M. 1972-170 (1♀ BMNH); (CIBC), 8-13.IV.1987, Mal. trap, N.V. Buren RMNH (1♀ RMNH).

Etymology. Named in honor of John Noyes, who collected part of the type series and who has greatly advanced chalcid taxonomy.

Description. FEMALE. Head with face green except parascrobal region between about level of interantennal region and dorsal margin of scrobal depression more violaceous to blue under some angles of light, with this area having distinctly larger and deeper punctate-alveolate sculpture than elsewhere; region surrounding ocellar triangle variably extensively cupreous, but extending to inner orbit from posterior ocellus and on either side of anterior ocellus to scrobal depression, and with green/blue of parascrobal region extending dorsally along inner orbit to level of anterior ocellus; vertex with slender blue/green band between inner orbits contiguous with posterior ocelli, the band sometimes very narrowly separated medially, but extending along outer orbit and widened to gena, with posterior surface of head otherwise black. Antenna black except scape and pedicel usually with slight greenish luster. Scrobal depression extending to within or less than 0.5 OD of anterior ocellus, with outer margin carinate dorsally but not conspicuously reflexed above plane of parascrobal region, and with undulating portion of channel surface above interantennal region smooth and shiny. Interantennal region dorsally ridgelike with dorsal margin right-angled to bottom of channel so as to appear very slightly protuberant. Gena with inconspicuous genal carina extending height of pronotal panel; uniformly punctate-rugulose. Eye densely microsetose.

Pronotum mostly green to variably extensively blue or violaceous posterodorsally, except panel black, and often with variably large black/cupreous spot medially on neck around median line; uniformly punctate with interstices slightly narrower than width of punctures. Mesonotum green to violaceous except mesoscutal medial lobe entirely cupreous, the cupreous region extending laterally as large anteromesal spot on lateral lobe but not extending posteriorly beyond level of anterior margin of tegula, axilla variably extensively cupreous dorsally along transscutal articulation and scutellum cupreous except for anteriorly convergent posteromedial spot extending about one-third to half length of scutellum; mesoscutal medial lobe and scutellum punctate-reticulate, the punctures about twice width of interstices, and interstices with conspicuous rosetteform subsculpture; lateral lobe uniformly punctate anteriorly, without evident parapsidal band, but with punctures anterior to paraaxillar margin slightly larger than on mesoscutal medial lobe. Scutellum convex, uniformly sculptured posteriorly (Fig. 436) without stronger crenulae differentiating pit medially above marginal rim; with marginal rim broadened posteromedially into flat to slightly concave flange, the flange in dorsal view having evenly rounded posterior margin, and in lateral view extending to level equal with base of gaster. Propodeum with lunate furrow along foramen uniformly crenulate; plical region with broad median smooth region and panel smooth and shiny mesal to distinct paraspiracular furrow (Fig. 436). Forewing with brown setae but membrane hyaline, without brownish tinge. Legs yellowish-orange except at least basal three-quarters of metacoxa with metallic luster similar to mesopleuron, and apical 1 or 2 tarsal segments sometimes slightly darker than remaining tarsal segments; profemur without distinct preapical angulation; metacoxa dorsally with dense band of setae, but without distinct carina.

Gt_1 green, to violaceous laterally under some angles of light, and with laterotergite violaceous anteriorly, to green posteriorly, except cupreous along extreme posterior margin. Gt_2 cupreous and laterotergite with similar color pattern as Gt_1 except linearly cupreous/dark along anterior and posterior margins; dorsally punctate except for smooth apical margin, with the punctures partly coalesced into transverse bands (Fig. 436) or somewhat punctate-rugulose. Gt_3 variably cupreous but at least with small greenish to violaceous spot(s) medially and often with large and conspicuous green to violaceous transverse band partly or entirely across tergum, and laterotergite with similar color pattern as Gt_2 except usually with more distinct anterodorsal cupreous/dark spot; dorsally punctate-rugulose except for smooth apical margin. Gt_4 cupreous basally and apically but with large greenish to violaceous band entirely across tergum, the band sometimes arcuate, and laterotergite with similar color pattern as Gt_3 except anterodorsal cupreous/dark spot usually larger, sometimes extending for about half length of tergum; similarly sculptured as Gt_3. Gt_5 about 1.4–1.7 times as long as basal width; variably brightly cupreous dorsally, often darker centrally, but with posteriorly enlarged, elongate-triangular green to yellowish region laterally along about posterior two-thirds margin, and laterotergite with triangular cupreous/dark region dorsally over about anterior half to two-thirds and sometimes variably extensively brown to cupreous along ventral margin; dorsally with sculpture graduating from distinctly punctulate with some punctures coalesced anteriorly, to much smoother and coriaceous posteriorly. Gt_6 cupreous with white setae at least laterally. Syntergum with dark brown setae; cupreous or with variably distinct greenish luster; about 3 times as long as Gt_6, and combined length with Gt_6 subequal to length of Gt_5; postcercal length about 2–2.5 times precercal length.

MALE. Color pattern similar to female except dark/cupreous region around ocellar triangle usually not as extensive, with upper parascrobal region entirely or almost entirely green between inner orbit and anterior ocellus to near level of posterior ocellus, and sometimes partly metallic between inner orbit and posterior ocellus; mesoscutal medial lobe usually at least linearly green to blue along notaulus and sometimes with median cupreous/dark region triangular, not extending to transscutal articulation; meso- and metatarsi with apical 1 or 2 segments usually distinctly darker than preceding yellowish to orange segments; gaster with color pattern of Gt_3 and Gt_4 highly variable, sometimes similar to female, but often with greenish/violaceous bands reduced, particularly on Gt_4, which sometimes has only a few scattered spots or a very irregular band. Structure, excluding syntergum, similar to female except propodeum longer (Fig. 437). Sculpture similar to female except Gt_5 more uniformly punctate.

Remarks. *Shedoepistenia noyesi* is differentiated only by quite minor differences in color pattern from some other morphospecies keyed above. More comprehensive material is required in order to accurately evaluate infraspecific variation. Both sexes of specimens from Nicaragua have the pronotum more extensively and conspicuously violaceous posterodorsally than the specimens from Trinidad, and they lack a distinct dark/cupreous spot from the neck.

***Urolycisca* Roman**

Figs 440–447

Urolycisca Roman, 1920: 19–20. Type species: *Lycisca apicalis* Walker, by original designation.

Diversity. Three described and at least four undescribed species based on females; known from the Neotropical region [Argentina, *Belize, Brazil, Chile, *Costa Rica, *Ecuador, *El Salvador, Guatemala, *Guyana, *Mexico, *Panama, *Peru, *Trinidad, *Venezuela].

✓ ***Urolycisca apicalis* (Walker)**. *Lycisca apicalis* Walker, 1862: 393–394; ♀ holotype (BMNH: 5.893). Combination by Roman (1920: 20). DISTRIBUTION: Brazil, *Ecuador (USNM), *Guyana (BMNH).

- ✓ ***Urolycisca balteata* (Cameron)**. *Epistenia balteata* Cameron, 1884: 129; 4♀, 1♂ syntypes (BMNH: 5.895). Combination by Hedqvist (1961: 100). DISTRIBUTION: *Costa Rica (INBIO, UCDC, USNM), *El Salvador (USNM), Guatemala, *Mexico (CASC, EMEC), *Panama (BMNH, UCDC, USNM).
- ✓ ***Urolycisca hastata* (Walker)**. *Lycisca hastata* Walker, 1862: 393; ♀ holotype (BMNH: 5.894). Synonym of *Lycisca romandi* Westwood (Hedqvist 1959: 177, 181); reestablished status and combination by Hedqvist (1961: 100). DISTRIBUTION: Brazil; *Peru (USNM).

Biology. Unknown.

Description. *Head* (Figs 440–442). Scrobal depression with outer margin of channel carinate and extending to or almost to anterior ocellus; scrobal channel undulating near ocellus, with scrobes and channel both smooth and shiny or scrobes sometimes finely transversely striate-coriaceous. Face with parascrobal region reticulate-alveolate to rugulose. Interantennal region abruptly margined and acutely angled dorsally, with ridgelike or carinate dorsal margin sometimes projecting slightly above plane of surface as low, convex process, but either abruptly angled or gradually sloped to bottom of scrobal depression. Vertex with posterior ocellus separated from inner orbit by about 0.25–1.0 maximum diameter of posterior ocellus. Gena without evident genal flange when head appressed to prothorax (at most with very short rim adjacent to mandible), and occiput without distinct occipital carina, but posterior of head with short carinate rim or toothlike angulation on postgena in both sexes (often not obvious unless posterior surface of head separated from mesosoma, Fig. 442). Eye superficially bare (Fig. 440) to relatively sparsely microsetose (Fig. 442); in dorsal view with upper inner orbits subparallel for short distance or slightly convergent behind posterior ocelli. Torulus with dorsal margin about level with ventral margin of eye.

Mesosoma distinctly bicolored, mesoscutal medial lobe entirely cupreous but mesonotum elsewhere and sometimes pronotum having variable pattern of cupreous/black regions contrasting with metallic blue or green regions. Pronotum conspicuously wider than long, at least in female (Fig. 443). Mesoscutum punctate with rosetteform subsculpture. Scutellum in lateral view with dorsal surface convex, distinctly curved down to margin rim projecting at least slightly over dorsellum and sometimes to level of base of gaster. Dorsellum usually concealed under dorsellum. Prepectal panel flat or inconspicuously concave, the sculpture of the concave region more rugulose and less distinctly punctate-reticulate (Fig. 444), but metallic. Upper mesepimeron smooth to finely aciculate-coriaceous over bare region; lower mesepimeron entirely punctate-reticulate to strigose. Propodeum with variably distinct paraspiracular carina or ridge separating postspiracular furrow behind spiracle from paraspiracular furrow, which differentiates callus from bare, convex plical region, and with crenulate furrow along about lateral quarter of anterior margin; plical region of female short, with foramen not extending posterior to level of posterior margin of callus (Fig. 445), and longitudinally crenulate at least medially, sometimes also obliquely crenulate to rugose laterally, but surface otherwise primarily smooth and shiny with at most very fine meshlike sculpture; plical region of male similar to female but posteriorly with transverse, irregular or arcuate carina (Fig. 447) that together with median carina often forms inverted Y-like carinal complex; callus setose to level of plical region except bare within postspiracular furrow.

Forewing hyaline or, more commonly, with variably large brownish region behind parastigma and often behind stigmal vein or at least with r-m fold dark brown.

Legs. Profemur with subapical ventral angulation or tooth; protibia with variably distinct, sometimes almost straight carinate ventral margin within basal half to three-quarters. Metacoxa at least sparsely setose dorsally exterior to dorsal carina, if carina evident.

Metasoma. Gaster with Gt_1 usually extensively punctate in both sexes (Figs 446, 447), but at least finely punctate longitudinally in female (Fig. 445) and transversely in male; Gt_2 in male normally with at most sublinear smooth and shiny posterior margin exposed (Fig. 447), but more extensively exposed and distinctly sculptured in female (Figs 445, 446). Hypopygium extending only slightly beyond level of apex of metacoxa, to level of posterior margin of Gt_3.

Remarks. My concept of *Urolycisca* includes those New World Clade species with a carinately margined and undulating type of scrobal channel, the metacoxa setose dorsally, Gt_2 exposed in females but normally concealed in males, and Gt_1 at least partly punctate in both sexes. Females of *U. hastata* have only a very slender mediolongitudinal punctate region on Gt_1, which may appear smooth and shiny without proper lighting. If males of *U. hastata* have a smooth Gt_1 they may be indistinguishable from males of *Protoepistenia* unless they have very sparsely and inconspicuously microsetose eyes and/or a distinct postoccipital flange. *Urolycisca* and *Protoepistenia* may form grades of structure or one genus may render the other paraphyletic, as is discussed under *Protoepistenia*. However, *Urolycisca* is also indicated to be closely related to *Proglochin* based on common possession of an exposed Gt_2 in females and a normally concealed Gt_2 in males. As discussed under *Proglochin*, this latter taxon may further represent a grade of structure between *Urolycisca* and those New World Clade species having a comparatively long propodeum with a single median carina and distinctly sculptured panels, plus a scrobal depression that is in a single plane and distinctly sculptured. Morphologically, *Urolycisca* is most similar to *Epistenia* and other New World Clade genera that share an undulating scrobal channel and a longitudinally crenulate but otherwise quite shiny propodeum. Females of *Urolycisca* are also similar to some females of *Shedoepistenia*, except for a typically larger body size and a sculptured Gt_1. The very limited sculpture on Gt_1 in *U. hastata* might indicate *Urolycisca* represents a group of species closely related to *Shedoepistenia*, which may have secondarily acquired sculpture on Gt_1 in conjunction with a larger body. Alternatively, the concealed Gt_2 of males may indicate *Urolycisca* + *Proglochin* are more closely related to *Epistenia*, and possibly *E.* (*Punctepistenia*), because individuals of *E.* (*Punctepistenia*) have a sculptured Gt_1 and dorsally concealed Gt_2 in both sexes. If so, the exposed and sculptured Gt_2 of female *Urolycisca* and *Proglochin* likely represents a reversal from a concealed Gt_2. Species of *Urolycisca* vary in the extent to which the scutellar marginal rim projects; in *U. apicalis* it extends as a distinct flange to the base of the gaster, whereas in *U. hastata* it extends at most about half the distance to the base of the gaster, and in other species it projects only very slightly. Species also vary in whether or not the forewing is hyaline or has a variably distinct bimaculate color pattern, and some species have the prepectal panel shallowly concave, though never black as for species of *Scaphepistenia*. Female *Urolycisca* resemble *Lycisca* females because of their relatively large size and often distinctly bimaculate forewing, but they differ significantly in structure and sculpture of the scrobes and propodeum, as well as by lacking propodeal plical setae.

Key to species of *Urolycisca* Roman

1 Female **2**

– Male **8**

2(1) Gaster with Gt$_1$ and Gt$_2$ yellowish-orange, contrasting distinctly with mesosoma **3**

– Gaster uniformly dark with metallic lusters, not contrasting distinctly with mesosoma (Gt$_1$ sometimes cupreous under some angles of light) **6**

3(2) Coxae metallic green/blue, except pro- and metacoxae apically and mesocoxa ventrally white; Gt$_1$ with only very slender band of fine punctures mediolongitudinally . . . . ***Urolycisca hastata* (Walker)**

– Coxae mostly yellowish-orange, sometimes with white spot apically; Gt$_1$ extensively and distinctly punctate, except smooth anterolaterally and broadly smooth along posterior margin **4**

4(3) Profemur white ventrally basal to preapical angulation; metafemur with about ventrobasal two-thirds white; axilla with distinct cupreous spot anterolaterally [Guyana (1♀ BMNH), Trinidad (1♀ CNCI)] . . . . ***Urolycisca* n. sp. #1**

– Profemur at most white apical to preapical ventral angulation; metafemur sometimes white ventroapically, but yellowish-orange basally except for trochantellus; axilla without cuprous region **5**

5(4) Metafemur with white stripe apically along dorsal and exterior ventral surfaces; pronotum with 3 very slender cupreous marks, 1 medially and 2 laterally [Mexico (1♀ UCDC)] . . . . ***Urolycisca* n. sp. #2**

– Metafemur with only small white spot dorsoapically; pronotum with complete transverse cupreous band or with band variably distinctly separated medially into large paramedial spots [Belize (1♀ MUCR), Costa Rica (7♀♀ INBIO), Mexico (2♀♀ EMEC)] . . . . ***Urolycisca* n. sp. #3**

6(2) Legs with procoxa, mesocoxa at least ventrally, and sometimes metacoxa extensively yellowish-orange (ventral surface of mesocoxa and ventroapical surface of procoxa often whitish); metatibia yellowish-orange, similar to coxa; interantennal region punctulate and densely setose except for smooth, shiny, transverse bar dorsally below vertical flange (Fig. 441); gaster mostly dark dorsally but with bright blue or green spot or stripe on extreme lateral margin of Gt$_3$–Gt$_5$; laterotergite of Gt$_5$ with more or less Λ-like black mark basally, with one arm of mark along about dorsal half of basal margin and with often longer arm extending posteromedially . . . . ***Urolycisca apicalis* (Walker)**

– Legs with at least procoxa and sometimes all coxae with distinct metallic luster ventrally; metatibia dark brown or partly brown with distinct subbasal white band; interantennal region punctate-rugose, relatively sparsely setose and dorsally without transverse bar below vertical flange (Fig. 440); gaster under some or all angles of light with purplish luster on at least Gt$_3$–Gt$_5$ and last 2 terga non-metallic black **7**

7(6) Metatibia with subbasal white band; meso- and metacoxae extensively yellowish-orange; profemur yellowish-orange with ventral whitish spot adjacent to preapical angulation; Gt_1 under some angles of light with cupreous luster, similar to most of scutellum [locality unknown (1♀ BMNH)] . . . . ***Urolycisca* n. sp. #4**

– Metatibia uniformly orange-brown to dark brown; meso- and metacoxae with at least ventral surfaces blue/purple; profemur often with some metallic luster, but without white mark ventrally; Gt_1 dark with metallic luster, similar to subsequent terga . . . . ***Urolycisca balteata* (Cameron)**

8(1) Gaster uniformly metallic blue-purple; Gt_1 extensively punctate (Fig. 447) . . . . ***Urolycisca balteata* (Cameron)**

– Gaster colored differently, either Gt_1 and/or some other terga largely or entirely yellowish to dark brown or terga with rufous or green metallic lusters; Gt_1 sometimes with only transverse region of punctures across middle **9**

9(8) Procoxa distinctly metallic bluish-purple, at least ventrally, except for ventroapical white spot; mesocoxa white ventrally but dark laterally . . **10**

– Procoxa yellowish to dark brown except sometimes for ventroapical white spot; mesocoxa entirely or mostly orange-yellow to brown, at least ventrally **12**

10(9) Profemur white along ventral length; metafemur entirely white along ventral exterior surface, or at least extensively white basally [Trinidad (1♂ BMNH, 1♂ CNCI), Venezuela (1♂ CASC, 1♂ RMNH, 2♂♂ USNM)] . . . ***Urolycisca* sp. M#1**

– Profemur, excluding trochantellus, white only apically or ventroapically; metafemur with trochantellus white and sometimes with ventral exterior surface white apically **11**

11(10) Profemur white apically beyond level of preapical angulation; metafemur with apex and about apical third of ventral exterior surface white; Gt_1 extensively punctate, only quite narrowly smooth laterally and along posterior margin [Mexico (5♂♂ UCDC)] . . . . ***Urolycisca* n. sp. #2**

– Profemur with ventral white line only subapically; metafemur with only small dorsoapical white spot; Gt_1 with transverse band of punctures only over about middle third of tergum [Brazil (1♂ USNM)] . . . . . ***Urolycisca* sp. M#2**

12(9) Gt_1 dark, similar to non-metallic regions of subsequent terga; interantennal region and lower face with dense lanceolate setae forming white reflective surface from frontolateral view; mesoscutal medial lobe and scutellum with smooth and shiny interstices; scutellum cupreous except for marginal rim and small apical spot adjacent to marginal rim, but axilla entirely metallic green . . . . ***Urolycisca apicalis* (Walker)**

– Gt_1 yellowish-orange, contrasting with variably patterned subsequent terga; interantennal region and lower face with well separated hairlike setae not forming white reflective surface; mesoscutal medial lobe and scutellum with rosetteform subsculpture on interstices; scutellum with greenish-blue spot over about posterior half medially and axilla partly cupreous anteriorly **13**

13(12) Metafemur yellowish-brown except white apically; procoxa without apical white spot; profemur uniformly yellowish-orange except for small apical white spot; gaster with broad metallic green band across most of Gt_3 and Gt_4 with large paramedial green areas [Trinidad (1♂ CNCI)] . . . . ***Urolycisca* sp. M#3**

– Metafemur distinctly white basally, partly over exterior surface and more extensively along ventral surface, the ventral region almost joining apical white region; procoxa with distinct ventroapical white spot; profemur with posterior surface white ventrally along length; gaster with Gt_3 and Gt_4 yellowish-brown dorsally with metallic lusters only laterally [Trinidad (1♂ BMNH, 1♂ RMNH)] . . . . ***Urolycisca* n. sp. #1**

OODERINI

Remarks. The monotypic tribe Ooderini was established by Bouček (1958) "to stress the unusual characters of *Oodera* Westwood, especially on its dorsal surface" (Bouček 1988*a*: 267). Bouček (1958) stated that some cleonymines, especially *Oodera*, seem to form a bridge to the Eupelmidae. In some classifications (e.g., Ashmead 1904, Nikol'skaya 1952, Graham 1969) *Oodera* has even been classified in Eupelmidae. Bouček (1988*a*) noted that the pleural subdivision of the thorax is rather vague in *Oodera* (Fig. 451) and suggested this was the reason why some authors included *Oodera* in Eupelmidae. Graham (1969: 14) correctly noted that *Oodera* and 'Eupelmidae' both have a membranous area between each mesocoxa and the posterior margin of the mesosternum (Fig. 456: mem), which allows the coxa to be swung directly forwards, and that the mesotarsus in both taxa have rows of stout spines ventrally (Fig. 460). Subsequently, Gibson (1989) showed that the membranous areas and ability to rotate the mesocoxae forward, as well as the presence of distinct pegs on the mesotarsus, were not possessed by all eupelmids and probably evolved independently within the three subfamilies comprising the family. Consequently, the two features cannot be synapomorphic for *Oodera* + Eupelmidae, but must either be convergent or a synapomorphy for *Oodera* plus some part of Eupelmidae. In Eupelmidae, the two features are correlated with a greatly enlarged pleural muscle and modified jumping mechanism that results in comparatively prodigious jumps by individuals (Gibson 1986*b*). The site of origin of the muscle, the pl_2–t_2c muscle, is externally evident in many chalcids as a relatively small differentiated region below the base of the forewing (e.g., Fig. 68), which Bouček (1988*a*, fig. 6) called the subalar area and Gibson (1986*b*, figs 1, 2) termed the acropleuron. Except for male eupelmines, eupelmids have the pl_2–t_2c muscle enlarged so that the acropleuron occupies all or most of the mesopleural region (Gibson 1986*b*, figs 25–30). The mesepisternum and mesepimeron are reduced or absent and the 'mesopleuron' consequently appears to be undifferentiated. Although (Bouček 1988*a*) is correct in stating the pleural subdivisions are comparatively vague in *Oodera* (Fig. 451), this is primarily because an acropleuron is not distinctly differentiated from the rest of the mesopleuron. The pl_2–t_2c muscle is very small in *Oodera* and the pleural structure of *Oodera* and eupelmids, other than male eupelmines, is very different. Gibson (1986*b*) hypothesized the ability of many eupelmids to rotate the mesocoxae out of their fossae evolved so that the middle legs could be brought directly forward during a jump and the mesotarsi used to help protect the head and antennae during landings when individuals tend to tumble. The mesotibial and mesotarsal pegs were hypothesized to have evolved to enhance traction during jumping, to help prevent the mesotarsus from slipping when the jumping force is exerted through the tarsus, and/or to cushion the tarsus by absorbing some of the shock load (Gibson 1986*b*). Chalcids primarily use their middle legs to jump, which in most chalcids are powered by mesotergal-mesotrochanteral (t_2-tr_2) muscles (Gibson 1986*b*, fig. 4: 17a, 17b). These muscles are very large in *Oodera*, suggesting that individuals are powerful jumpers. If so, the similar middle leg modifications of *Oodera* and Eupelmidae may have evolved in response to the same selective pressures (Gibson 1986*b*). An alternative functional explanation is suggested by other structural features of *Oodera*. Individuals have highly modified forelegs that appear to be raptorial, adapted for grasping objects between the protibia and profemur (Figs 457, 458). The long pronotum also has an unusually narrow, ball-and-socket type of articulation with the mesonotum (Fig. 453) that likely gives the head and prothorax much greater mobility relative to the mesothorax (Fig. 451) than for most other cleonymines and chalcids. The mobility and modified forelegs both suggest *Oodera* is adapted for locating and grasping objects. It is possible that in *Oodera* the selection pressure resulting in the two middle leg modifications (ability to rotate the mesocoxae forward and presence of tarsal pegs) was so that the middle legs could be brought straight forward and the mesotarsi used to help manipulate whatever is caught. Individuals of *Oodera* also resemble some eupelmids, particularly some Calosotinae, because of the modified structure and sculpture of their upper parascrobal region (Figs 448, 449). However, similar head structures have evolved in other parasitoids of wood-boring hosts as an adaptation to help the emerging adult exit the host tunnel in wood (see character 7).

Bouček (1988*a*) also stated that some species of *Heydenia* suggest a close relationship to *Oodera*, but did not provide further information. Many species of *Heydenia* are similar to *Oodera* because they have a ventrally extensive prepectus, a very similar pronotal structure with a ball-and-socket type of articulation between the prothorax and mesothorax, and somewhat similar, probably raptorial forelegs. However, my character-state analysis indicates these states were derived within *Heydenia* rather than being groundplan states of the genus. The states therefore are either convergent in the two genera or *Oodera* renders *Heydenia* paraphyletic. Convergence is indicated because all known *Heydenia* have what I hypothesize to be a more apomorphic setal pattern of the forewing than do species of *Oodera*. The setal pattern supports monophyly of *Heydenia* (see Remarks for Heydeniini). It will be necessary to more accurately determine true character-state distribution throughout Pteromalidae prior to establishing robust hypotheses of relationships for *Oodera* and *Heydenia*. For example, Leptofoeninae lack raptorial forelegs, but do have a ventrally extensive prepectus and a similar pronotal structure as for *Oodera* and many *Heydenia*. They also lack a distinctly differentiated acropleuron, have a convex, cristate upper parascrobal region (Fig. 3), and a smoother apical band on the scutellum (Fig. 9) similar *Oodera* (Figs 454, 455) (though the region is not distinctly carinate).

The presence of one unidentified species in eastern United States likely results from recent accidental introduction (see Diversity for *Oodera*). If so, present day distribution indicates *Oodera* evolved in the Old World after the separation of Australia + South America from Africa as a result of opening of the mid-Atlantic channel in the late Cretaceous, i.e., more recently than 110 million years ago. Morphologically, *Oodera* is much less diverse than *Heydenia*, species differing from each other most conspicuously by length of the ovipositor sheaths. The comparative lack of morphological diversification in *Oodera* may support an hypothesis of a more recent origin than for *Heydenia*, which probably has existed for 40 million years (see Remarks for Heydeniini).

***Oodera* Westwood**

Figs 448–463

Oodera Westwood, 1874: 145. Type species: *Oodera gracilis* Westwood; subsequent designation by Ashmead (1904: 288).

Stellophora Risbec, 1951: 239. Type species: *Stellophora magnifica* Risbec; by monotypy. Synonymy by Bouček (1958: 375).

Diversity. Seventeen nominal species in the Palearctic, Afrotropical and Oriental regions. One unidentified species is also known from the Nearctic region (northeastern United States), but this likely represents a relatively recent accidental introduction. Specimens were first recovered in New Jersey in 1969. It is unlikely that such large-bodied individuals would not have been collected previously if the species was native. The species of *Oodera* need to be revised prior to confident identification, but the Nearctic species is similar to the Palearctic species, *O. formosa*.

✓ ***Oodera ahoma* (Mani & Kaul)**. *Lycisca ahoma* Mani & Kaul *in* Mani *et al.*, 1973: 53–55; ♀ holotype (USNM: 76268). Combination by Bouček *et al.* (1979: 448). DISTRIBUTION: India, Pakistan, Sri Lanka.

***Oodera albopilosa* Crosby**, 1909: 86–88; ♀ holotype (CUIC). DISTRIBUTION: Zambia.

***Oodera bestia* Nikol'skaya**, 1952: 474; ♀ syntypes (ZMAS). DISTRIBUTION: Ukraine.

***Oodera dakarensis* Risbec**, 1957: 256–260; 3♀, 1♂ syntypes (MNHN). DISTRIBUTION: Senegal.

***Oodera formosa* (Giraud)**. *Heydenia formosa* Giraud, 1863: 21–22; ♀ holotype (location uncertain). Combination by implication by Bouček (1958: 375). *Stellophora formosa* (Hedqvist 1957: 44). DISTRIBUTION: *Bulgaria (BMNH), France, Italy, Romania, Russia, Ukraine.

✓ ***Oodera gracilis* Westwood**, 1874: 145; ♀ holotype (OXUM: T. 667). DISTRIBUTION: Indonesia (Irian Jaya, Sulawesi).

✓ ***Oodera hoggarensis* Hedqvist**, 1967*b*: 186–187; ♀ holotype (MHNG). DISTRIBUTION: Algeria.

✓ ***Oodera longicollis* (Cameron)**. *Epistenia longicollis* Cameron, 1903: 97–99; ♀ lectotype (BMNH: 5.891) designated by Bouček in Bouček *et al.* (1979: 449). Combination by Hedqvist (1961: 97). DISTRIBUTION: Indonesia (Kalimantan), Malaysia (Sabah), Myanmar, Philippines.

= ✓ *Oodera ornata* Gahan, 1925: 97–99; ♀ holotype (USNM: 26762). Synonymy by Bouček *et al.* (1979: 448).

***Oodera madegassa* Bouček**, 1958: 376–380; ♀ holotype (NMPC: 3028). DISTRIBUTION: Madagascar.

***Oodera magnifica* (Risbec)**. *Stellophora magnifica* Risbec, 1951: 239–243; ♀ type (MNHN). Combination by Bouček (1958: 375). DISTRIBUTION: Senegal.

***Oodera monstrum* Nikol'skaya**, 1952: 474; ♀ syntypes (ZMAS). DISTRIBUTION: Russia.

***Oodera obscura* Westwood**, 1874: 146; ♀ type (location uncertain). DISTRIBUTION: Indonesia.

✓ ***Oodera pumilae*** **Yang**, 1996: 100, 311; ♀ holotype (NWCF). DISTRIBUTION: China (Heilongjiang).

✓ ***Oodera regiae*** **Yang**, 1996: 98–100, 310; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

Oodera rufimana **Westwood**, 1874: 146; ♀ type (location uncertain). DISTRIBUTION: Cambodia.

✓ ***Oodera tenuicollis*** **(Walker)**. *Eupelmus tenuicollis* Walker, 1872: 86–87; ♀ type (BMNH: 5.1622). DISTRIBUTION: Indonesia (South Moluccas).

Biology. Parasitoids of wood-boring beetle larvae of the families Buprestidae and Scolytidae (Bouček 1958, Yang 1996). Crosby's (1909) host record for *O. albopilosa* is anomalous. He stated that the holotype was a parasitoid of an unknown fly producing galls in the branches of *Combretum olivaceum* (Combretaceae). The unidentified species in the United States has been reared from the dead wood of *Gleditsia* (Fabaceae).

Description. *Head* (Fig. 448) with deep scrobal depression extending to anterior ocellus, and with upper parascrobal region raised above plane of eye and cristate from level near apex of interantennal region (Fig. 449); vertex very narrow, POL and OOL both only about equal in length to maximum diameter of ocellus, and with weakly convex ocellar triangle differentiated by furrow formed in part by posterior surface of raised upper parascrobal region (Fig. 449); without occipital carina. Eye superficially bare to sparsely and inconspicuously microsetose.

Antenna inserted variably distinctly below lower margin of eyes; flagellum (Fig. 461) with first segment much longer than wide, often as long as or longer than pedicel; funicle 8-segmented; preclaval segment and clava without processes; clava 3-segmented.

Mesosoma. Pronotum (Figs 450, 451) more or less tent-like without differentiated collar and neck or median line, with flat dorsal surface much longer than dorsal width and flat or slightly concave lateral panel angled at about 45° to dorsal surface, with each panel much higher than width of dorsal surface and dorsal surface usually with mediolongitudinal sulcus or furrow; in dorsal view appearing somewhat pentagonal, widest anteriorly and narrowed toward mesoscutum; in lateral view articulated with mesoscutal medial lobe obviously below dorsal plane of mesoscutum (Fig. 451). Mesoscutum (Fig. 450) without flexible transscutal articulation, with sulcate notauli extending to anterior margin of scutellum at anteromedial angles of axillae, and strigose posteriorly between axillae. Scutellum (Figs 450, 454) longitudinally strigose dorsally, with smoother, coriaceous apical rim distinguished by furrow or carina; axillula obscure, a small anterolateral vertical region of scutellum posterior to axilla; without evident frenum or frenal line. Axilla large, conspicuously advanced, and with much more finely sculptured posterior region abruptly delimited from more coarsely sculptured anterior region (Figs 450, 454). Dorsellum bare, subvertical and extending dorsally slightly over apical rim of scutellum. Prepectus triangular in lateral view, with posterior margin about level with apex of procoxa (Fig. 451); in ventral view relatively long with anteromedial triangular region delineated by crenulate furrows (Fig. 452). Mesopleuron (Fig. 451) without distinctly differentiated, convex acropleuron below base of forewing; mesepimeron setose posterodorsally, but not differentiated into upper and lower mesepimeron. Mesosternum with small membranous area anterior to each mesocoxa (Fig. 456) and coxa able to rotate anteriorly out of fossa. Metapleuron uniformly sculptured and setose. Propodeum (Fig. 455) without paraspiracular carina or distinctly differentiated plical region, with radiating or irregular crenulae medially and with crenulate furrow along anterior margin; densely setose posterolateral to imaginary line drawn between inner margin of spiracle and lateral margin of foramen.

Wings. Forewing with humeral plate setose along leading margin, but bare dorsally except for 1–3 setae along apical margin; membrane, excluding anal region, uniformly setose or with slender bare region beyond basal cell, with basal cell uniformly setose and without differentiated setae distinguishing cubital or basal folds; postmarginal vein slightly shorter than marginal vein. Hind wing with costal cell broad.

Legs. Profemur (Figs 457, 458) conspicuously enlarged, ventral surface with row of ventrally projected straight spicules and with row or narrow band of longer, obliquely angled, spinelike setae exterior to spicules, and with basolateral patch of spinelike setae interior to spicules; protibia curved (Fig. 457) with dorsal and ventral margins carinate (Fig. 458), without spicules along dorsal margin but with one or more dorsoapical spicules (sometimes partly fused with tibia and obscure, Fig. 459) and with ventroapical angle projecting as small, acutely angled lobe over base of tibial spur. Mesotibia with row of strong spines along inner apical margin; mesotarsus with row of strong spines or pegs along inner and outer ventral margins (Fig. 460). Metacoxa not carinate dorsally, and with exterior surface uniformly setose.

Metasoma. Petiole short, in dorsal view a transverse dorsal strip, and in ventral view membranous medially. Gaster (Fig. 462) with Gt$_7$ and Gt$_8$ fused into syntergum; terga all of similar length and not strongly sclerotized or margined laterally; Gt$_1$–Gt$_4$ or Gt$_5$ with posterior margins slightly emarginate; syntergum with digitlike cerci projecting from extreme posterolateral margin of tergum (Fig. 463); and with anal filament extending from apex of syntergum over ovipositor along entire length of ovipositor sheaths (often concealed between ovipositor sheaths, Fig. 463). Ovipositor sheaths varying from about as long as hind basitarsus to as long as rest of gaster.

Remarks. Monophyly of *Oodera* is supported by at least two features, presence of a unique system of spines and spinelike setae ventrally on the profemur (Figs 457, 458) and absence of a flexible transscutal articulation. Dried individuals often have an arcuate fracture line on the mesoscutum between the inner margins of the advanced axillae (Fig. 450). Position of the fracture varies so that the fracture does not appear to be a specific line of weakness analogous to the transscutal articulation, but likely is a consequence of the absence of a flexible transscutal articulation. In most chalcids, the transscutal articulation is a more or less transverse line of flexibility across the mesonotum at the level of the tegula. It acts as a hinge because it is flexible and transverse, allowing the mesoscutum and scutellar-axillar complex to flex relative to one another with alternate contraction of the primary dorsolongitudinal and dorsoventral flight muscles. The flexing movements are necessary for manipulation of the forewing axillary sclerites during flight (Gibson 1986*b*). The mesonotal fracture likely occurs in dried specimens of *Oodera* because of differential forces exerted on the mesoscutum when the large dorsoventral thoracic muscles dry. The suture separating the mesonotum from the axilla undoubtedly represents the transscutal articulation, which has secondarily become deeply V-shaped (Fig. 450) with resulting loss of flexibility. The distinctive sculptural pattern of the axilla in *Oodera* is correlated with origin of the large mesotergal-trochanteral (t$_2$-tr$_2$) muscle. This muscle originates from the anterior, more coarsely sculptured region of the axilla (see Gibson 1986*b*, fig. 4: 17a) and from a long axillar phragmata (Gibson 1986*b*, fig. 4: 17b) extending anteriorly under the mesoscutum from this region (Gibson 1986*b*, fig. 5: axp). The more finely sculptured posterior region of the axilla lacks muscle in *Oodera*.

Oodera is also unusual within Cleonyminae because members apparently often have the protibial dorsoapical pegs partly fused with the tibia (Fig. 459). Members of Lyciscini and Heydeniini are characterized by distinct pegs, whereas Cleonymini and Chalcedectini are characterized by the absence of pegs. Structural features putatively shared with eupelmids (mesocoxal articulation and structure of upper parascrobal region) might indicate a sister-group relationship with Calosotinae, but more likely the features evolved independently, as is discussed under 'Remarks' for the tribe.

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Appendix I: Abbreviations used to designate structures in figures

acf	anterior crenulate furrow
acr	acropleuron
anf	anal filament
axc	axillular carina
axl	axillula
axs	axillular sulcus
bc	basal cell
bsl	basal setal line
cal	callus
car	carina
cer	cercus
csl	cubital setal line
cut	cuticle
das	dorsoapical spicules
dor	dorsellum
dos	dorsal spicules
fl$_n$	flagellar segment
fra	frenal arm
fre	frenum
frl	frenal line
gc	genal carina
grv	groove
Gt$_n$	gastral tergum
hpl	humeral plate
lsc	scutellar lip
ltg	laterotergite
mem	membrane
mrs	marginal rim of scutellum
msm	mesoscutal margin
not	notaulus
occ	occipital carina
osh	ovipositor sheath
paa	preapical angulation of protibia
pam	paraaxillar margin of mesoscutal lateral lobe
plr	plical region
pml	median line of pronotum
post	postcercal length of syntergum
pre	prepectus
prec	precercal length of syntergum
prm	preaxillar margin of mesoscutal lateral lobe
prp	prepectus panel
psc	paraspiracular carina
psf	paraspiracular furrow
psm	parascutal margin of mesoscutal lateral lobe
pst	parastigma
ptf	postspiracular furrow
ptl	petiole
sap	subalar pit
spc	speculum
sr	strigose (region)
syn	syntergum
tc	tibial comb
tgl	tegula

Appendix II: Outgroup Pteromalidae examined for character-state analysis

COLOTRECHINAE: Hetreulophini
- *Hetreulophus* spp. (♀ ♂)
- *Zeala walkerae* Bouček (♀ ♂)

LEPTOFOENINAE
- *Doddifoenus rex* Bouček (♀)
- *Leptofoenus stephanoides* (Roman) (♀ ♂)
  - *L. westwoodi* Ashmead (♀ ♂)

LOURICIINAE
- *Callimomoides* sp. (♀ ♂)

MACROMESINAE
- *Macromesus americanus* Hedqvist (♀ ♂)

NEFOENINAE
- *Nefoenus pilosus* Bouček (♀)

PTEROMALINAE: Pteromalini
- *Dinotiscus aponius* (Walker) (♀ ♂)
  - *D. dendroctoni* (Ashmead) (♀ ♂)
  - *D. eupterus* (Walker) (♀ ♂)
- *Rhaphitelus maculatus* Walker) (♀ ♂)
- *Rhopalicus pulchripennis* (Crawford) (♀ ♂)
  - *R. tutela* (Walker) (♀ ♂)
- *Roptrocerus xylophagorum* (Ratzeburg) (♀ ♂)

PTEROMALINAE: Trigonoderini
- *Gastracanthus conicus* (Girault) (♀ ♂)
  - *G. pulcherrimus* Westwood (♀ ♂)
- *Ogloblinisca americana* Hedqvist (♀ ♂)
- *Platygerrhus algonquinius* (Girault) (♀ ♂)
  - *P. americanus* Hedqvist (♀ ♂)
  - *P. columbianus* (Ashmead) (♀ ♂)
- *Plutothrix cisae* Hedqvist (♀ ♂)
  - *P. smithi* Heydon (♀ ♂)
  - *P. ungutta* (Girault) (♀ ♂)

Genus / Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Pteromalinae: Pteromalini																														
Dinotiscus	0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2	?	1	1	0	0	2	0	0	0	0	0
Rhaphitelus	0	0	2	0	1	0	0	0	0	0	1	2	0	0	0	1	0	0	2	?	1	1	0	0	2	0	0	0	0	0
Rhopalicus	0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2	?	1	1	0	0	2	0	0	0	0	0
Roptrocerus	0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	2	?	1	2	0	0	0	0	0	0	0	0
Pteromalinae: Trigonoderini																														
Gastracanthus	0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0,1	2	0	0	0	0	0
Ogloblinisca	0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0,1	0,1	0	0	0
Platygerrhus	0	0	2	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2	2	0	2	0	0	0	0	0
Plutothrix	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0
Leptofoeninae																														
Doddifoenus	0	0	0	0	1	0	1	0	0	0	0	0	?	0	0	0	0	0	0	0	1	3	0	1	0	0	?	0	1	0
Leptofoenus	0	0	0	0	1	0	1	0	0,2	0	0	0	0	0	0	0	0,1	0	0	0	0	2	2	1	0	0	0	0	0	0
Nefoeninae																														
Nefoenus	0	0	0	0	1	1	0	0	0	0	0	0	?	0	0	0	0	0	0	0	0	0	1	1	0	0	?	0	0	0
Macromesinae																														
Macromesus	0	0	2	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0
Louriciinae																														
Callimomoides	1	1	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Colotrechinae																														
Hetreulophus	1	1	0	0	1	0	0	0	0	0	0	2	1	0	0	0	0	0	2	?	1	2	2	0	2	0	0	0	0	0
Zeala	1	1	1	0	1	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	1	2	2	0	2	0	0	0	0	0
Cleonyminae: Lyciscini (Old World)																														
Agamerion	1	1	0	0	0	0,1	0	0	0	0	0	2	1	0	0	0	2	2	0	1	0	2	2	0	1	1	1	0	0	0
Chadwickia	1	1	0	0	0	1	0	0	0	0	0	2	1	0	0	0	1,2	0	0	1	0	2	2	0	1	1	1	0	0	1
Eupelmophotismus	1	1	0	0	0	0,1	0	0	0	0	0	2	1	0	0	0	2	2	0	1	0	2	2	0	0,1	1	1	0	0	0
Grooca	1	1	0	1	0	1	0	0	0	0	0	0,1	0	0,1	0	0	0	2	1	1	0	2	0	0	0	0,1	0,1	0	1	0,1
Marxiana	1	1	0	0	0	1	1	0	1	0	0	1	1	0	0	0	0	2	0	1	0	2	1	0	0	1	1	0	1	0
Mesamotura	1	1	0	0	0	0	0	1	0	0	0	2	1	0	0	0	1	2	0	0	0	2	2	0	0	0	0	0	1	3
Neboissia	1	1	0	0	0	1	0	0	1	0	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	1	1	0	1	0
N. (Anepistenia)	1	1	0	0	0	1	0	0	1	0	0	2	1	1	3	1	0	2	0	1	0	2	2	0	0	0	0	0	1	0
N. (Nepistenia)	1	1	0	0	0	1	0	0	1	0	0	2	1	1	0	0	0	2	0	1	0	2	2	0	0	0	0	0	1	0
Parepistenia	1	1	0	0	0	1	0	0	1	0	0	1	1	0	0	0	0	2	0	1	0	2	1	0	0	1	1	0	1	0
Proshizonotus	1	1	0	0	0	0,1	0	0,2	0,1,2	0	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0,1	0,1	0,1	0	0,1	0
Riekisura	1	1	0	0	0	0,1	0	0	1	0	0	2	1	0	0	0	0	2	0	1	0	2	2	0	1	0	0	0	1	0
Solenura	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	2	0	0	0	0,1	0,1	0	1	1

Appendix III. Character matrix for phylogenetic analyses. Numbers correspond to characters and character-states described in the text; character-state numbers separated by commas denote multiple known states for the taxon; question marks denote missing data.

Genus / Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Striatacanthus	1	1	0	0	0	1	0	0	0	0	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	1	1	0	1	0
Thaumasura	1	1	0	0	0	0,1	0	0,1	1,2	0	0	2	1	0	0	0	1,2	2	0	0,1	0	2	2	0	0,1	0	0	0	1	0,2
Westwoodiana	1	1	0	0	0	1	0	0	1	0	0	2	?	0	0	0	0	2	0	1	0	2	2	0	0	0	?	0	1	0
Cleonyminae: Lyciscini (New World)																														
NW *Proshizonotus*[1]	1	1	0	0	0	1	0	0	0,1	0,1	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	1	1	0,1	1	0
Cleonyminae: Lyciscini (New World Clade)																														
Amazonisca	1	1	0	0	0	1	0	0	1	0	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0
E. (Epistenia)	1	1	0	0,1	0	1	0	0	0	1	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0
E. (Punctepistenia)	1	1	0	0,1	0	1	0	0	0	1	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0
Hadroepistenia	1	1	0	0,1	0	0,1	0	0	1	1	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0,1	0	1	1	0
Hedqvistia	1	1	0	0	0	1	0	0	0	0	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0
Lycisca	1	1	0	0	0	1	0	0	0	0	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0
Neoepistenia	1	1	0	0	0	0,1	0	0	0	0	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0
Paralycisca	1	1	0	0	0	1	1	0	0	0	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0
Proglochin	1	1	0	0	0	1	0	0	0,1	0	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0
Protoepistenia	1	1	0	0,1	0	1	0	0	0	0	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0
Romanisca	1	1	0	0	0	1	0	0	0	0,1	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0
Scaphepistenia	1	1	0	0	0	1	0	0	1	1	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0
Shedoepistenia	1	1	0	0,1	0	0,1	0	0	0,1	0,1	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0
Urolycisca	1	1	0	0,1	0	0,1	0	0	1	0	0	2	1	0	0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0
Cleonyminae: Boucekiini																														
Boucekius	0	0	0	0	0	0	0	0	0	0	0	2	?	0	0	0	0	0	0	1	0	0	0	0	1	0	?	0	0	0
Chalcidiscelis	0	1	0	0	0	1	0	0	0	0	0	2	?	0	0	0	0	0	0	0	0	0	0	0	0	0	?	0	0	0
Cleonyminae: Chalcedectini																														
Agrilocida	1	0	0	0	0	1	1	0	1	0	0	2	1	0	1	3	0	0	2	?	0	2	1	1	0	0	0	0	0	0
Chalcedectus	1	1	0	0	0	0,1	0	0	0	0	0	0	0	0	0	4	0	0,1	0	1	0	4	3	0	1	0	0	0	0,1	0
Cleonyminae: Cleonymini																														
Callocleonymus	1	1	2	0	0	1	0	0	0	0	0	2	1	0	3	2	0	0	2	?	0	2	2	0	0	0	0	0	0	0
Cleonymus	1	1	1,2	0	0	1	0	0	0	0	0	2	1	0	1,2	0	0	0	2	?	0	2	1,2	0	0	0	0	0	0,1	0,1
Dasycleonymus	1	0	1	0	0	1	0	0	0	0	0	2	1	0	2	0	0	0	2	?	0	2	1	0	0	1	0	0	1	1
Notanisus	1	1	2	0	0	1	0	0	0	0	0	2	1	0	1,2	0	0	0	2	?	0	2	1,2	0	0	0	0	0	0,1	0,1
Zolotarewskya	1	0,1	1,2	0	0	1	0	0	0	0	0	2	1	0	1,2	0	0	0	2	?	0	2	1,2	0	0	0	0	0	0,1	0,1
Cleonyminae: Heydeniini																														
Heydenia	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0,1,2	0,1	0,1	2	0	0,1	0,1	0	0	0	0	0
Cleonyminae: Ooderini																														
Oodera	1	1	0	0	0	0,1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	3	0	0	0	0	0	1	0

[1] Excluding *Proshizonotus* n. sp. #1

Genus / Character	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61
Pteromalinae: Pteromalini																															
Dinotiscus	2	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0
Rhaphitelus	2	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0
Rhopalicus	2	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0
Roptocerus	2	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0
Pteromalinae: Trigonoderini																															
Gastracanthus	2	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0
Ogloblinisca	0,2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Platygerrhus	0,2,3	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Plutothrix	2	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Leptofoeninae																															
Doddifoenus	5	0	2	0	?	0	3	0	0	0	0	0	1	0	?	0	0	0	0	0	?	1	0	?	0	0	?	0	0	0	1
Leptofoenus	0	0	2	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0	0	2	0
Nefoeninae																															
Nefoenus	0	0	0	0	?	0	0	0	0	0	0	0	0	0	?	0	0	0	0	0	?	1	0	?	0	0	?	0	0	2	0
Macromesinae																															
Macromesus	0	2	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0
Louriciinae																															
Callimomoides	4	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Colotrechinae																															
Hetreulophus	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Zeala	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cleonyminae: Lyciscini (Old World)																															
Agamerion	0,1	2	1	0	0	1	0,2	0	0	0	0	0	0,1	0	0	0,3,5	0	0	1	0	0	0	0	0	0	0	0	0	0	2	1
Chadwickia	0	2	0	0	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1
Eupelmophotismus	0,1	2	1	0	0	1	0	0	0,1	0	0	0	0,1	0,1	0,1	0,5	0	0	0,1	0	0	0	0	0	0	0	0	0	0	2	1
Grooca	0	2	0,1	0	0	1	0	0	0	0	0	0	0	1	0,1	0	0	0	0	0	0	0	0,1	1	1	0,2	0,2	0,1	0,1,2	2	1
Marxiana	0	2	0	1	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	1	1
Mesamotura	0	2	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	2	1
Neboissia	0	2	1	0	0	1	0	0	2	0	0	2	0	1	1	0	0	0	0	0	4	0	0	0	0	0	0	1	1	1	1
N. (Anepistenia)	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
N. (Nepistenia)	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Parepistenia	0	2	0	0,1	0,1	1	0	0	0,1	0	1	0	0	0,1	0	0	0	0	0	0	5	0	1	0	0	0	0	1	1	1	1
Proshizonotus	0,1	2	0	0	0	1	0	0	0,1	0	0	1	0	0,1	0	0	0	0	0	0	0,6	0	0,1	0,1	0,1	0,2	0,2	0,1	0,1	1	1
Riekisura	0	2	0	0	0	1	0	0	0,1	0	0	0	0	0,1	0,1	0	0	0	0	0	0	0	0	0	0,1	0,2	0,2	0	0	1,2	1
Solenura	0	2	1	0	0	1	0	0	0	0	0	0	0	1	0,1	0	0	0	0	0	0	0	0	1	1	2	0,1,2	0,1,2	2	2	1

Genus / Character	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61
Striatacanthus	1	2	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	3	0	1	1	0	0	0	1	1	1	1
Thaumasura	0,1	2	0,1	0	0	1	0	0	0,1	0	0	0	1	0,1	0	0	0	0	0,1	0,1	2	0	0	0	0	0	0	0	0	2	1
Westwoodiana	0	2	0	0	?	1	0	0	0	0	0	0	1	0	?	0	0	0	0	0	?	0	0	?	0	0	?	0	0	2	1
Cleonyminae: Lyciscini (New World)																															
NW *Proshizonotus*[1]	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	0	0	1	1
Cleonyminae: Lyciscini (New World Clade)																															
Amazonisca	0	2	0	0	0	1	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	2	1
E. (Epistenia)	0	2	0	0	0	1	0	0	0,1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	2	2	2	1
E. (Punctepistenia)	0	2	0	0	0	1	0	0	0,1	0	0	0,1	0	1	1	0	0	0	0	0	0	0	1	1	1	2	2	2	2	2	1
Hadroepistenia	0	2	0	0	0	1	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	1	1	1	2	1	0	0	2	1
Hedqvistia	0	2	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	2	1
Lycisca	0	2	0	1	1	1	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	1	1	1	0,1	0,1,2	0	0	2	1
Neoepistenia	0	2	0	0	0	1	0	0	1	0	0	1	0	0,1	0,1	0	0	0	0	0	0	0	1	1	1	1,2	1,2	0	0	2	1
Paralycisca	0	2	0	1	0	1	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1	2	1
Proglochin	0	2	0	0	0	1	0	0	1	0	0	0	0	0,1	1	0	0	0	0	0	0	0	1	1	1	0,2	2	0	2	2	1
Protoepistenia	0	2	0	0	0	1	0	0	0,1	0	0	0,1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	2	2	2	1
Romanisca	0	2	0	0	0	1	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	2	1
Scaphepistenia	0	2	0	0	0	1	0	0	1	0	0	0,1	0	1	1	0	0	0	0	0	0	0	1	1	1	0	0	1	1,2	2	1
Shedoepistenia	0	2	0	0	0	1	0	0	0,1	0	0	0	0	0,1	0,1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	2	1
Urolycisca	0	2	0	0	0	1	0	0	1	0	0	1	0	0,1	0,1	0	0	0	0	0	0	0	1	1	1	2	2	0	2	2	1
Cleonyminae: Boucekiini																															
Boucekius	0	0	0	0	?	0	0	1	0	0	0	0	0	1	?	1	0	0	0	0	?	0	0	?	0	0	?	0	0	0	0
Chalcidiscelis	0	2	0	0	?	0	0	0	1	0	0	0	0	1	?	2	0	0	0	0	?	0	0	?	0	0	?	2	?	2	0
Cleonyminae: Chalcedectini																															
Agrilocida	0	1	0	0	0	1	1	0	0	1	0	0	0	1	0	3	1	0	0	0	1	0	0	0	0	0	0	1	1	1	0
Chalcedectus	0,1	1	0,1	0	0	1	0,2	1	0	1	0	0	0	1	1	3,4	1,2	0,1,2	0	0	0,1	0	0	0	0	0	0	0,1,2	0,1,2	2	1
Cleonyminae: Cleonymini																															
Callocleonymus	3	2	0	0	0	1	0,2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0,1	0,1	2	1
Cleonymus	0,1,4	2	0	0	0	1	0,2	0	0	1	0	0	0	0	0	0,1,2	0	0	0	0	1	0	0	0	0,1	0,1	0	0,1	0,1	2	1
Dasycleonymus	0	2	0	0	0	1	0	0	0	1	0	0	0	0	1	2	0	0	0	0	1	0	0	1	1	0	0	1	0	2	1
Notanisus	1,4	2	0	0	0	1	0,2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0,1	0,1	2	1
Zolotarewskya	0	2	0	0	0	1	0	0	0	1	0	0	0	0	0	2	0	0	0	0	1	0,1	0	0	0	0,1	0	0,1	0,1	2	1
Cleonyminae: Heydeniini																															
Heydenia	0,1,4	2	0,1	0	0	0	1,2	0	0,3	0	0,1	0,1,2	0,1	0,1	0	0,5	0	0	0	0	0,1	0	0	0	0	0	0	0	0	2	1
Cleonyminae: Ooderini																															
Oodera	0	2	1	0	0	0	0	1	4	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0

[1] Excluding *Proshizonotus* n. sp. #1

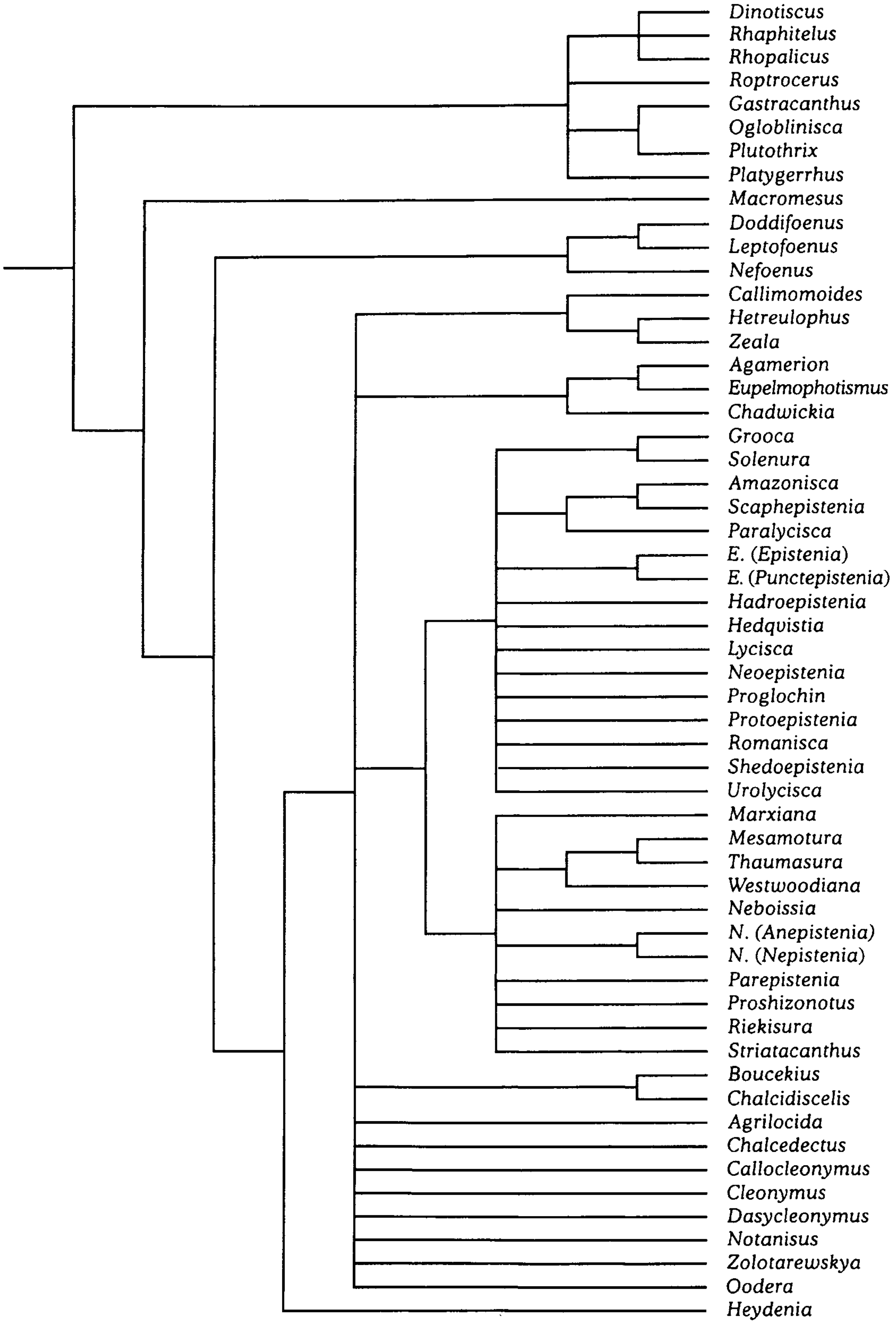


Fig. 1a. Strict consensus tree of relationships of Cleonyminae and outgroup taxa prior to successive weighting when NW *Proshizonotus* is subsumed within *Proshizonotus* and Pteromalinae is used to root the tree.

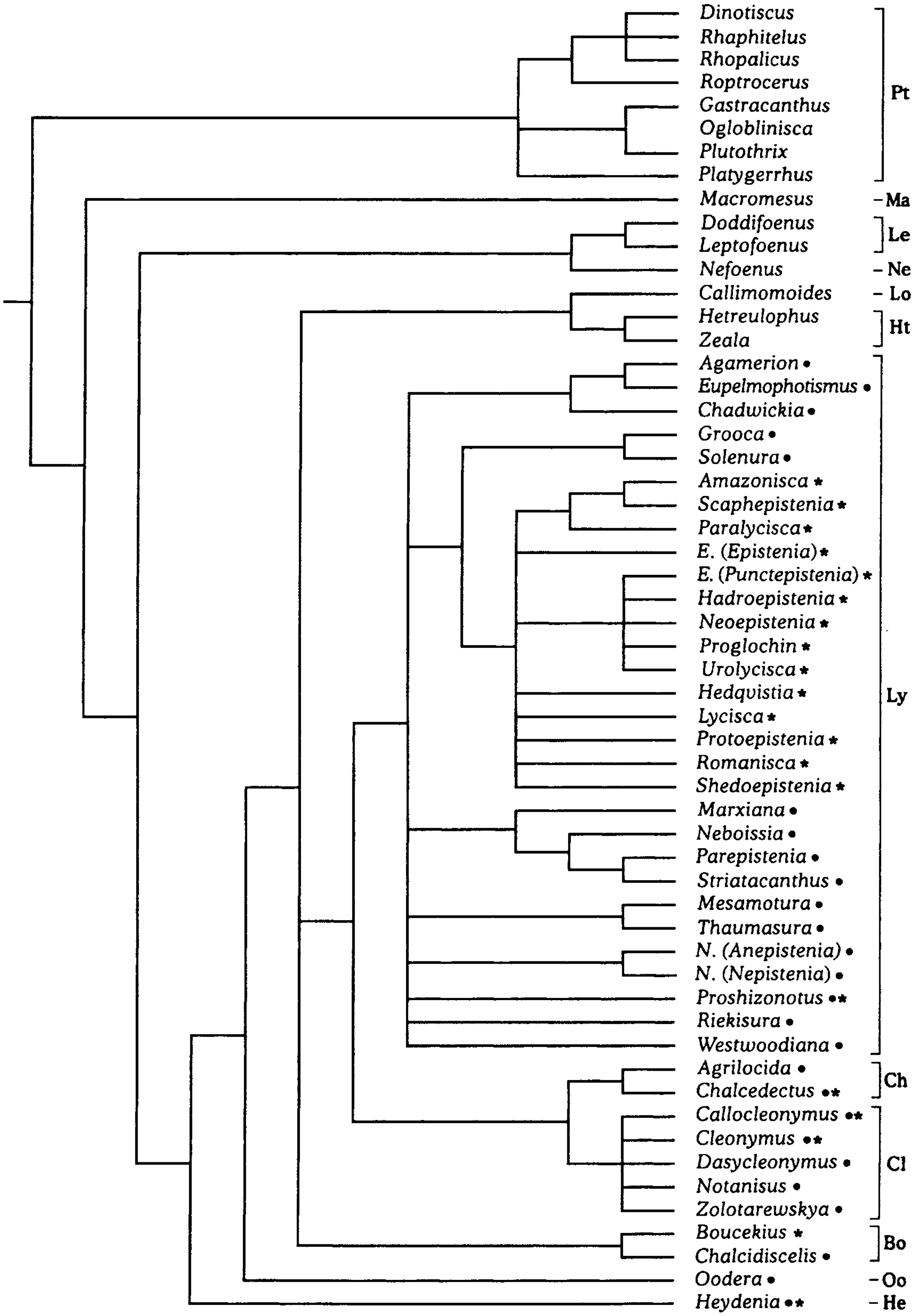
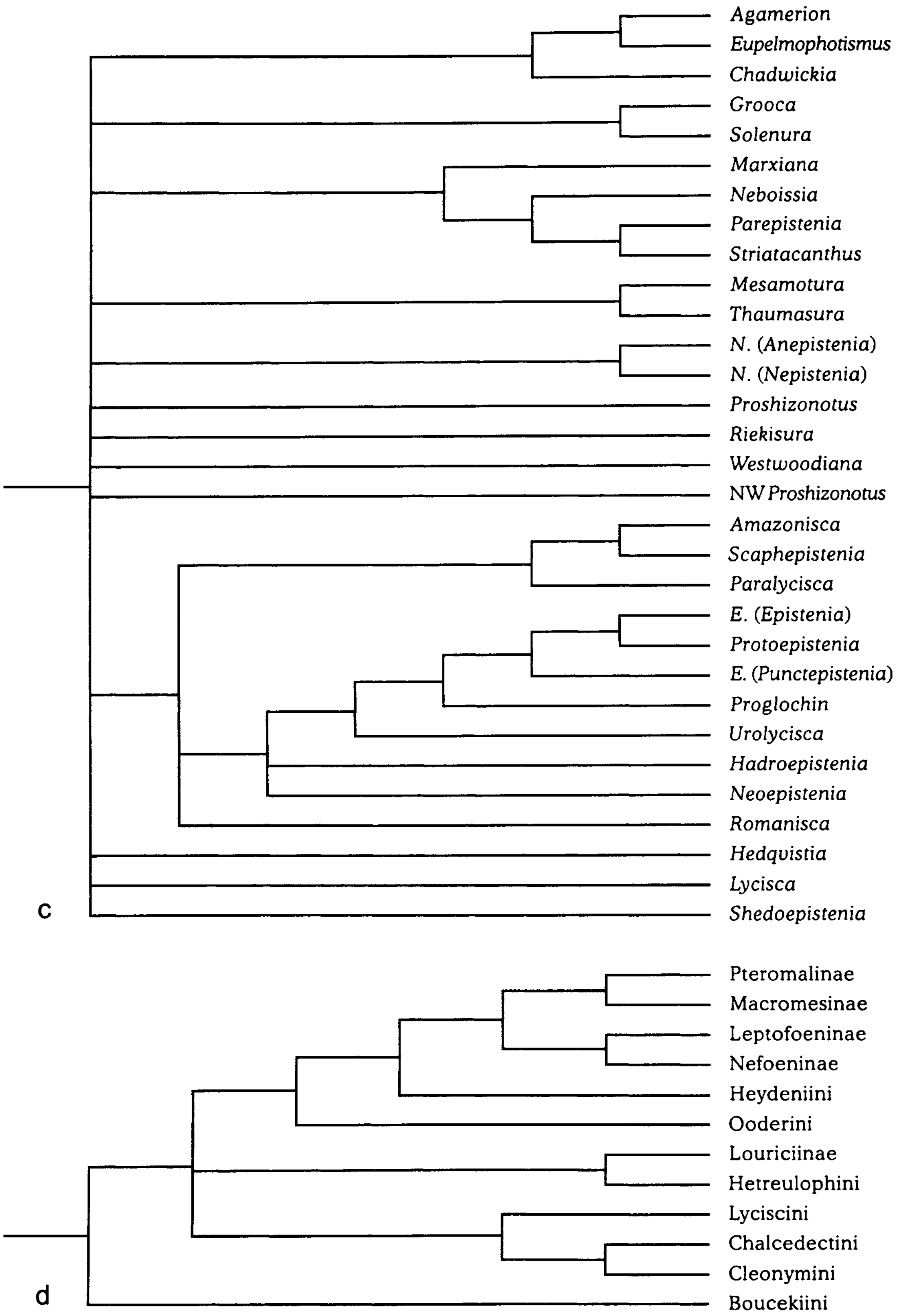
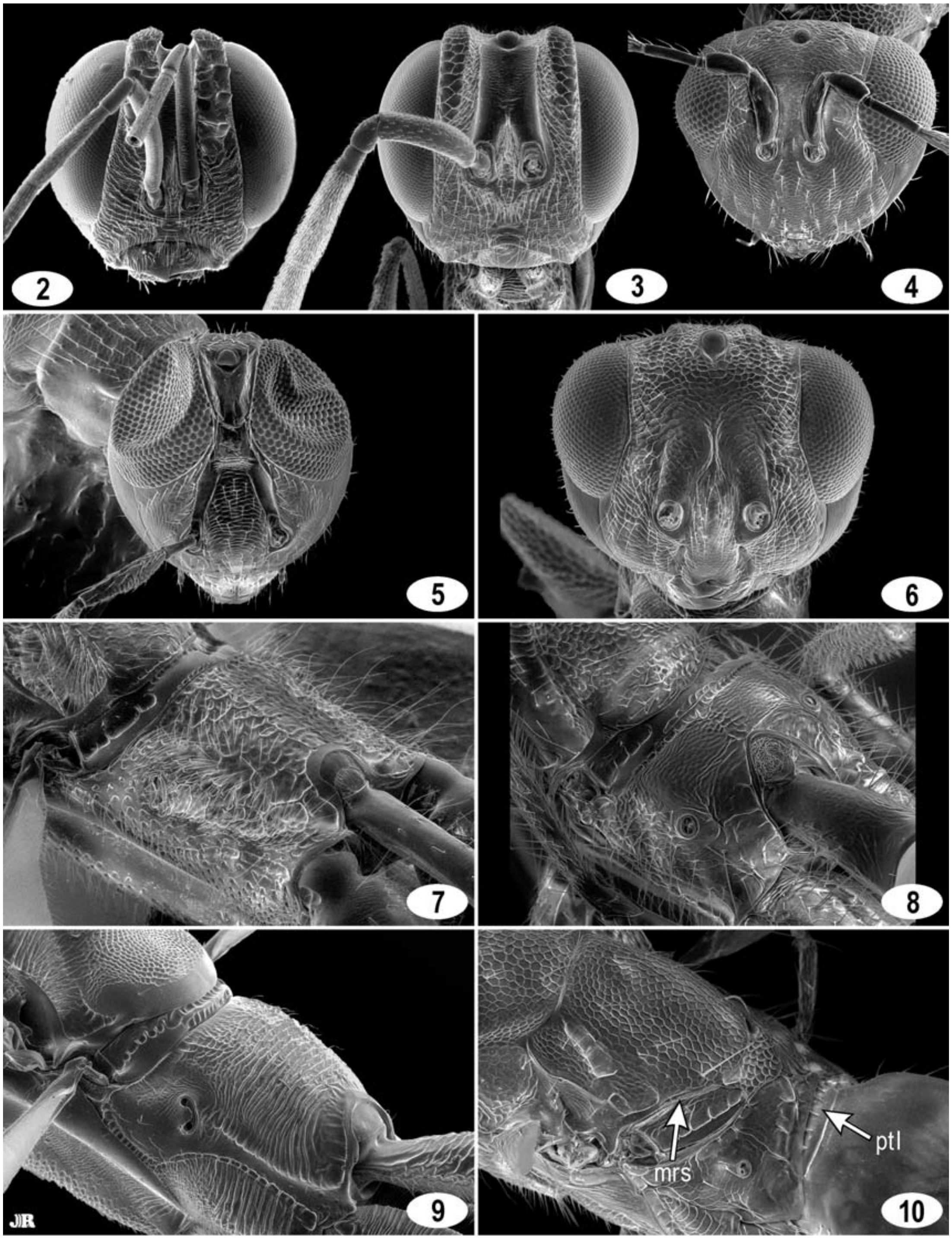


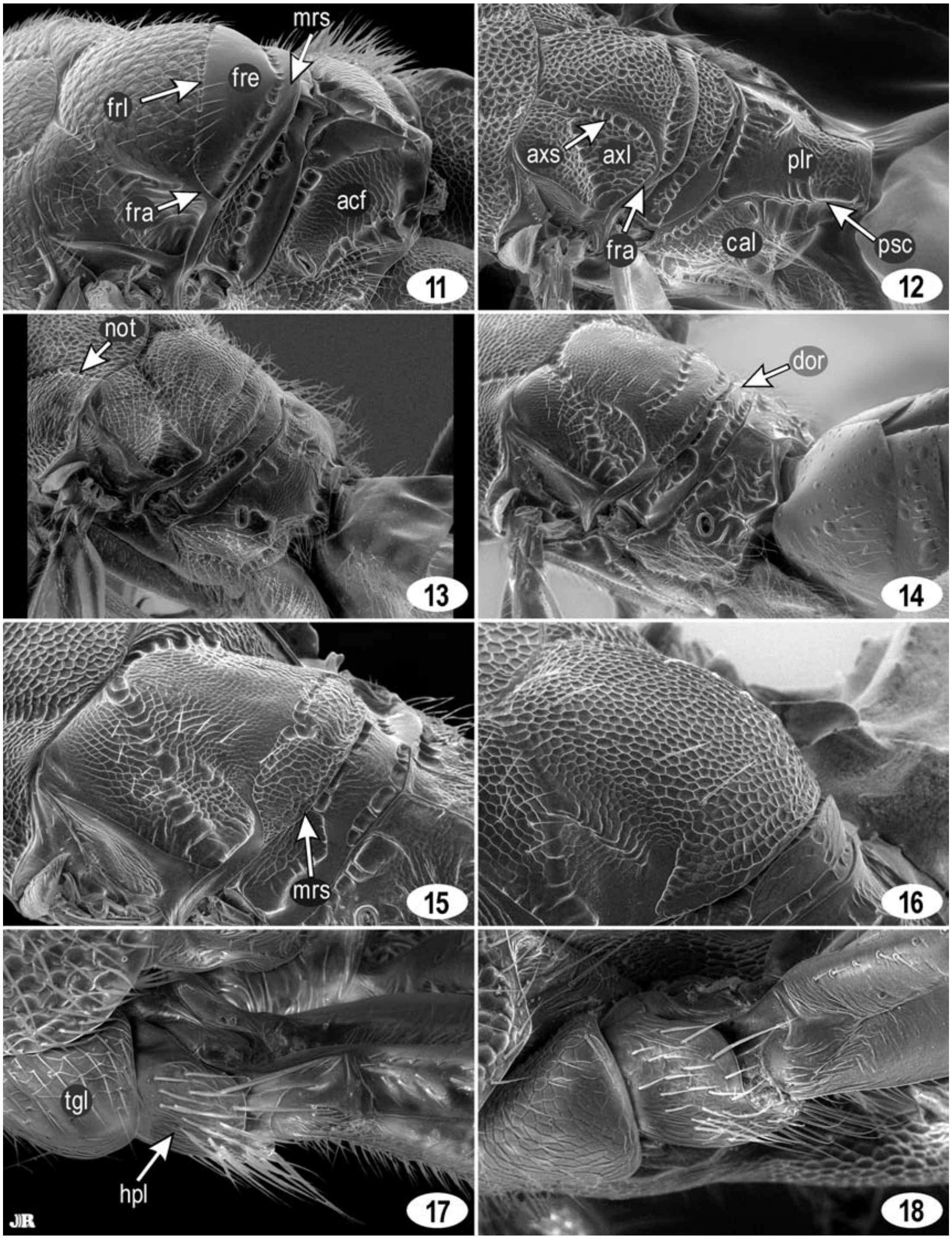
Fig. 1b. Strict consensus tree of relationships of Cleonyminae (Bo = Boucekiini, Ch = Chalcedectini, Cl = Cleonymini, He = Heydeniini, Ly = Lyciscini, Oo = Ooderini) and outgroup taxa (Ht = Hetreulophini, Le = Leptofoeninae, Lo = Louriciinae, Ma = Macromesinae, Ne = Nefoeninae, Pt = Pteromalinae) when NW *Proshizonotus* is subsumed within *Proshizonotus* and after successive weighting (* = New World genus, • = Old World genus).



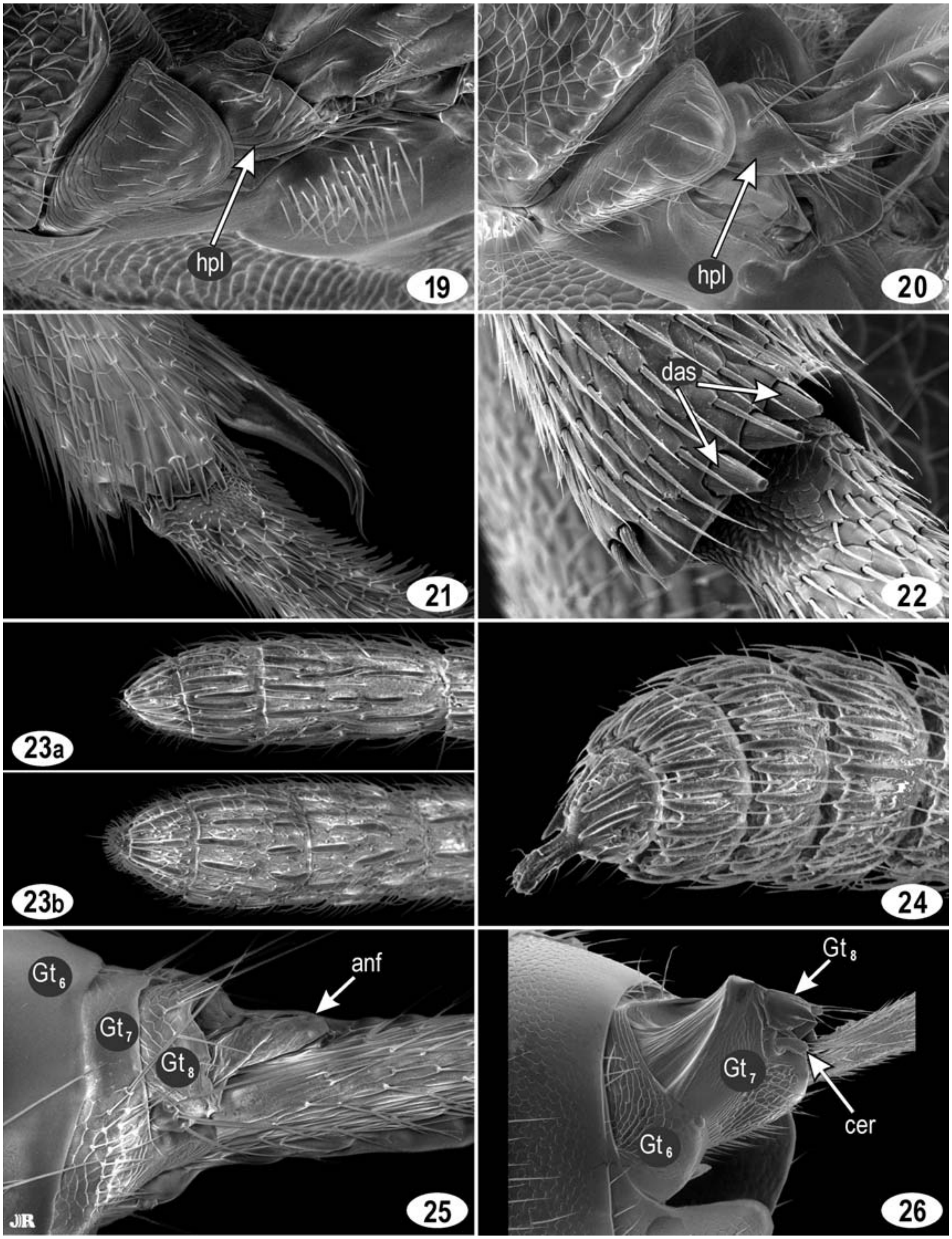
Figs 1c–1d. 1c, strict consensus tree of generic relationships of Lyciscini after successive weighting when NW *Proshizonotus* is treated as a separate taxonomic unit; **1d**, relationships of higher taxa illustrated in Fig. 1b when *Boucekius* is used to root tree.



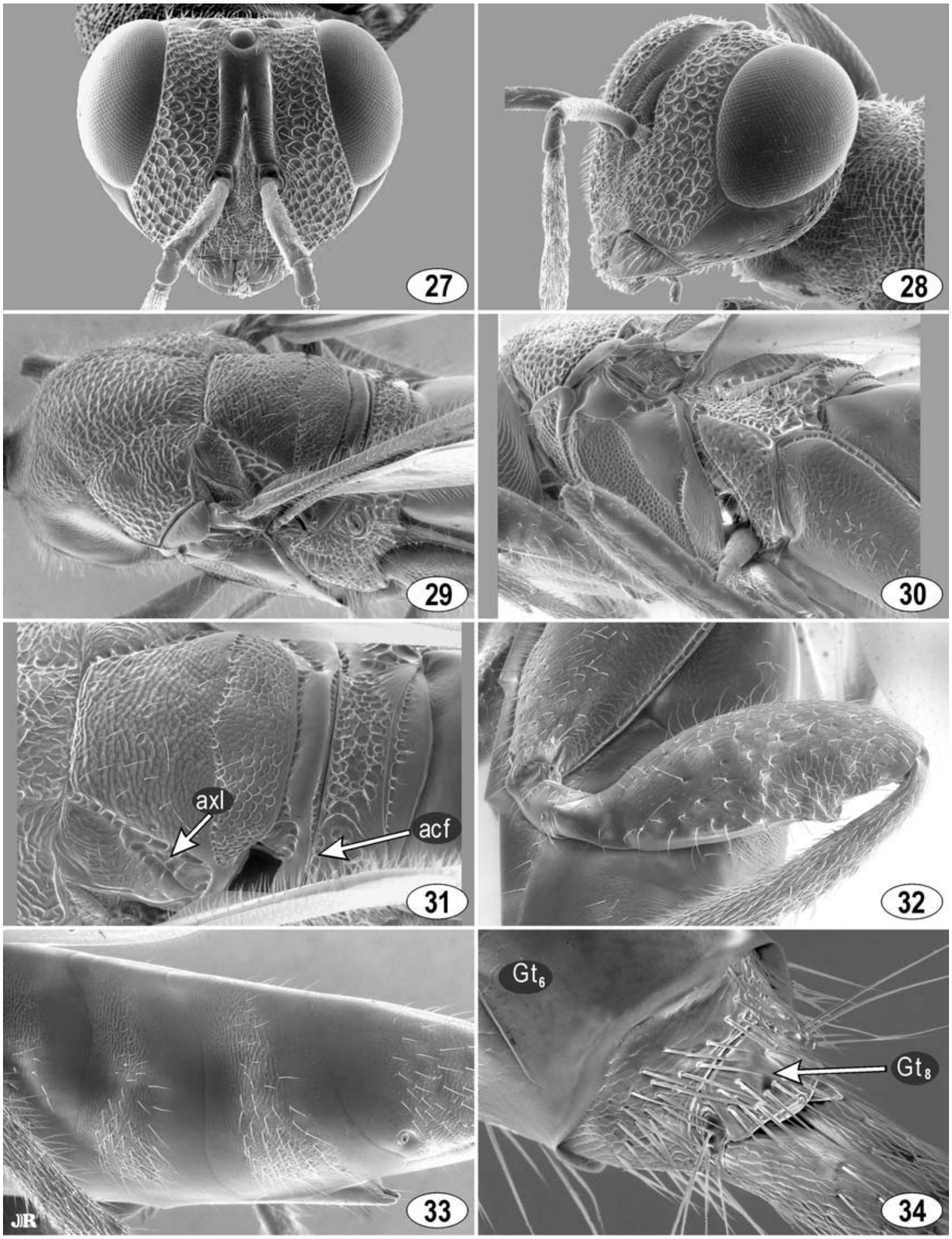
Figs 2–10. Phylogenetic features. **2–6**, head, anterior: **2**, *Doddifoenus rex* (&); **3**, *Leptofoenus rufus* (%); **4**, *Macromesus americanus* (&); **5**, *Callimomoides* sp. (%); **6**, *Zeala walkerae* (&). **7–9**, apex of scutellum to petiole, dorsolateral: **7**, *L. rufus* (%); **8**, *Nefoenus pilosus* (&); **9**, *D. rex* (&). **10**, *M. americanus* (&): scutellar-axillar complex to base of gaster, dorsolateral.



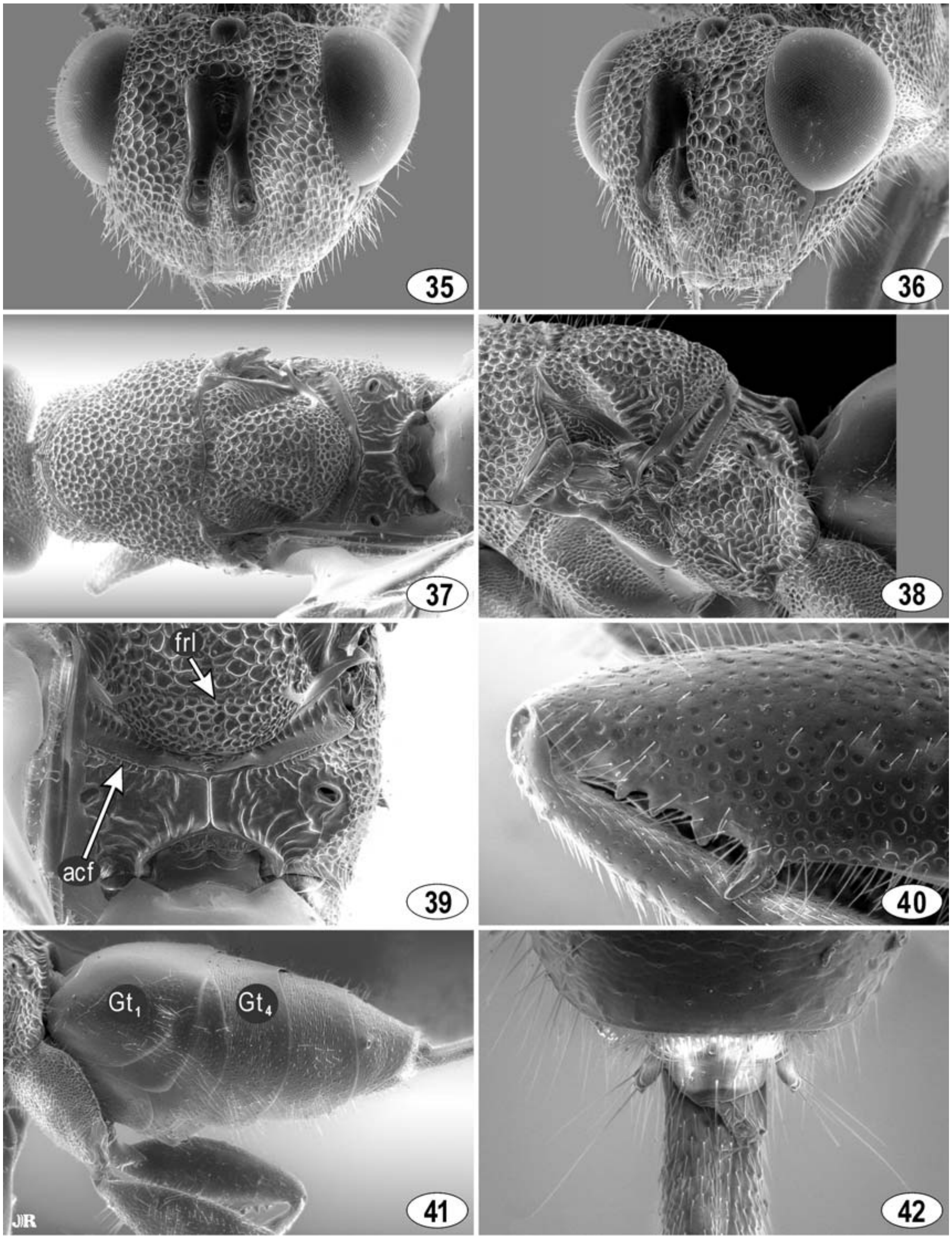
Figs 11–18. Phylogenetic features. 11–14, scutellar-axillar complex to base of gaster (&), dorsolateral: **11**, *Monodontomerus dentipes*; **12**, *Zeala walkerae*; **13**, *Ogloblinisca americana*; **14**, *Plutothrix ungutta*. **15 and 16**, scutellar-axillar complex and dorsellum (&), dorsolateral: **15**, *Gastracanthus conicus*; **16**, *Rhaphitelus maculatus*. **17 and 18**, tegula and humeral plate (&), dorsal: **17**, *Chalcedectus* sp.; **18**, *Cleonymus* sp.



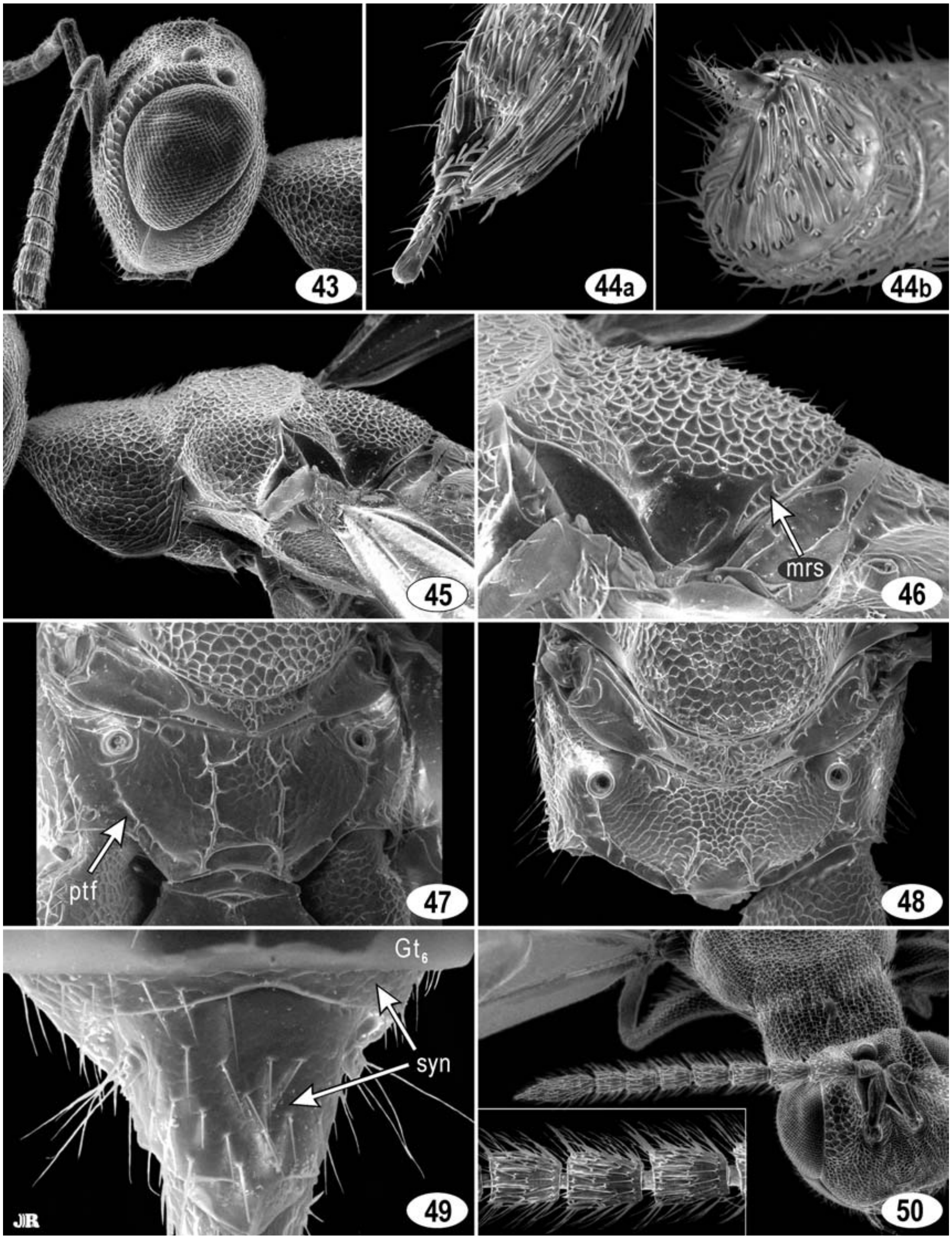
Figs 19–26. Phylogenetic features. 19 and 20, tegula and humeral plate, dorsal: **19**, *Thaumasura* sp. (%); **20**, *Ogloblinisca americana* (&). **21 and 22**, protibial dorsoapical spicules (&): **21**, *O. americana*; **22**, *Neoepistenia flavoscapus*. **23**, clava (&): ***a***, *Gastracanthus conicus*; ***b***, *Dinotiscus dendroctoni*. **24**, *Rhaphitelus maculatus* (&), apical four flagellar segments and claval spicule. **25 and 26**, apex of gaster (&): **25**, *Zeala walkerae*; **26**, *Monodontomerus dentipes*.



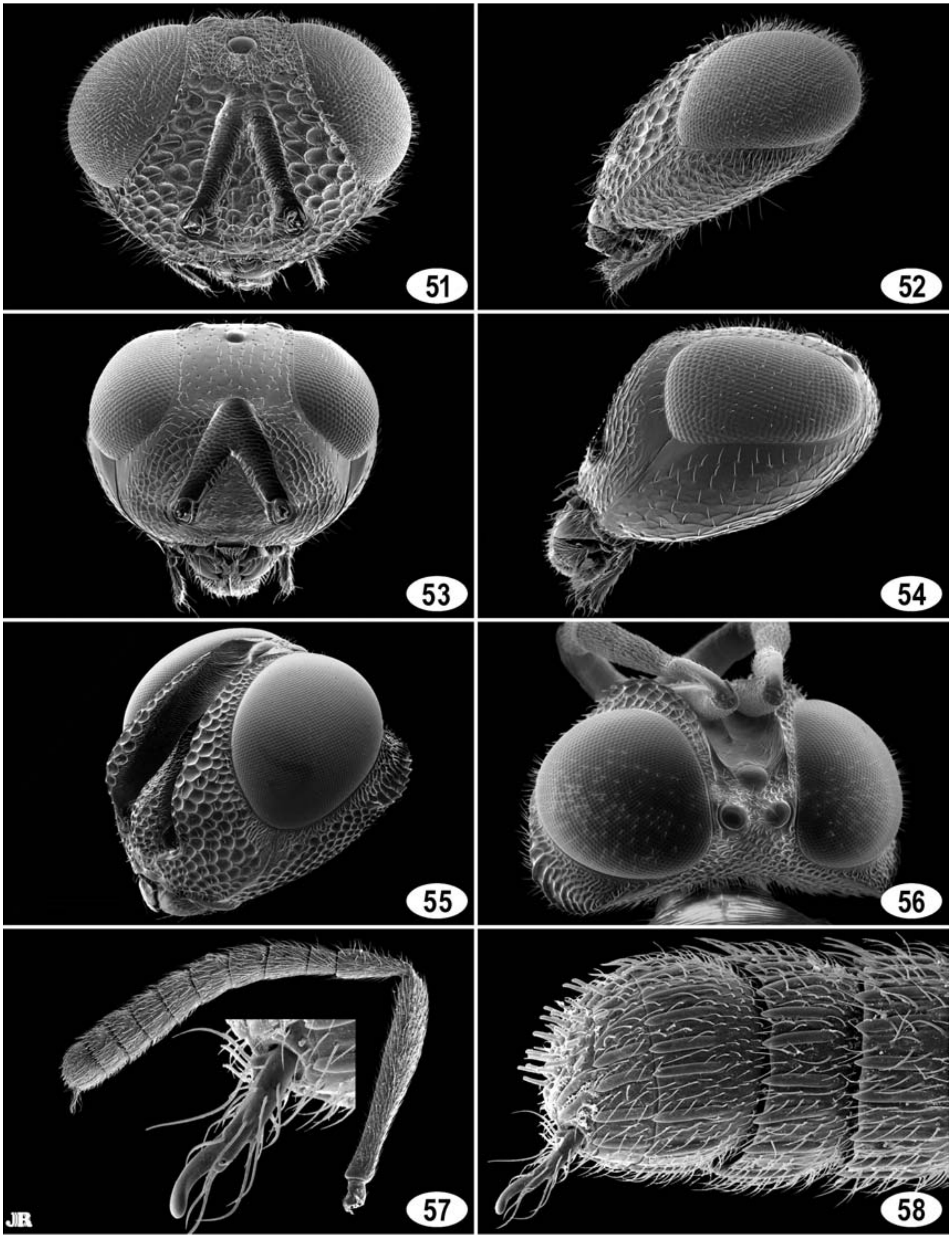
Figs 27–34. BOUCEKIINI, *Boucekius primevus* (&): **27**, head, frontal; **28**, head, frontolateral; **29**, mesosoma, dorsolateral; **30**, mesosoma, lateral; **31**, scutellar-axillar complex to petiole; **32**, hind leg, metacoxa to metatibia, outer surface; **33**, Gt$_3$ to Gt$_6$ plus hypopygium, lateral; **34**, apex of Gt$_6$ to Gt$_8$, posterodorsal.



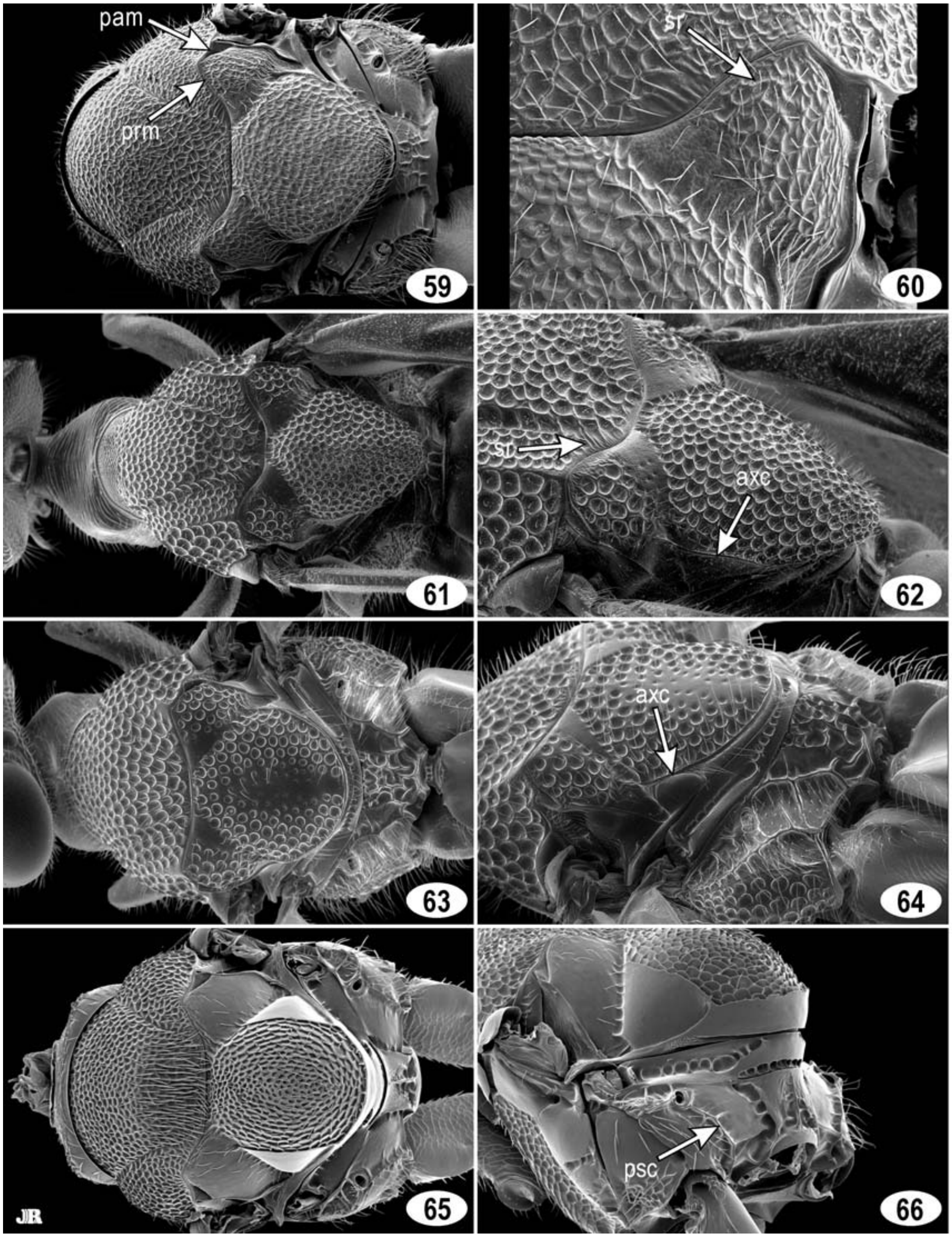
Figs 35–42. BOUCEKIINI, ***Chalcidiscelis koebelei*** **(&): 35**, head, frontal; **36**, head, frontolateral; **37**, mesosoma, dorsal; **38**, posterior half of mesosoma, lateral; **39**, apex of scutellum to base of gaster, dorsal; **40**, apex of metafemur, outer surface; **41**, gaster, lateral; **42**, gaster, apex of Gt$_6$ plus syntergum, dorsal.



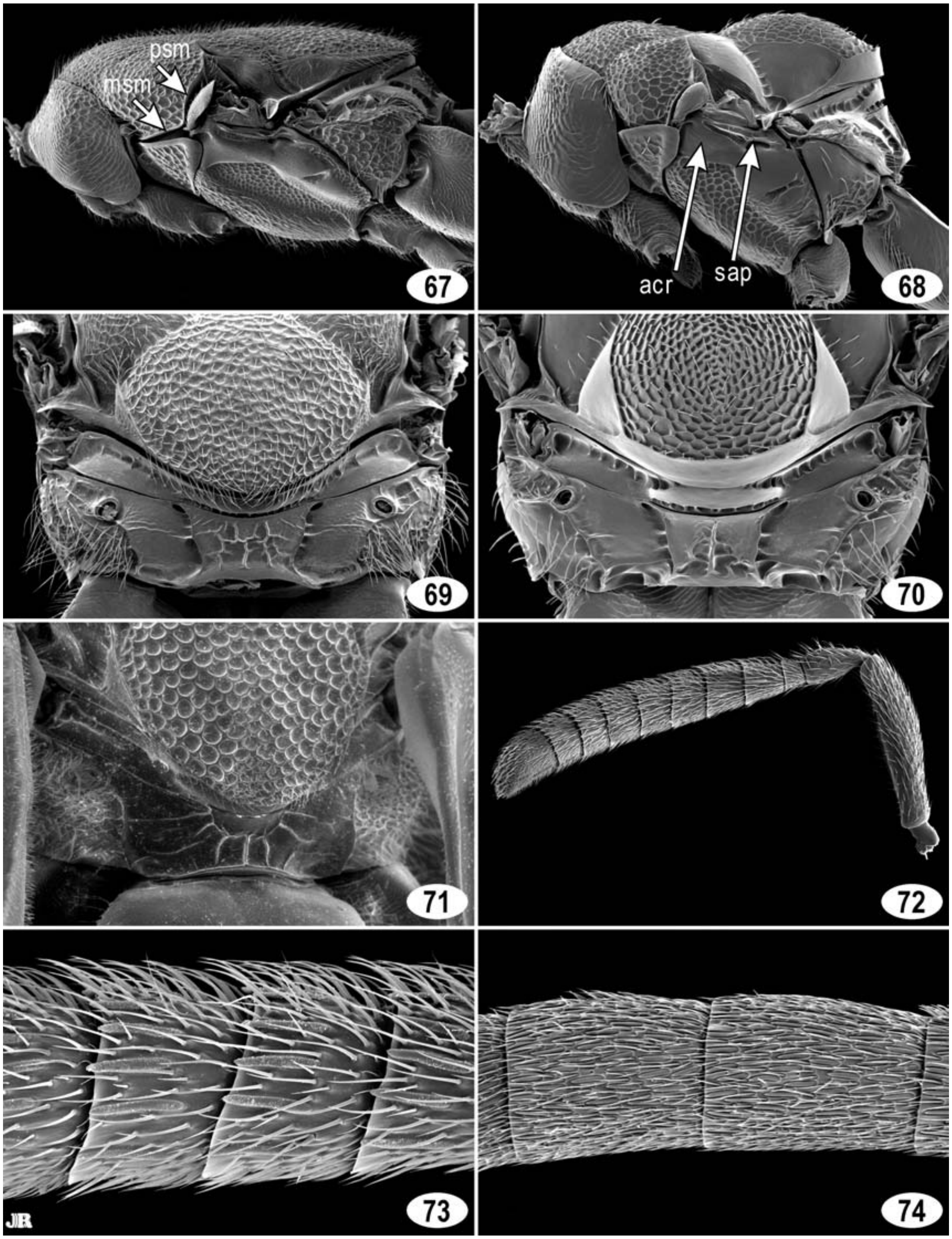
Figs 43–50. CHALCEDECTINI, ***Agrilocida ferrierei*: 43**, head and flagellum (&), dorsolateral; **44**, clava (&): ***a***, ventral, ***b***, oblique lateral; **45**, thorax (&), dorsolateral; **46**, scutellar-axillar complex to base of propodeum (&), lateral; **47**, apex of scutellum to base of gaster (&), dorsal; **48**, apex of scutellum to propodeum (%), dorsal; **49**, syntergum (&), dorsal; **50**: head and antenna (%), with enlargement of three flagellar segments (insert).



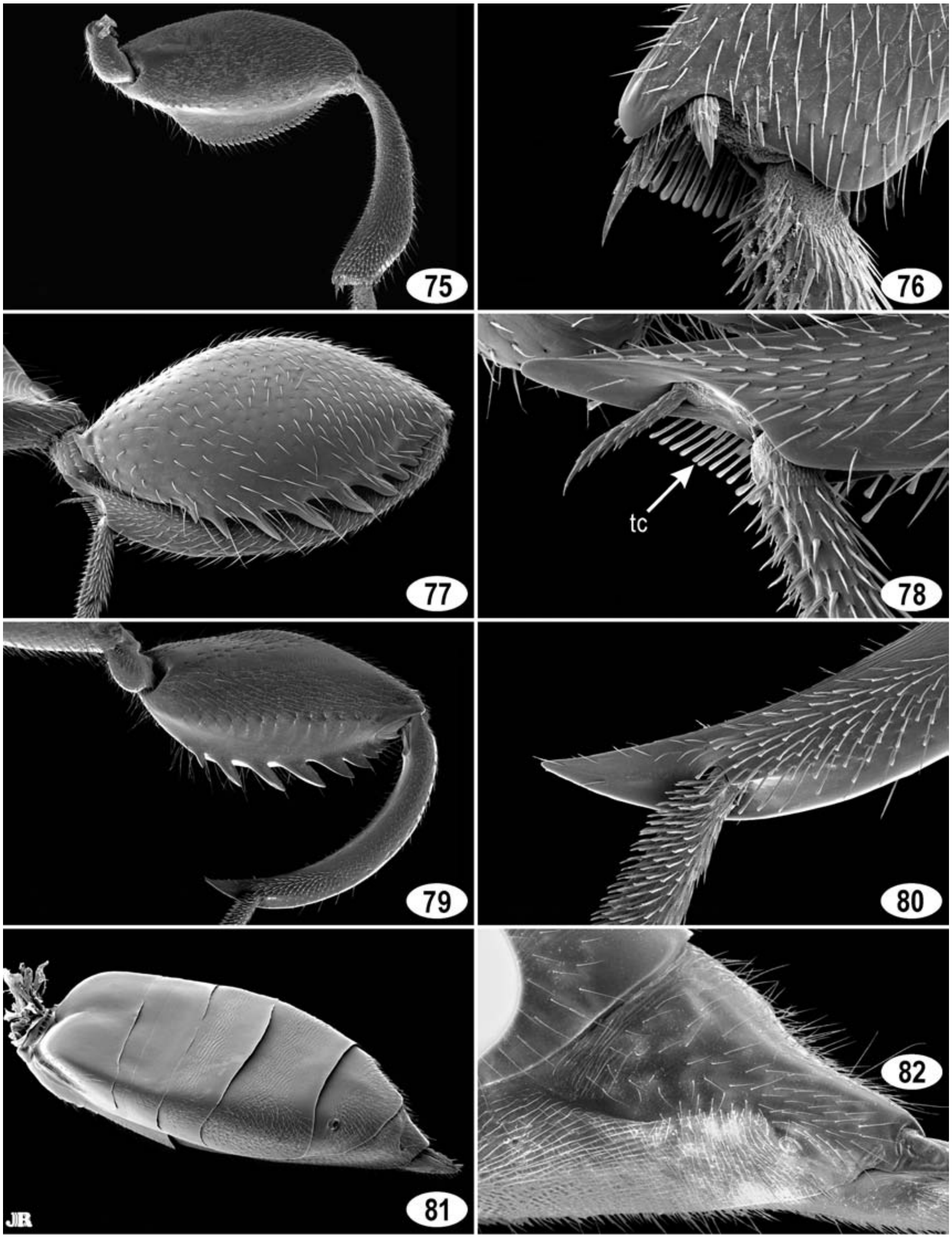
Figs 51–58. CHALCEDECTINI, *Chalcedectus*. 51 and 52, *C. hyalinipennis* (&), head: **51**, frontal; **52**, lateral. **53 and 54**, *C. maculipennis* (&), head: **53**, frontal; **54**, lateral. **55 and 56**, *C. maculicornis*, head: **55**, &, frontolateral; **56**, %, dorsal. **57 and 58**, *C. hyalinipennis* (&): **57**, flagellum and (insert) claval spicule; **58**: apical two flagellar segments and clava.



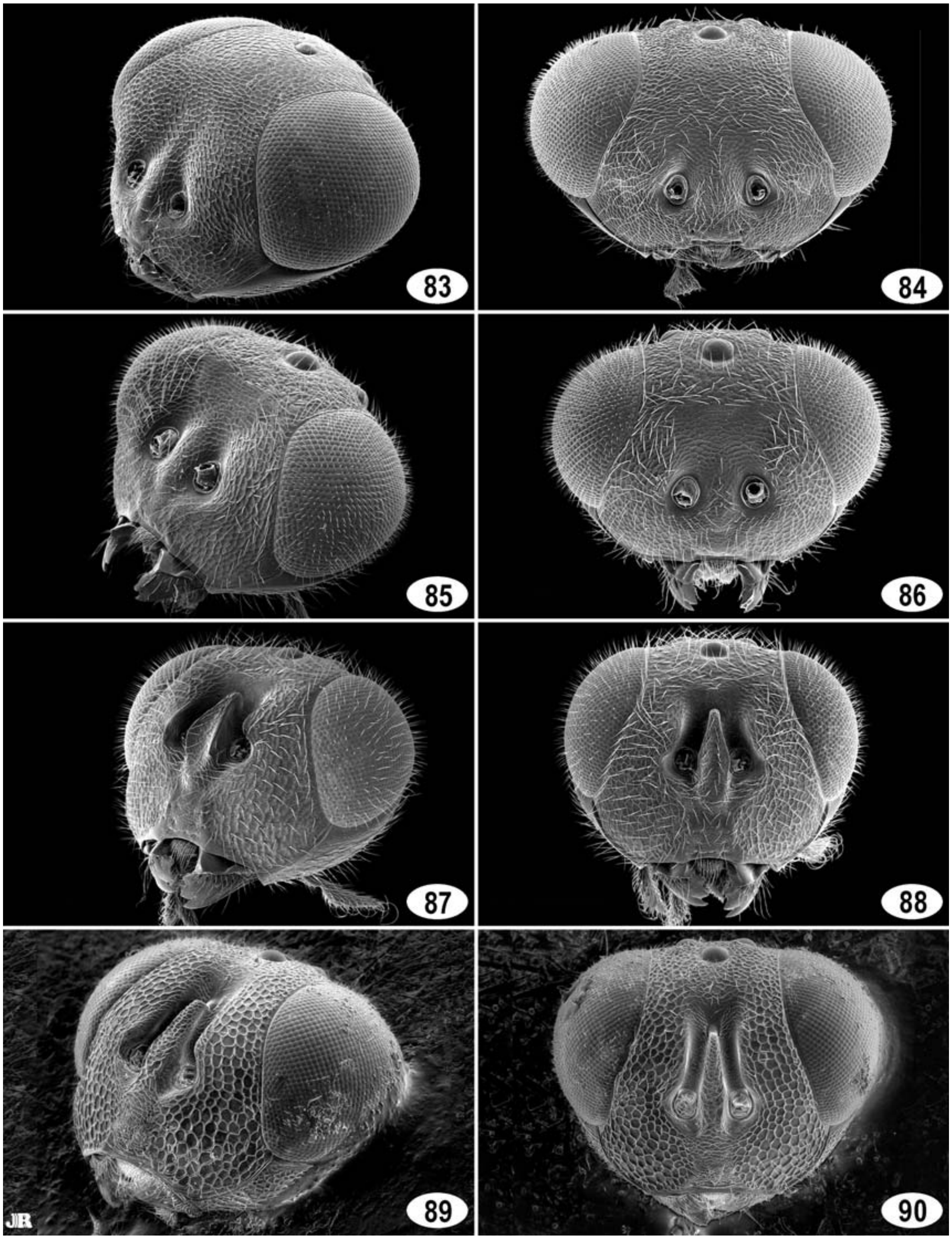
Figs 59–66. CHALCEDECTINI, *Chalcedectus*. 59 and 60, *C. hyalinipennis* (&): **59**, mesosoma, dorsal; **60**, axilla, dorsal. **61 and 62**, *C. maculicornis* (&): **61**, mesosoma, dorsal; **62**, mesoscutum to base of gaster, dorsolateral. **63 and 64**, *C. septemdentatus* (%), mesosoma: **63**, dorsal; **64**, dorsolateral. **65 and 66**, *C. maculipennis* (&): **65**, mesosoma, dorsal; **66**, posterior of mesosoma, posterolateral.



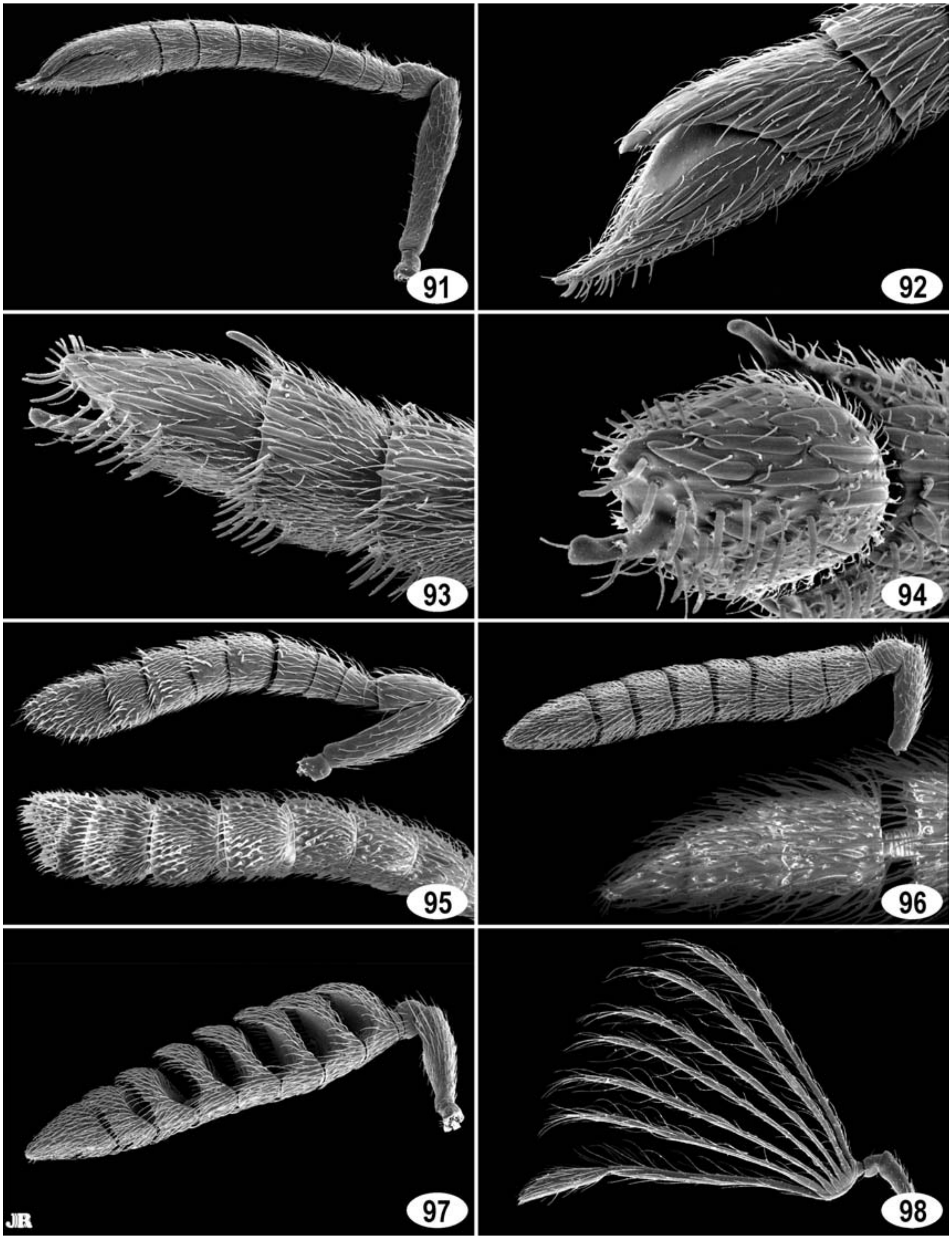
Figs 67–74. CHALCEDECTINI, *Chalcedectus*. 67 and 68, lateral mesosoma (&): **67**, *C. hyalinipennis*; **68**, *C. maculipennis*. **69–71**, scutellum to propodeum, dorsal (&): **69**, *C. hyalinipennis*; **70**, *C. maculipennis*; **71**, *C. maculicornis*. **72 and 73**, *C. hyalinipennis* (%): **72**, antenna; **73**, fl$_4$ and fl$_5$. **74**, *C. texanus* (%): fl$_3$ and fl$_4$.



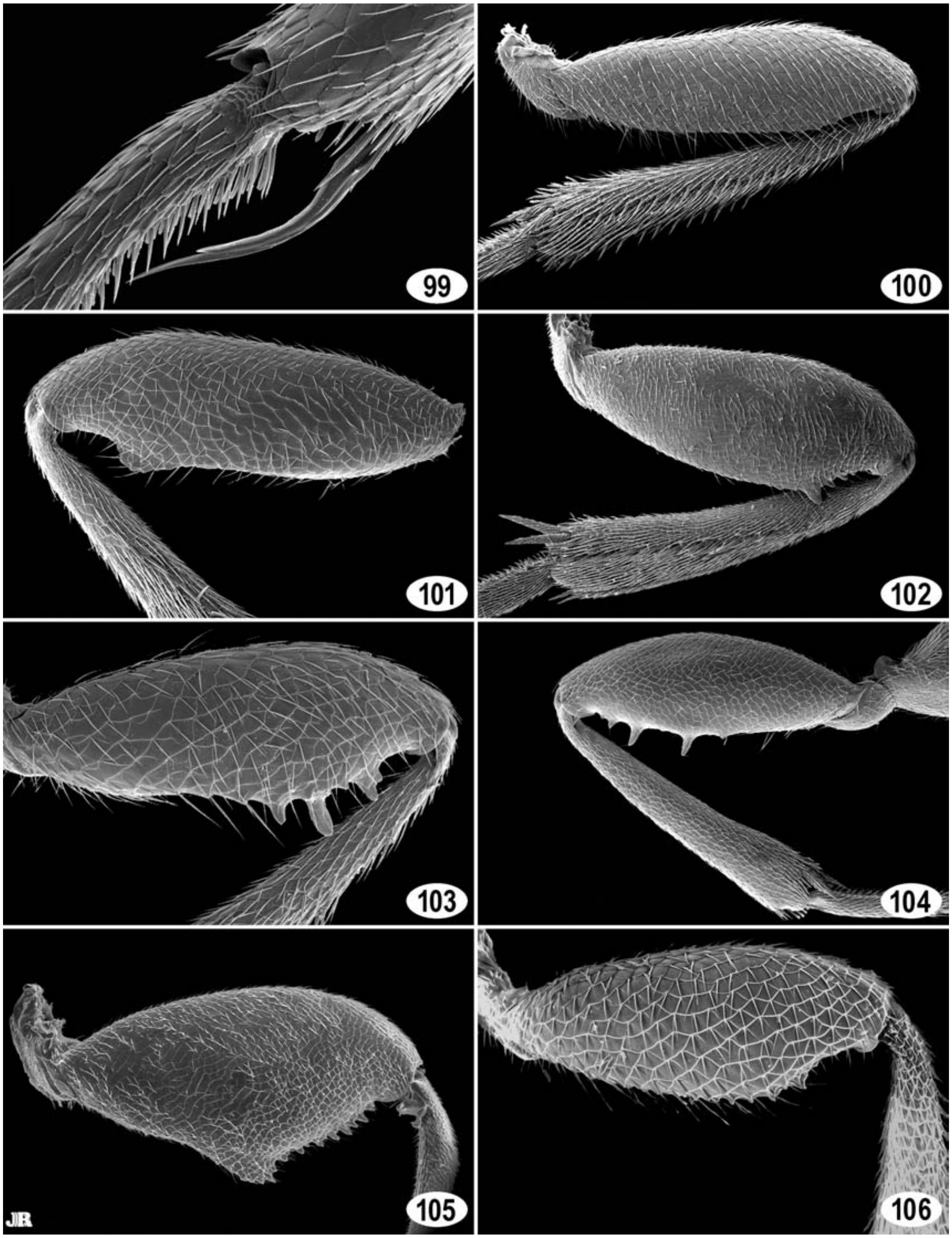
Figs 75–82. CHALCEDECTINI, *Chalcedectus*. 75 and 76, *C. hyalinipennis* (&): **75**, metafemur and tibia, inner surface; **76**, apex of metatibia. **77 and 78**, *C. septemdentatus* (%): **77**, metafemur and tibia, outer surface; **78**, apex of metatibia. **79 and 80**, *C. texanus* (&): **79**, metafemur and tibia, inner surface; **80**, apex of metatibia. **81**, *C. hyalinipennis* (&): gaster, dorsolateral. **82**, *C. maculicornis* (&): syntergum, dorsolateral.



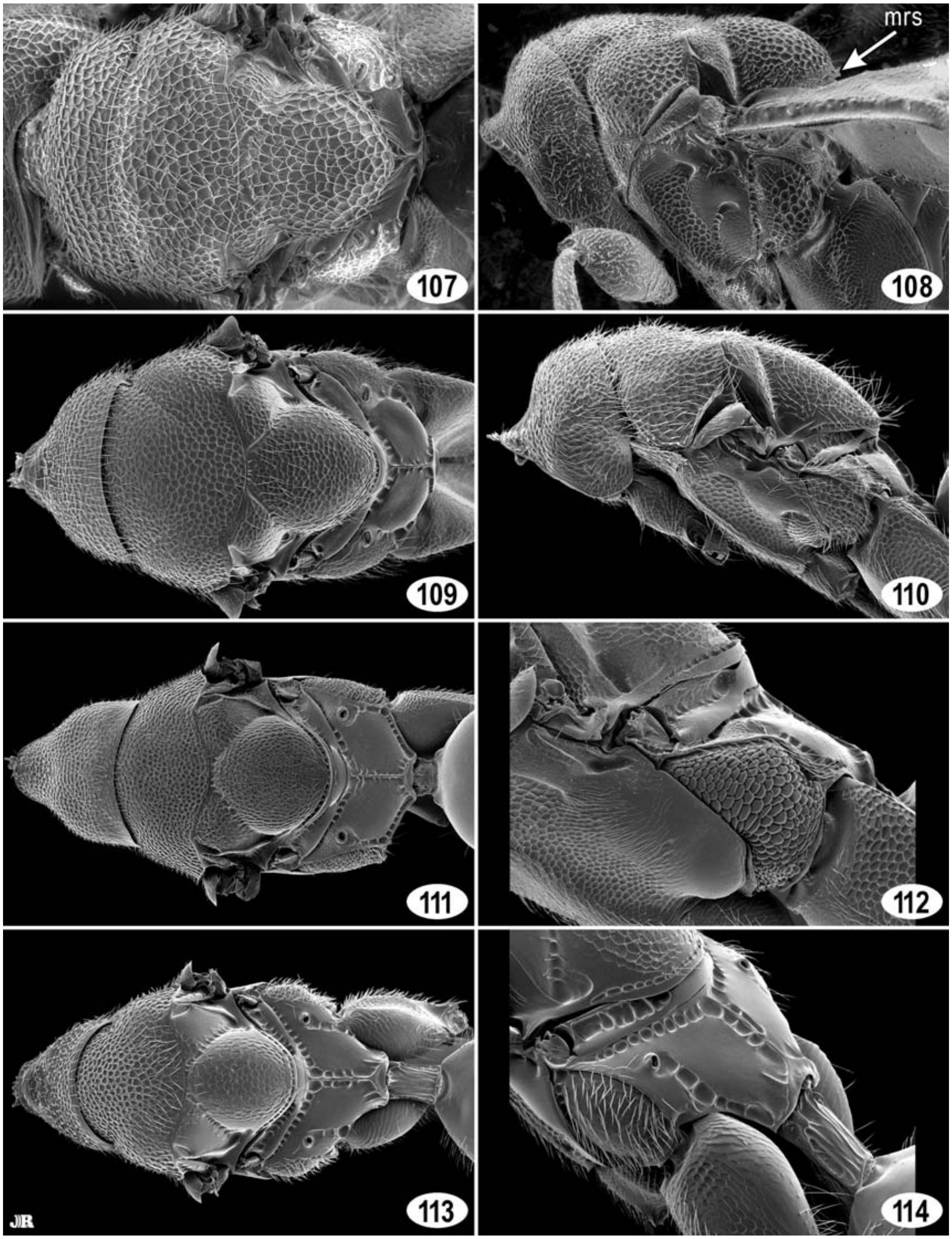
Figs 83–90. **CLEONYMINI.** **83**, *Notanisus* sp. (&): head, frontolateral. **84**, *Cleonymus* sp. (&): head, frontal. **85 and 86**, *Cleonymus* sp. (%), head: **85**, frontolateral; **86**, frontal. **87 and 88**, *Cleonymus* sp. (%), head: **87**, frontolateral; **88**, frontal. **89 and 90**, *Dasycleonymus bakeri* (&), head: **89**, frontolateral; **90**, frontal.



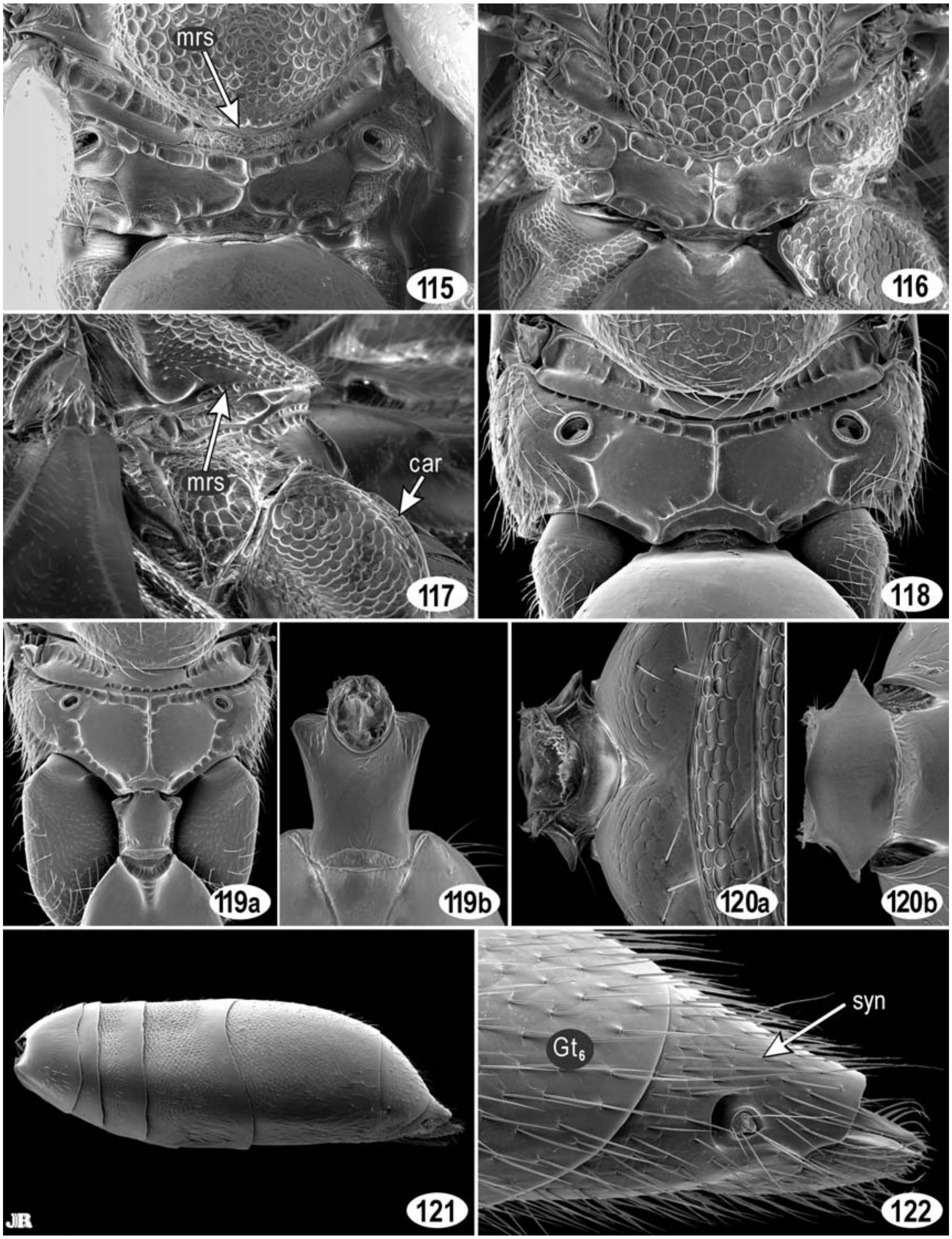
Figs 91–98. **CLEONYMINI. 91**, *Cleonymus* sp. (&): antenna. **92**, *Zolotarewskya* sp. (&): clava and preclaval segment, oblique terminal view. **93 and 94**, *Callocleonymus* sp. (&): **93**, clava and preclaval segment, lateral; **94**, clava and apex of preclaval segment, oblique terminal view. **95–98**, antenna (%): **95**, *Callocleonymus* spp. from Yemen (upper) and Madagascar (lower); **96**, *Cleonymus* sp. (enlargement of clava, insert); **97**, *Zolotarewskya* sp.; **98**, *Zolotarewskya* sp.



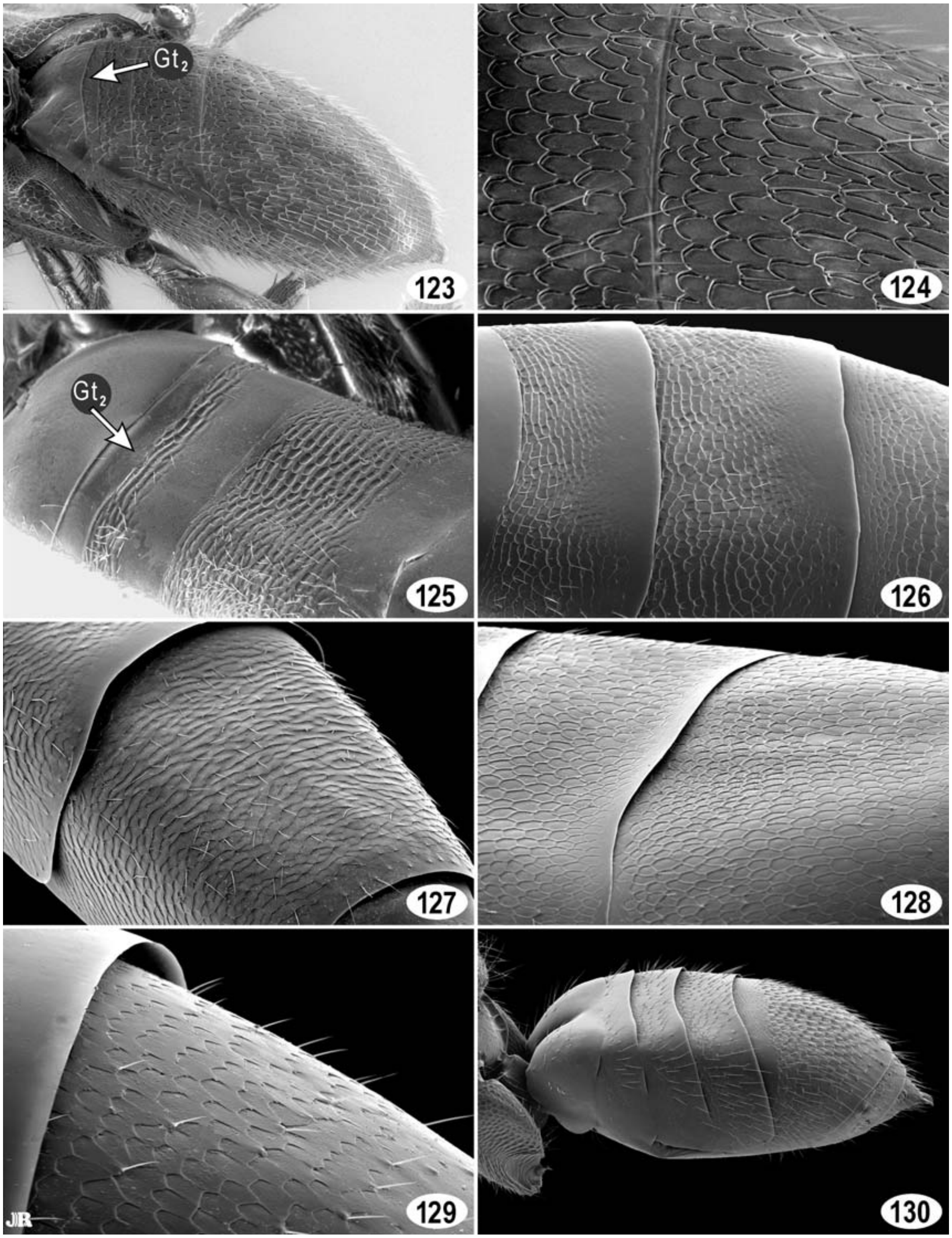
Figs 99–106. **CLEONYMINI.** **99**: *Zolotarewskya* sp. (&), apex of protibia and basal tarsal segment, dorsolateral. **100–104**, metafemur and tibia, outer surface: **100**, *Cleonymus* sp. (%); **101 and 102**, *Cleonymus* spp. (&); **103**, *Zolotarewskya* sp. (%); **104**, *Zolotarewskya* sp. (&). **105 and 106**: *Dasycleonymus bakeri*, metafemur: **105**, &; **106**, %.



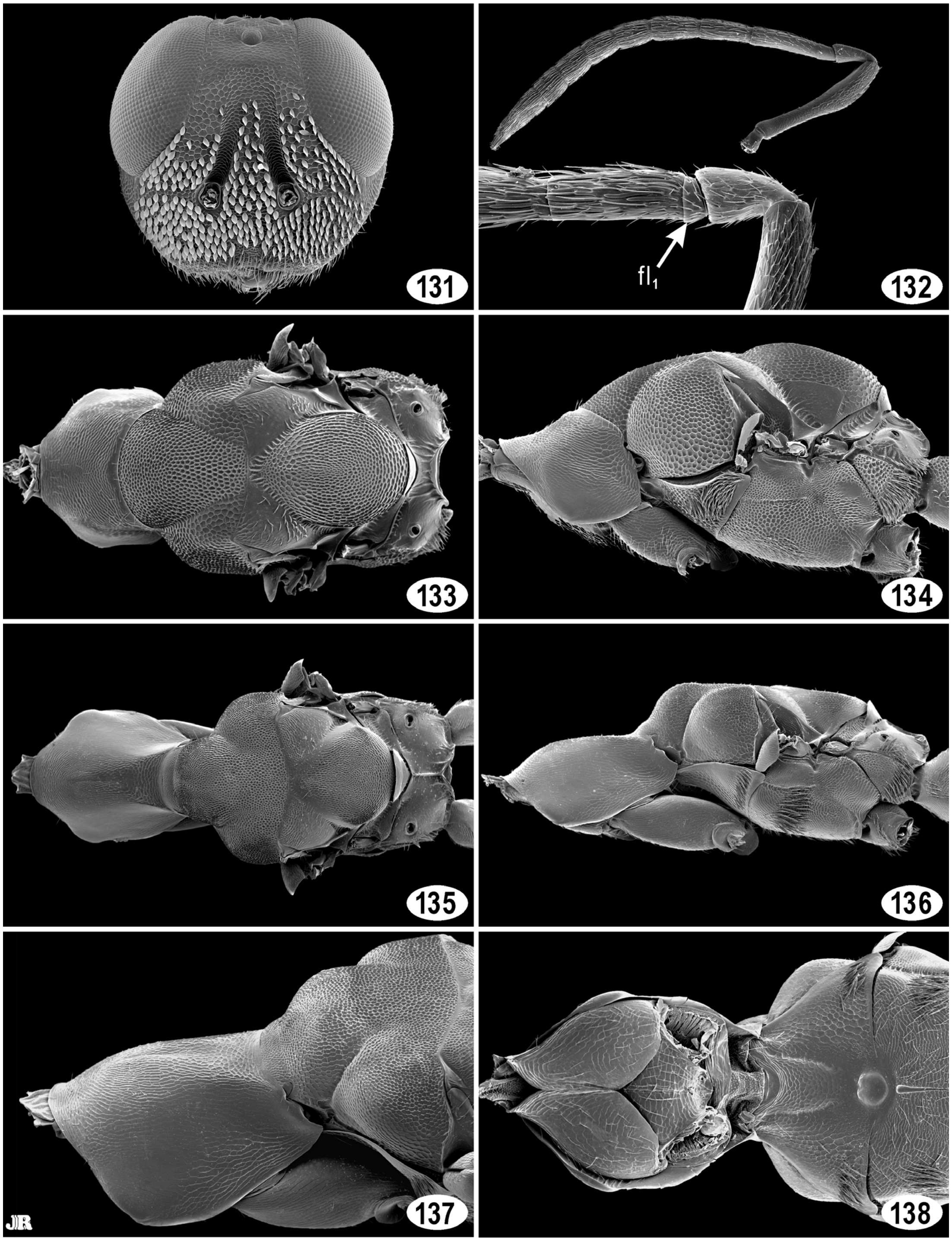
Figs 107–114. CLEONYMINI. 107 and 108, *Dasycleonymus bakeri*, mesosoma: **107**, dorsal (%); **108**, lateral (&). **109**, *Cleonymus* sp. (&): mesosoma, dorsal. **110**, *Zolotarewskya* sp. (%): mesosoma, lateral. **111 and 112**, *Callocleonymus* sp. (&): **111**, mesosoma, dorsal; **112**, posterior of mesosoma, lateral. **113 and 114**, *Notanisus* sp. (&): **113**, mesosoma, dorsal; **114**, scutellum to base of gaster, posterolateral.



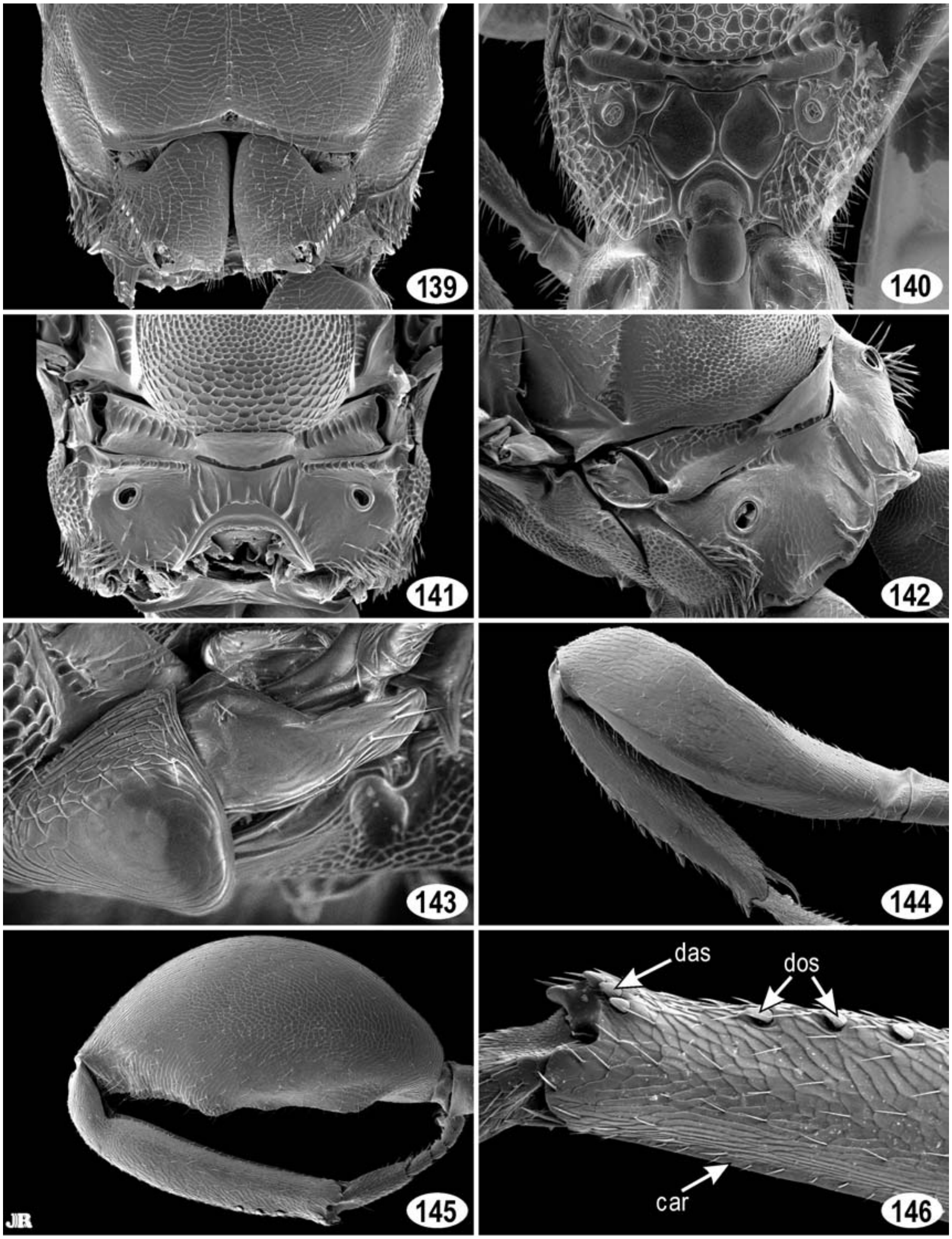
Figs 115–122. CLEONYMINI. 115 and 116, *Dasycleonymus bakeri*, scutellum to base of gaster, dorsal: **115**, &; **116**, %. **117**, *D. bakeri* (%): posterior of mesosoma, lateral. **118**, *Cleonymus* sp. (&): scutellum to base of gaster, dorsal. **119**, *Cleonymus* sp. (%): ***a***, scutellum to base of gaster, dorsal, ***b***, petiole, ventral; **120**, *D.* n. sp. M#1 (%): ***a***, petiole and basal gastral terga, dorsal, ***b***, petiole, ventral. **121 and 122**, *Cleonymus* sp. (&): **121**, gaster, dorsolateral; **122**, syntergum, lateral.



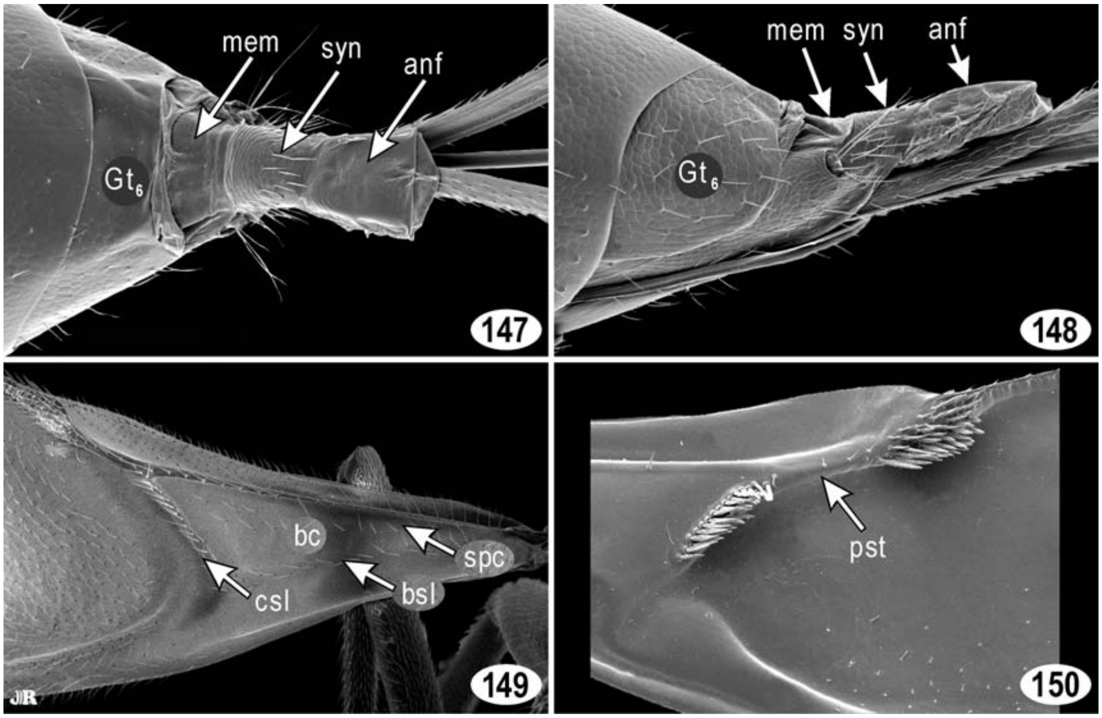
Figs 123–130. **Cleonymini.** **123–125**, *Dasycleonymus bakeri*: **123**, gaster (%), dorsolateral; **124**, sculpture of Gt$_4$ and Gt$_5$ (%); **125**, Gt$_1$–Gt$_4$ (&), dorsolateral. **126–130**, sculpture of gastral terga (&): **126**, *Callocleonymus* sp.; **127**, *Cleonymus* sp.; **128**, *Zolotarewskya* sp.; **129**, *Notanisus* sp. **130**: *Zolotarewskya* sp. (%), gaster, dorsolateral.



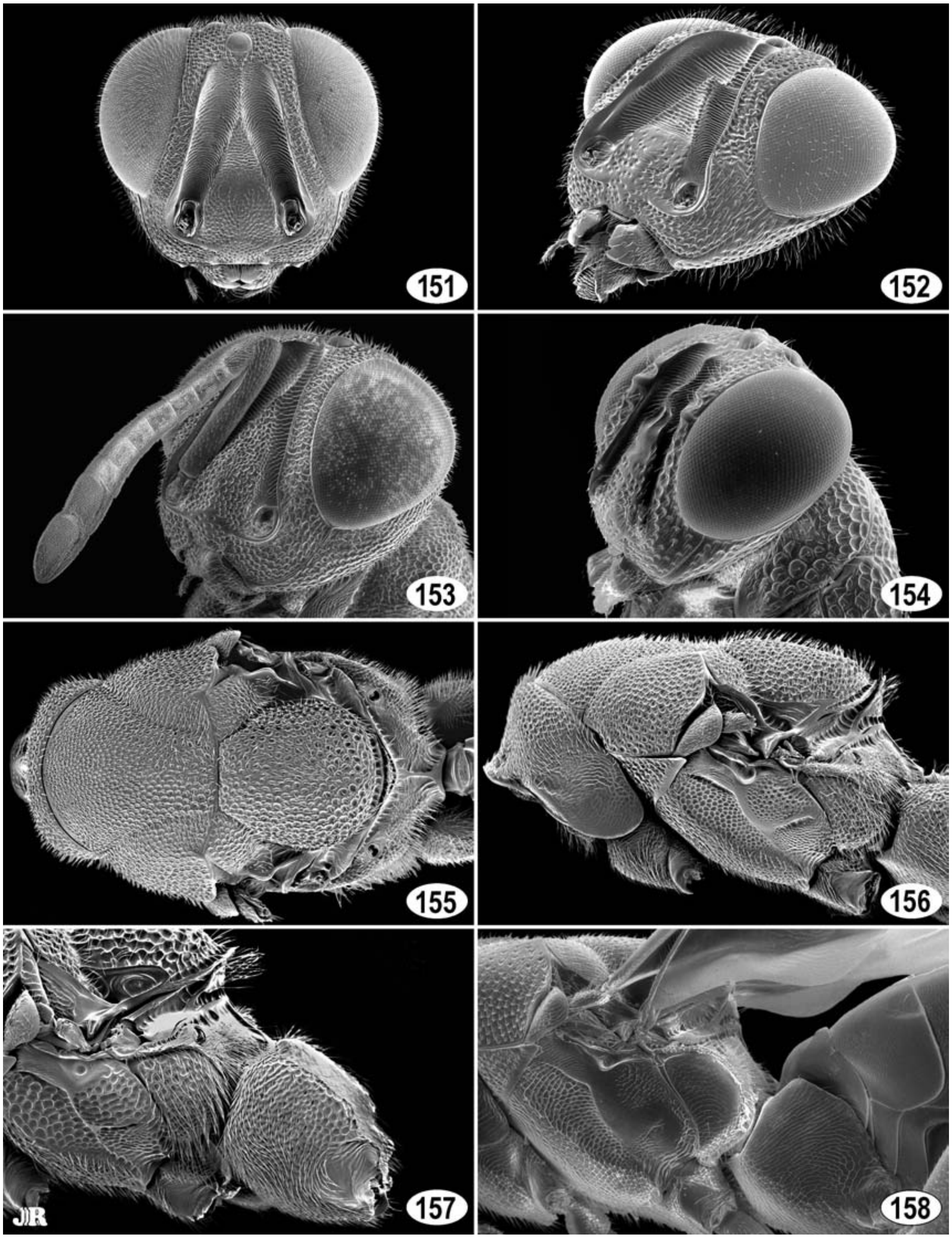
Figs 131–138. HEYDENIINI, *Heydenia*. 131–134, *Heydenia* sp. (&): **131**, head, frontal; **132**, antenna (top) and pedicel to base of fl_3 (bottom); **133**, mesosoma, dorsal; **134**, mesosoma, lateral. **135–138**, *H. unica* (&): **135**, mesosoma, dorsal; **136**, mesosoma, lateral; **137**, pronotum and mesoscutum, dorsolateral; **138**, prothorax and prepectus, ventral.



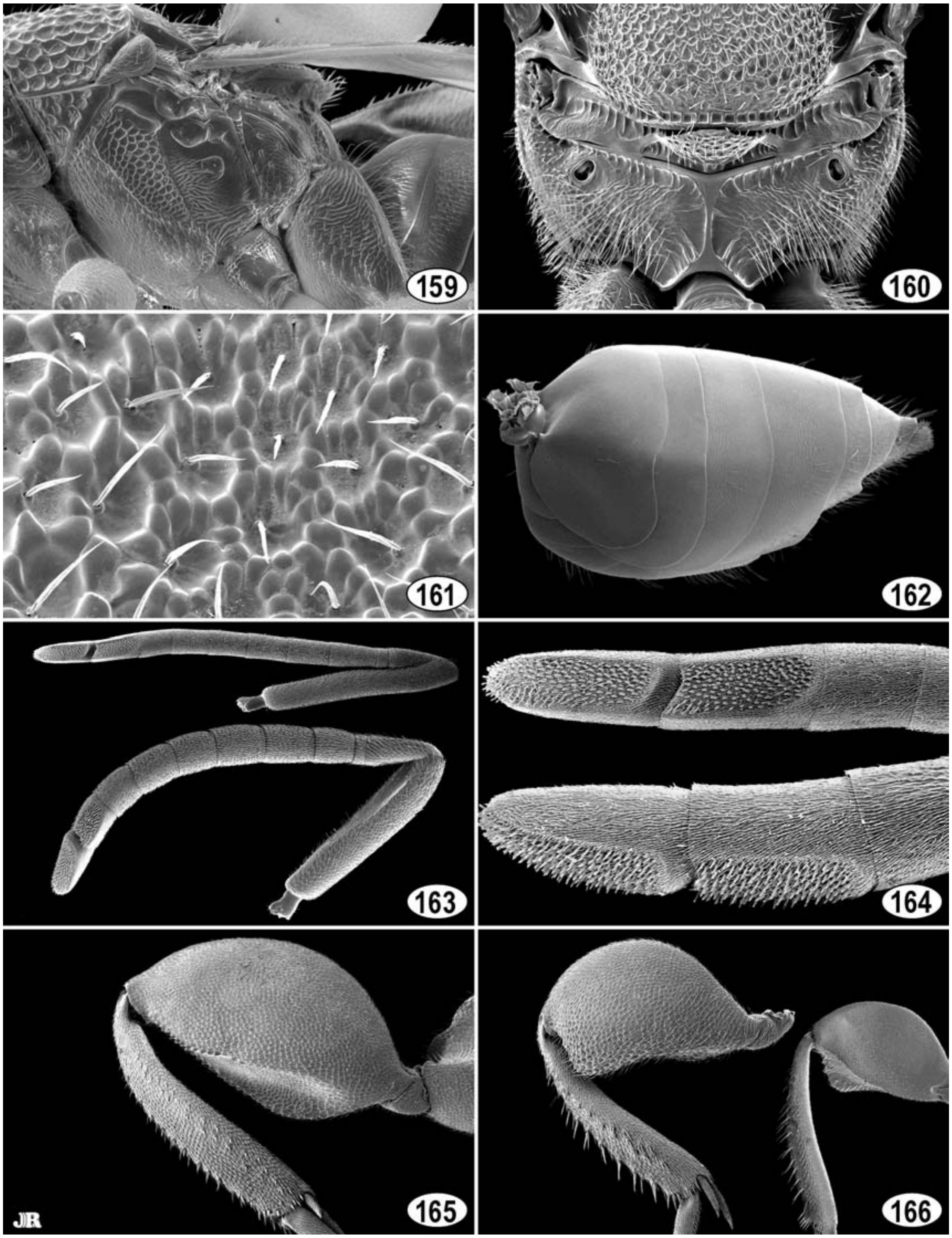
Figs 139–146. HEYDENIINI, *Heydenia*. 139, *Heydenia unica* (&): mesocoxal articulation, ventral. **140–142**, *Heydenia* spp. (&), apex of scutellum to propodeum: **140**, dorsal; **141**, dorsal; **142**, posterolateral. **143**, *Heydenia* sp. (&), tegula and humeral plate. **144 and 145**, profemur and tibia (&), outer surface: **144**, *Heydenia* sp.; **145**, *H. unica*. **146**, *H. unica* (&): apex of protibia with dorsal and dorsoapical spicules.



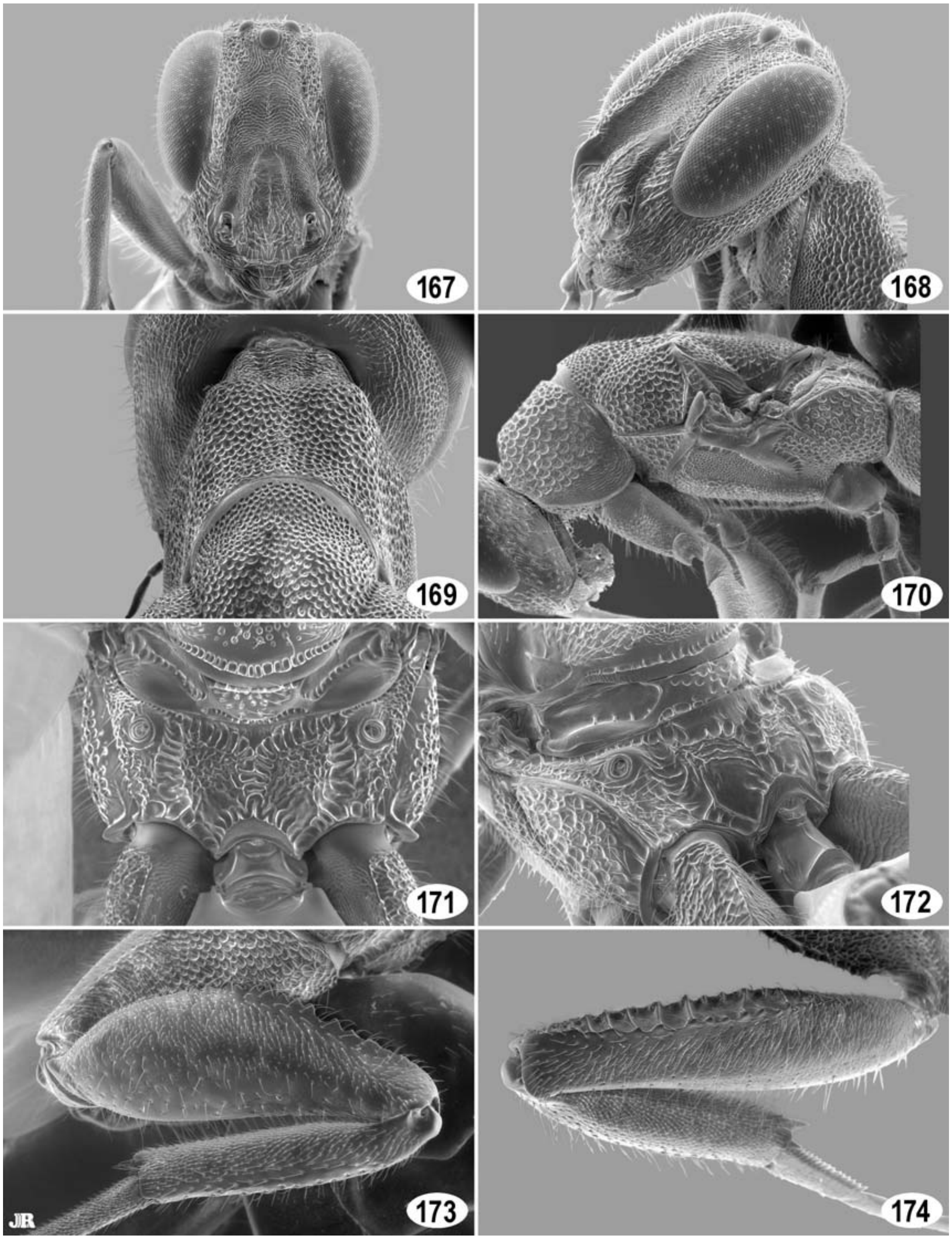
Figs 147–150. HEYDENIINI, *Heydenia* spp. (&): 147, apex of gaster, dorsal; **148**, apex of gaster, lateral; **149 and 150**, base of forewing, setal pattern.



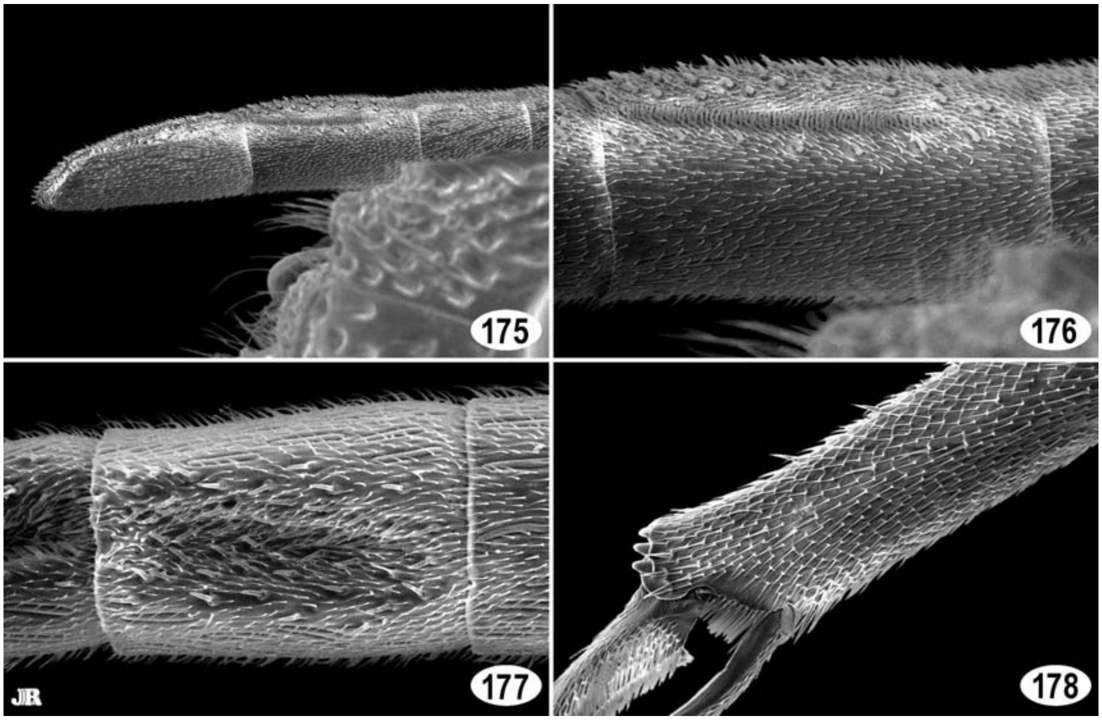
Figs 151–158. Lyciscini, *Agamerion*. 151–154, head: **151**, *A. cleptideum* (%), frontal; **152**, *A. cleptideum* (%), frontolateral; **153**, *A. metallicum* (&), frontolateral; **154**, *Agamerion semialbicorne*-group sp. (&), frontolateral. **155 and 156**, *A. gelo* (%), mesosoma: **155**, dorsal; **156**, lateral. **157 and 158**, posterior of mesosoma, lateral: **157**, *A. cleptideum* (%); **158**, *Agamerion cleptideum*-group sp. (&).



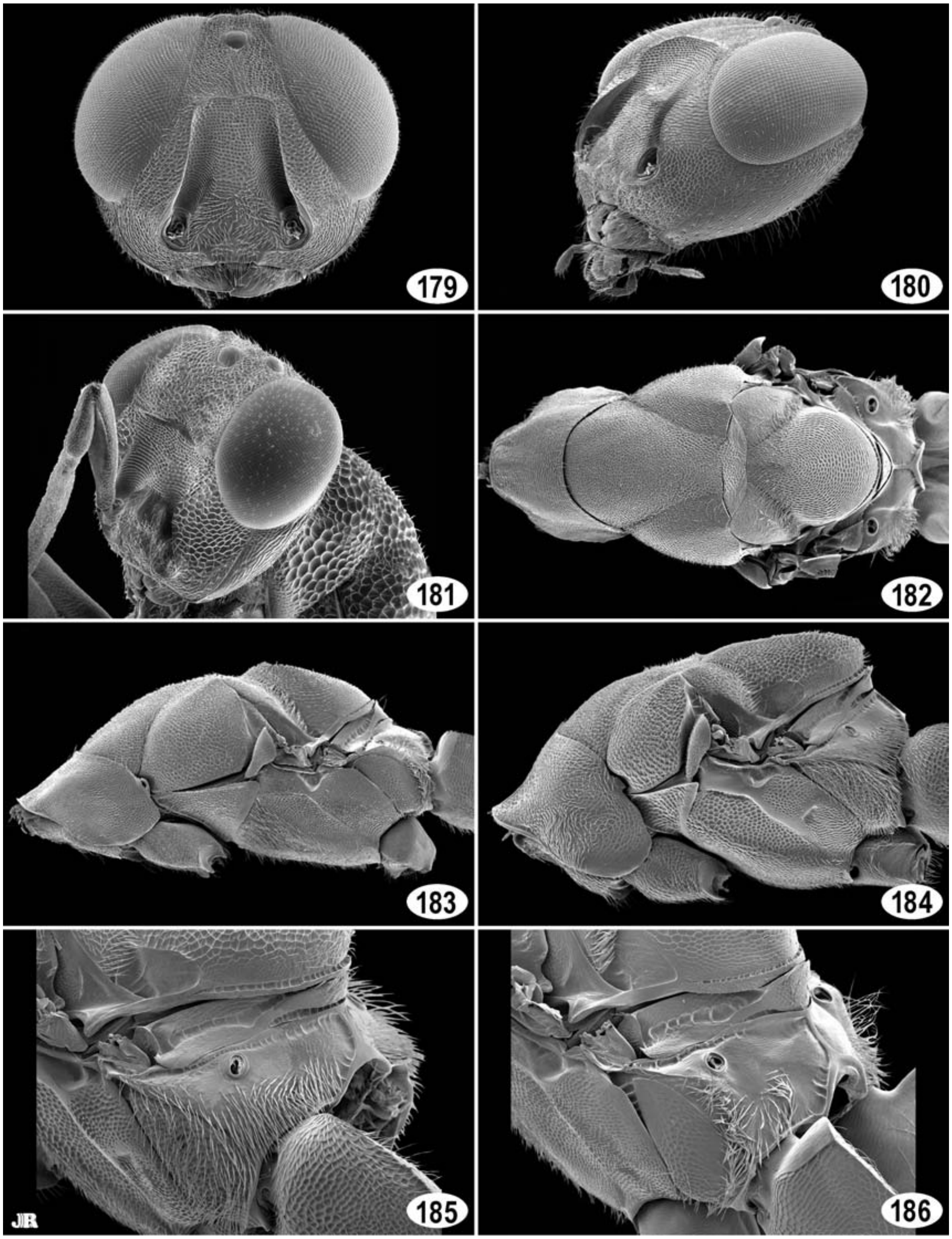
Figs 159–166. Lyciscini, *Agamerion*. 159, *Agamerion semialbicorne*-group sp. (&): posterior of mesosoma, lateral. **160 and 161**, *A. gelo* (%): **160**, apex of scutellum to propodeum, dorsal; **161**, scutellum, surface microsculpture. **162–164**, *A. cleptideum*: **162**, gaster (&), lateral; **163**, antenna, & (top) and % (bottom); **164**, clava and preclaval segment (&), full (top) and oblique (bottom) views of micropilose sensory regions. **165 and 166**, metafemur and tibia: **165**, *A. metallicum* (%), outer surface; **166**, *A. cleptideum* (&), outer (left) and inner (right) surfaces.



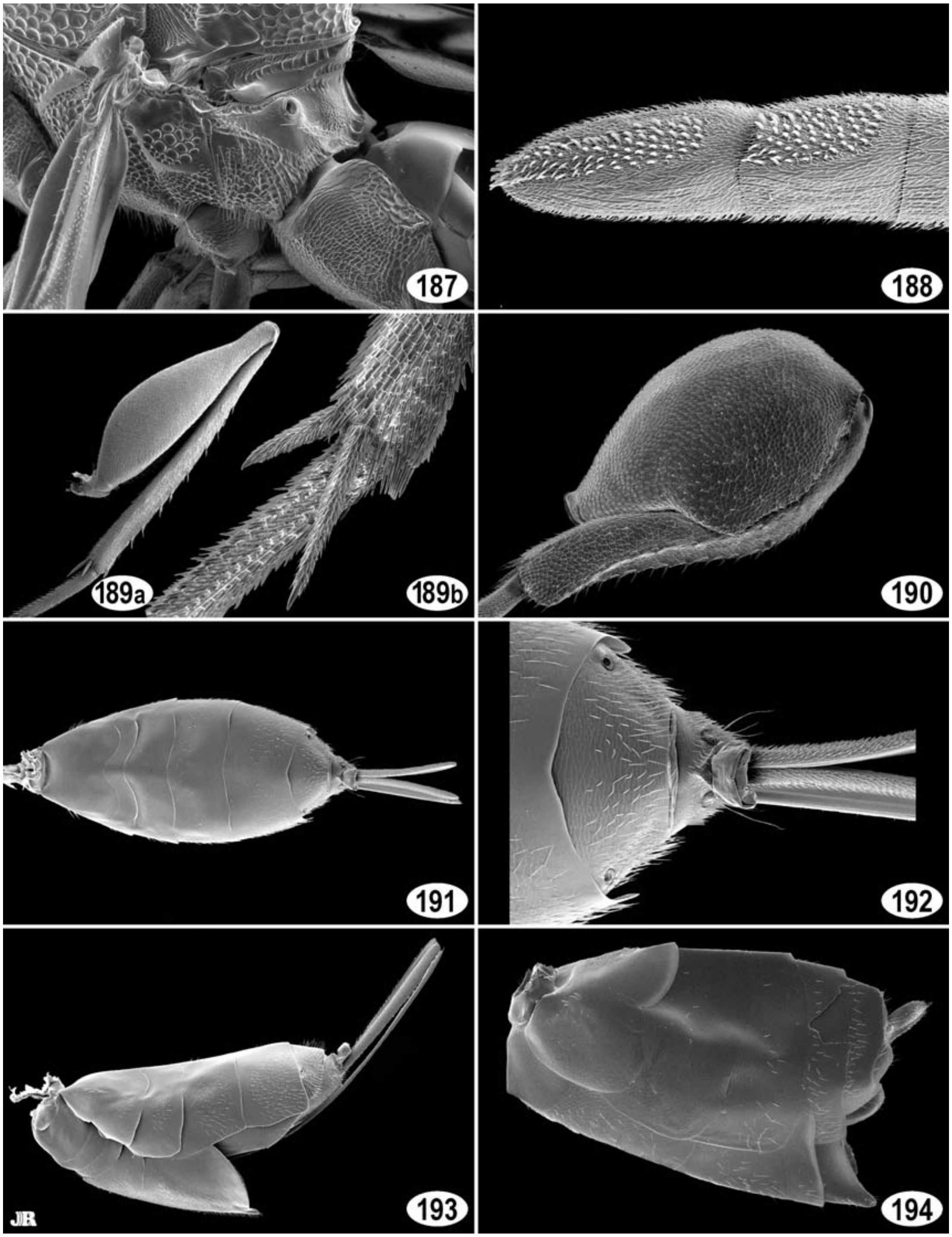
Figs 167–174. LYCISCINI, ***Chadwickia*. 167 and 168**, *C. longiceps* (%), head: **167**, frontal; **168**, frontolateral. **169**, *C. longiceps* (&): pronotum, dorsal. **170**, *Chadwickia* sp. (&): head and mesosoma, lateral. **171 and 172**, *C. longiceps*, apex of scutellum to petiole: **171**: &, dorsal; **172**, %, posterolateral. **173 and 174**, *Chadwickia* sp. (&), metafemur and tibia: **173**, outer surface, lateral; **174**, dorsolateral.



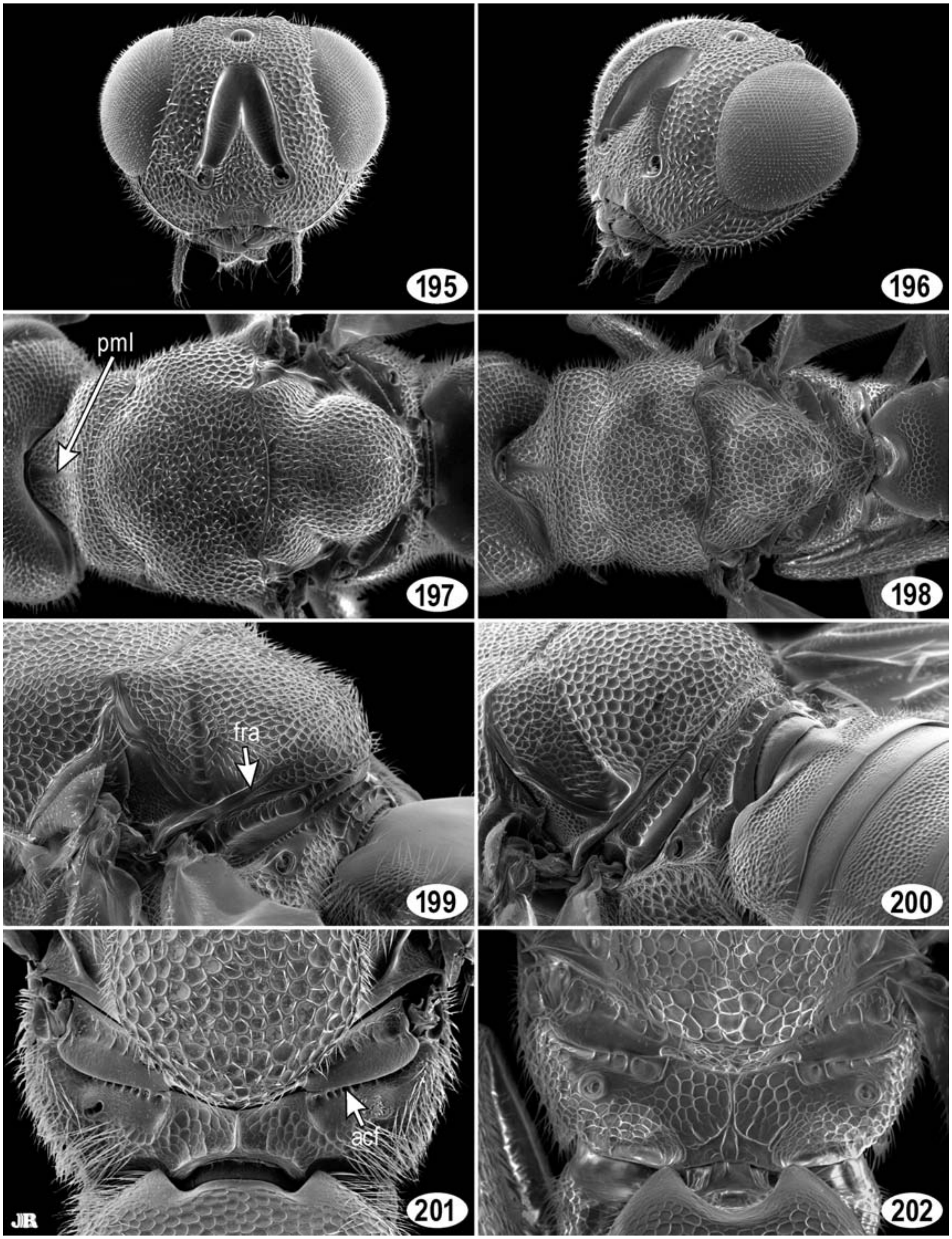
Figs 175–178. LYCISCINI, *Chadwickia*. 175 and 176, *Chadwickia* sp. (&): **175**, apical three flagellar segments, oblique view of sensory regions; **176**, oblique view of sensory region on preclaval segment. **177**, *C. longiceps* (&): full view of sensory region on preclaval segment. **178,** *C. longiceps* (%): protibia, dorsolateral view with dorsal spines and dorsoapical spicules.



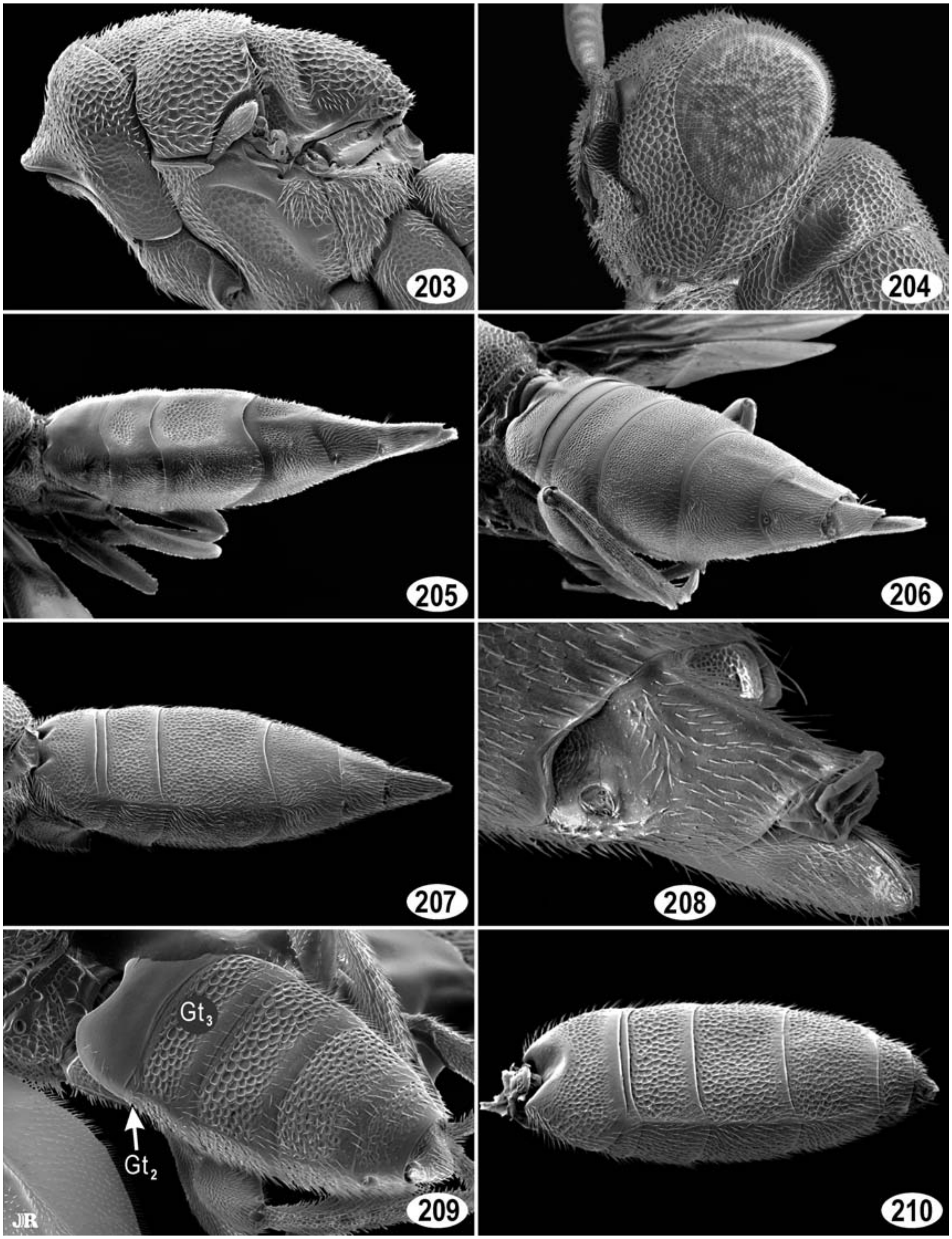
Figs 179–186. LYCISCINI, *Eupelmophotismus*. 179–181, head: **179**, *E. pulcher* (&), frontal; **180**, *Eupelmophotismus sidneyi*-group sp. (&), frontolateral; **181**, *Eupelmophotismus* sp. (%), frontolateral. **182 and 183**, *Eupelmophotismus sidneyi*-group sp. (&), mesosoma: **182**, dorsal; **183**, lateral. **184**, *E. pulcher* (&): mesosoma, lateral. **185 and 186**, apex of scutellum to propodeum plus base of metacoxa (&), posterolateral: **185**, *E. pulcher*; **186**, *Eupelmophotismus sidneyi* group sp.



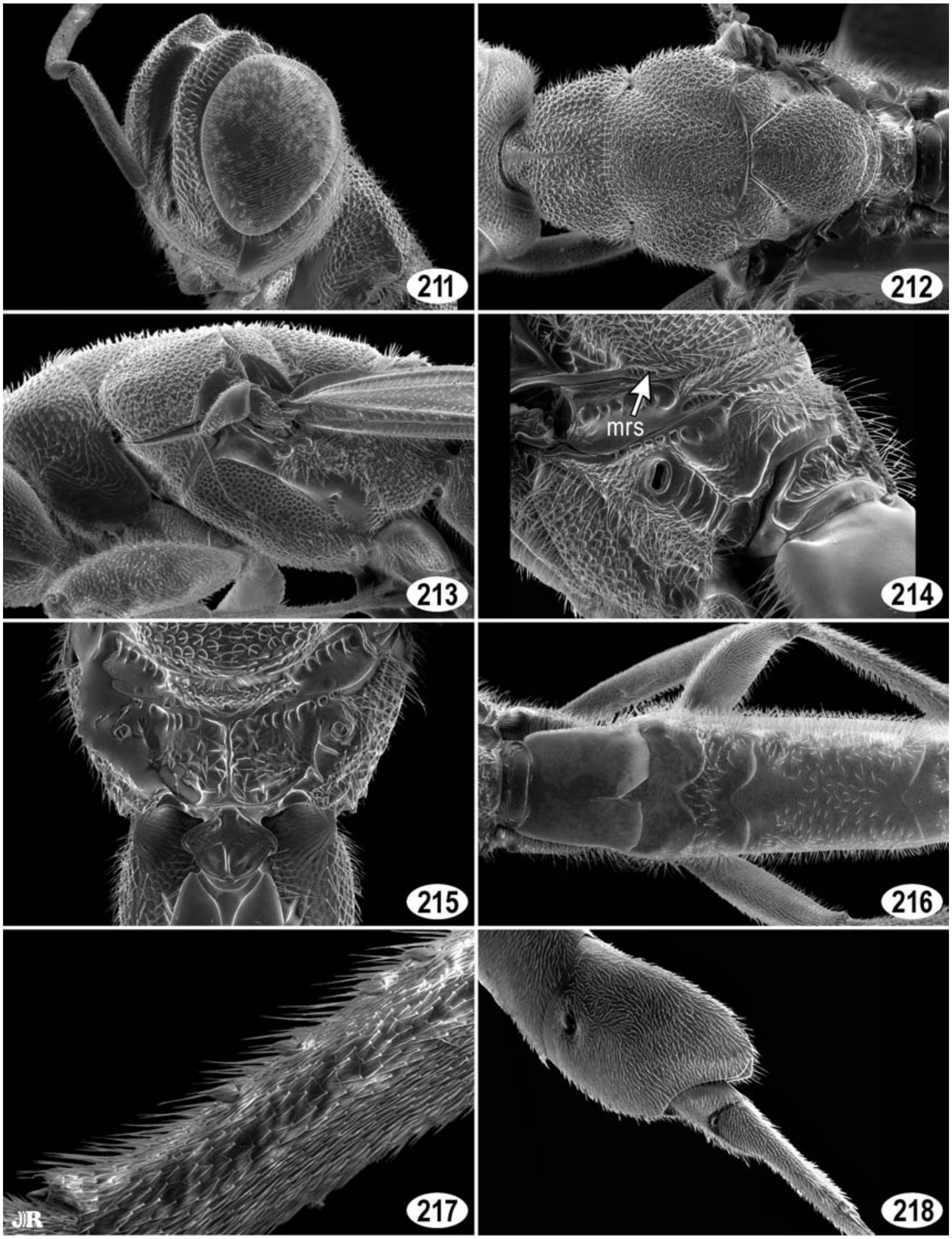
Figs 187–194. LYCISCINI, *Eupelmophotismus*. 187, *Eupelmophotismus* sp. (%): posterior of mesosoma, lateral. **188**, *E. pulcher* (&): clava and preclaval segment. **189**, leg (&): ***a***, *Eupelmophotismus sidneyi*-group sp., metafemur and tibia, ***b***, *E. pulcher*, tibial spurs. **190**, *Eupelmophotismus* sp. (%): metafemur and tibia. **191–193**, *E. pulcher* (&): **191**, gaster, dorsal; **192**, apex of Gt_5 to anal filament and ovipositor sheaths, dorsal; **193**, gaster, lateral. **194**, *Eupelmophotismus* sp. (&): gaster, lateral.



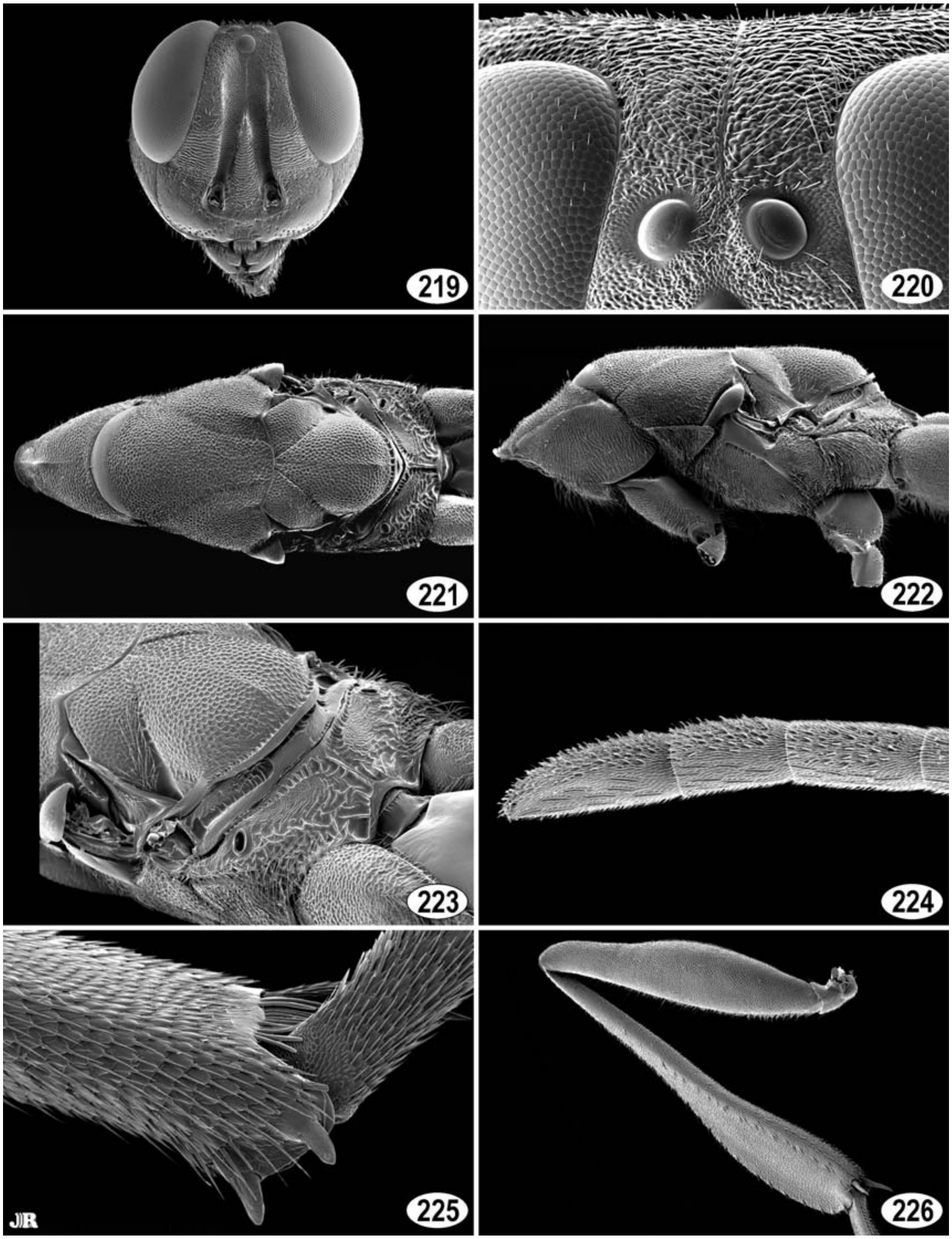
Figs 195–202. LYCISCINI, *Grooca*. 195 and 196, *Grooca* n. sp. #4 (&), head: **195**, frontal; **196**, frontolateral. **197 and 198**, mesosoma, dorsal: **197**, *G. coorgensis* (&); **198**, *Grooca* n. sp. M#7 (%). **199 and 200**, scutellar-axillar complex to base of gaster, posterolateral (&): **199**, *G. coorgensis*; **200**, *Grooca* n. sp. #1. **201 and 202**, apex of scutellum to base of gaster, dorsal: **201**, *Grooca* n. sp. #4 (&); **202**, *Grooca* n. sp. M#7 (%).



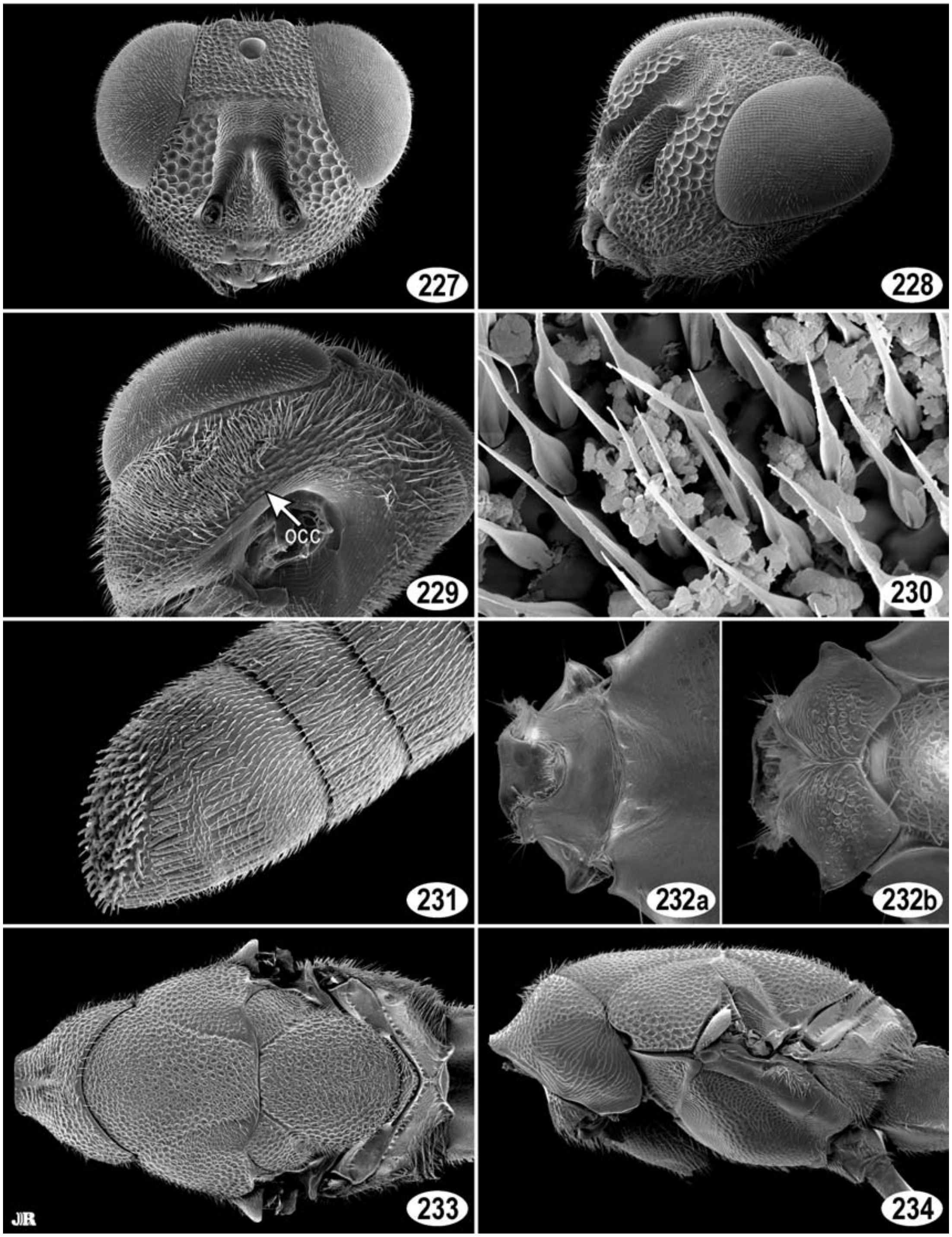
Figs 203–210. LYCISCINI, *Grooca*. 203, *Grooca* n. sp. #4 (&): mesosoma, lateral. **204**, *Grooca* n. sp. M#4 (%), head, frontolateral. **205–207**, gaster (&): **205**, *G. coorgensis*, dorsolateral; **206**, *Grooca* n. sp. #1, posterodorsal; **207**, *Grooca* n. sp. #4, dorsolateral. **208**, *Grooca* n. sp. #1 (&): syntergum, posterolateral. **209 and 210**, gaster (%): **209**, *G. coorgensis*, posterodorsal; **210**, *Grooca* n. sp. M#7 (%), dorsolateral.



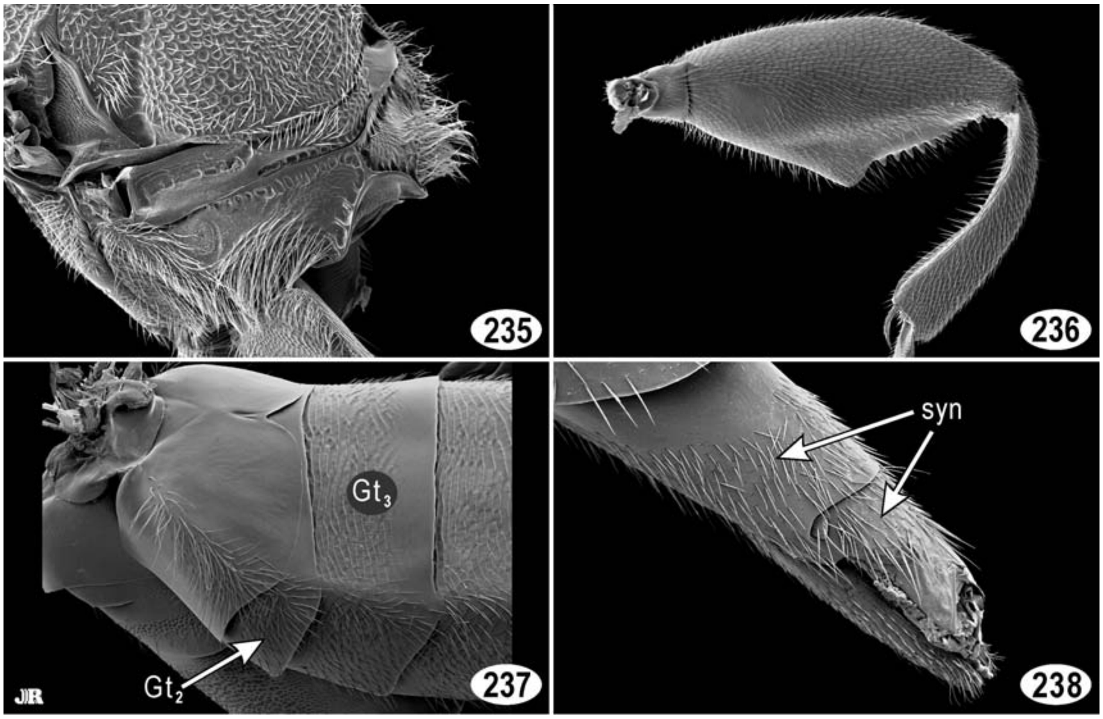
Figs 211–218. LYCISCINI, ***Marxiana grandiosa*****: 211**, head (&), dorsolateral; **212**, mesosoma (&), dorsal; **213**, mesosoma (%), lateral; **214**, apex of scutellum to base of gaster (&), posterolateral; **215**, apex of scutellum to base of gaster (%), dorsal; **216**, petiole to base of Gt_5 (&), dorsal; **217**, apex of protibia with dorsal and dorsoapical spicules (&), dorsolateral; **218**, apex of Gt_5 to syntergum (&), posterolateral.



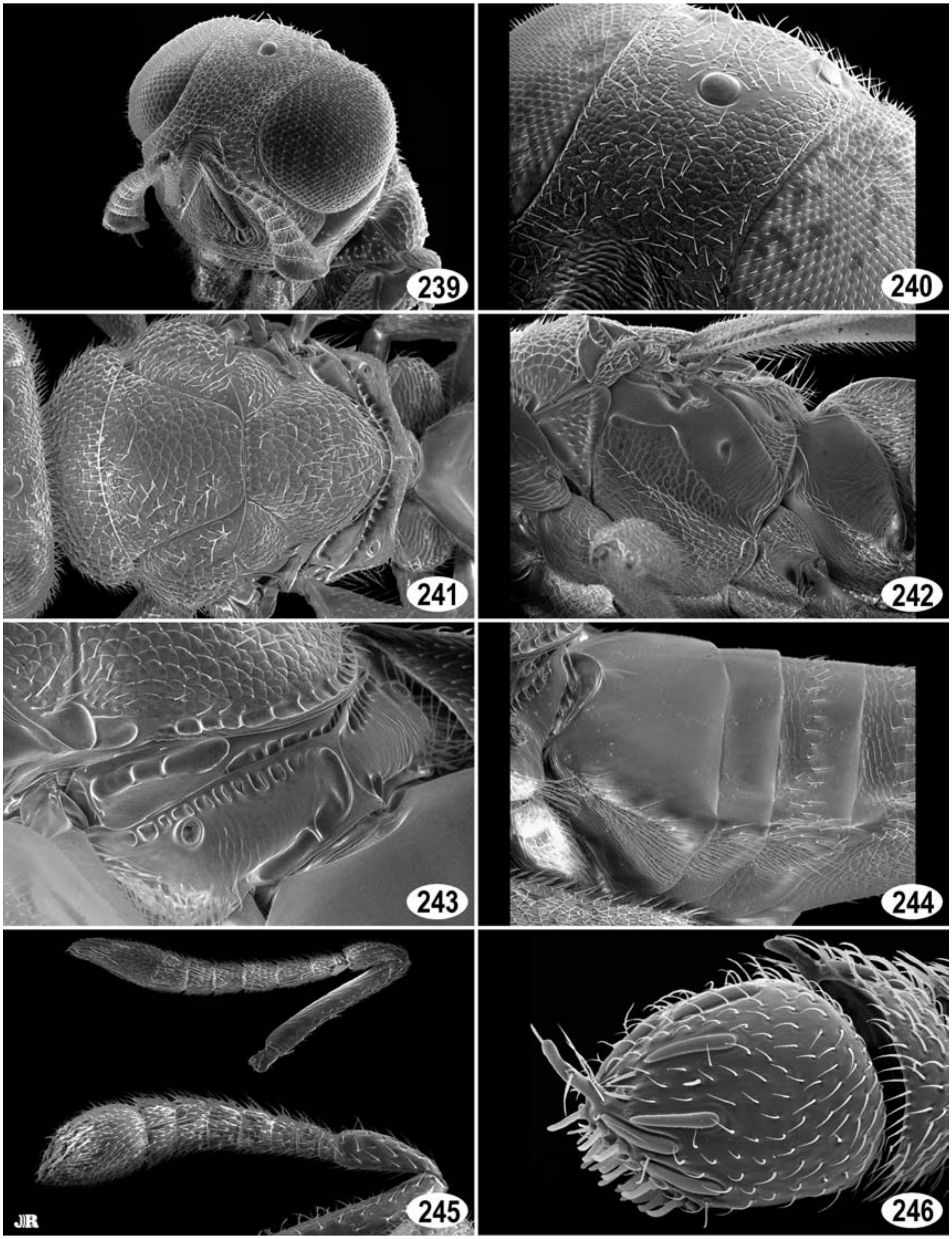
Figs 219–226. **Lyciscini,** ***Mesamotura keatsi*** **(%):** **219**, head, frontal; **220**, vertex, dorsal; **221**, mesosoma, dorsal; **222**, mesosoma, lateral; **223**, scutellar-axillar complex to base of gaster, posterodorsal; **224**, apical three flagellar segments with micropilose sensory regions; **225**, apex of protibia including dorsoapical spicules, dorsal; **226**, metafemur and tibia, outer surface.



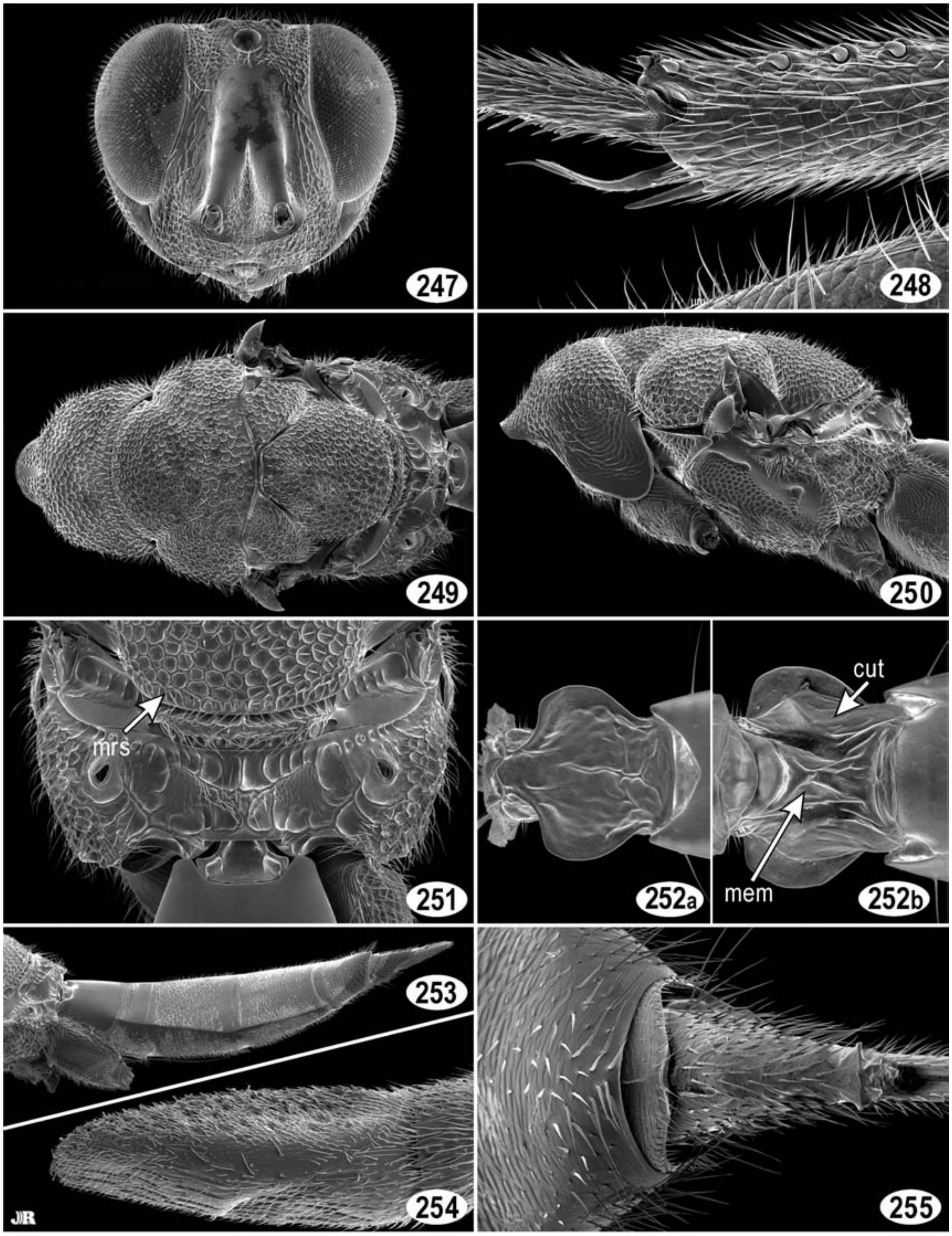
Figs 227–234. LYCISCINI, *Neboissia armipes*: 227, head (&), frontal; **228**, head (&), frontolateral; **229**, head (&), posterolateral; **230**, enlargement of setal region on gena behind eye (&); **231**, preclaval segment and clava with micropilose sensory region (&); **232**, petiole (%): ***a***, dorsal, ***b***, ventral; **233**, mesosoma (&), dorsal; **234**, mesosoma (&), lateral.



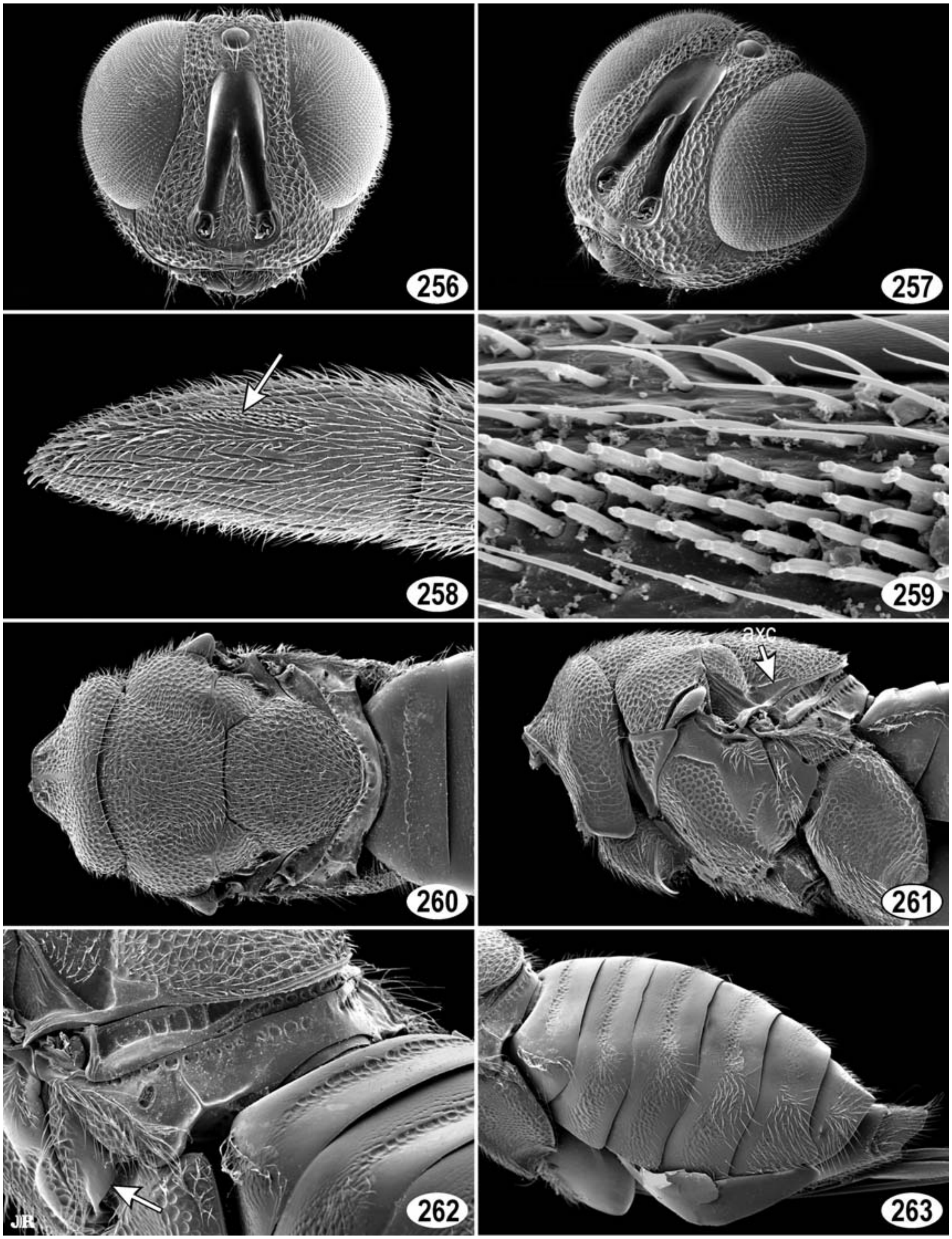
Figs 235–238. LYCISCINI, *Neboissia armipes* (&): 235, apex of scutellum to propodeum, posterodorsal; **236**, profemur and tibia, inner surface; **237**, gaster, Gt$_1$ to base of Gt$_4$; **238**, syntergum, lateral.



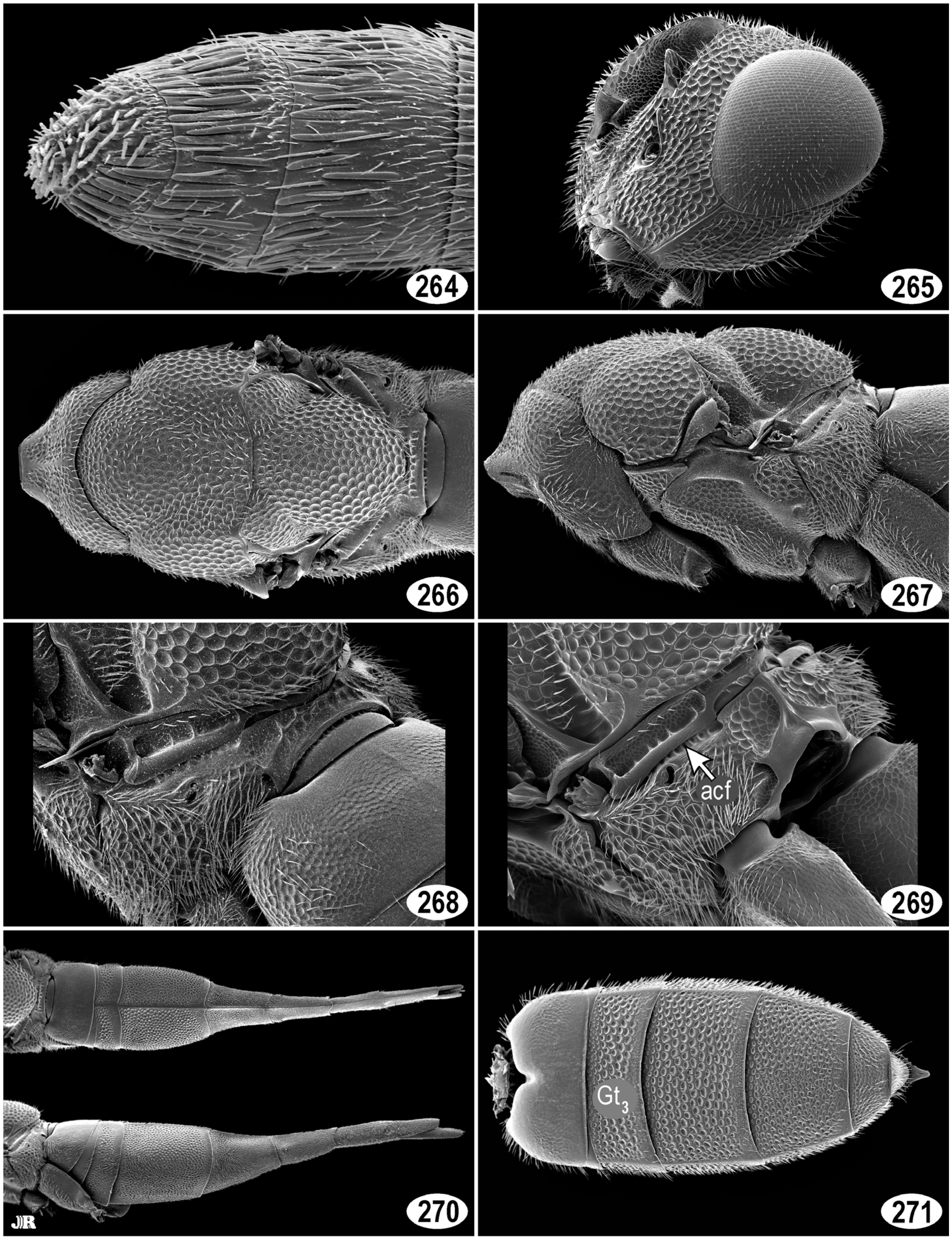
Figs 239–246. LYCISCINI, *Nepistenia*. 239, *N. (Anepistenia) vexans* (&): head, frontolateral. **240–242**, *N. (Nepistenia) septem*: **240**, head (&), frontovertex; **241**, mesosoma (%), dorsal; **242**, mesosoma (&), lateral. **243 and 244**, *N. (A.) vexans* (&): **243**, apex of scutellum to base of gaster, posterodorsal; **244**, gaster, Gt$_1$ to base of Gt$_4$, lateral. **245**, antenna: *N. (N.) septem* & (top) and *N. (A.) vexans* % (bottom). **246**, *N. (A.) vexans* (&): apex of preclaval segment and clava, oblique terminal view.



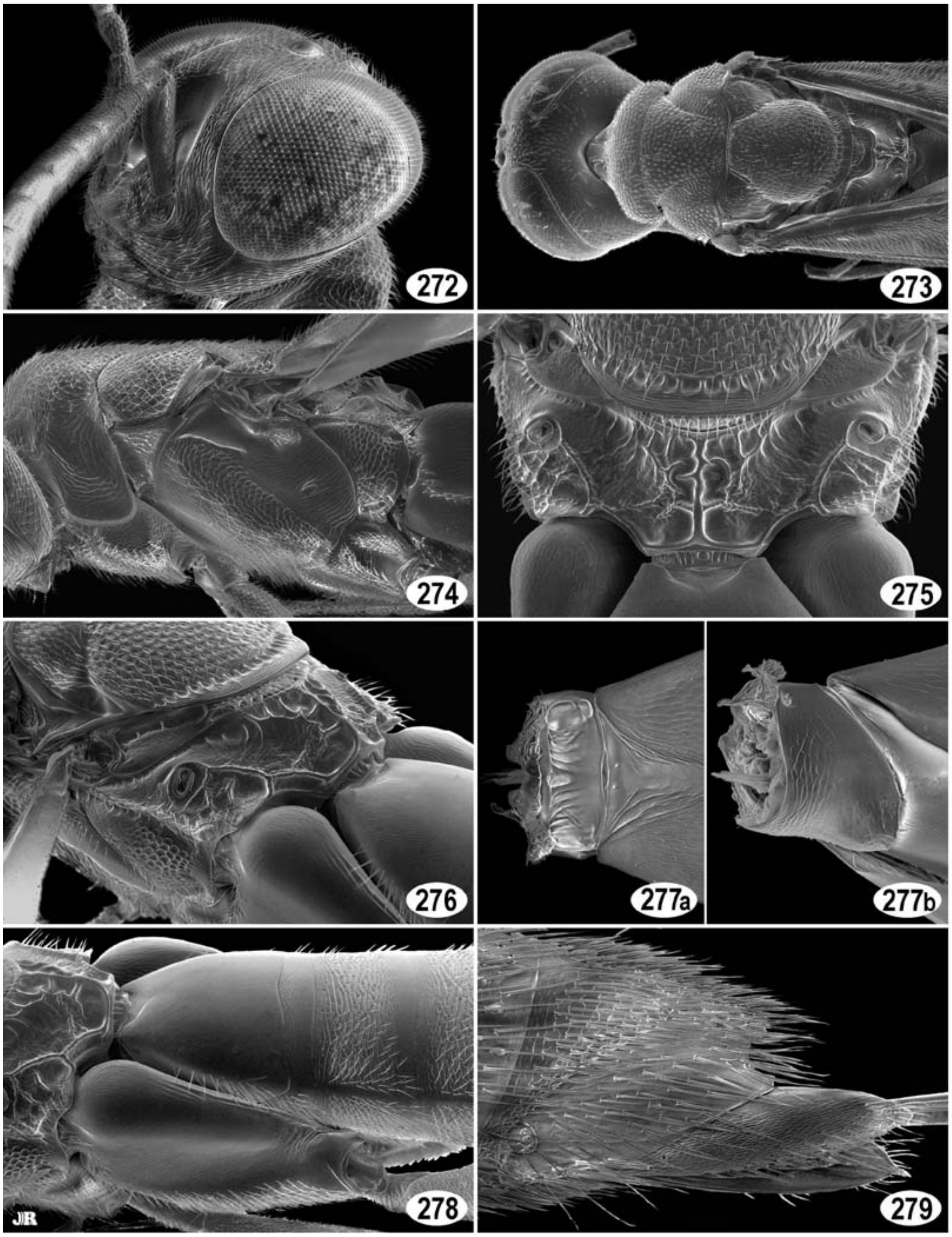
Figs 247–255. **Lyciscini, *Parepistenia varicornis*: 247**, head (&), frontal; **248**, apex of protibia with dorsal and dorsoapical spicules (&), dorsolateral; **249**, mesosoma (&), dorsal; **250**, mesosoma (&), lateral; **251**, apex of scutellum to base of gaster (&), dorsal; **252**, petiole (%): ***a***, dorsal, ***b***, ventral; **253**, gaster, lateral; **254**, 2-segmented clava with micropilose sensory region; **255**, apex of Gt_6 and syntergum (&), dorsal.



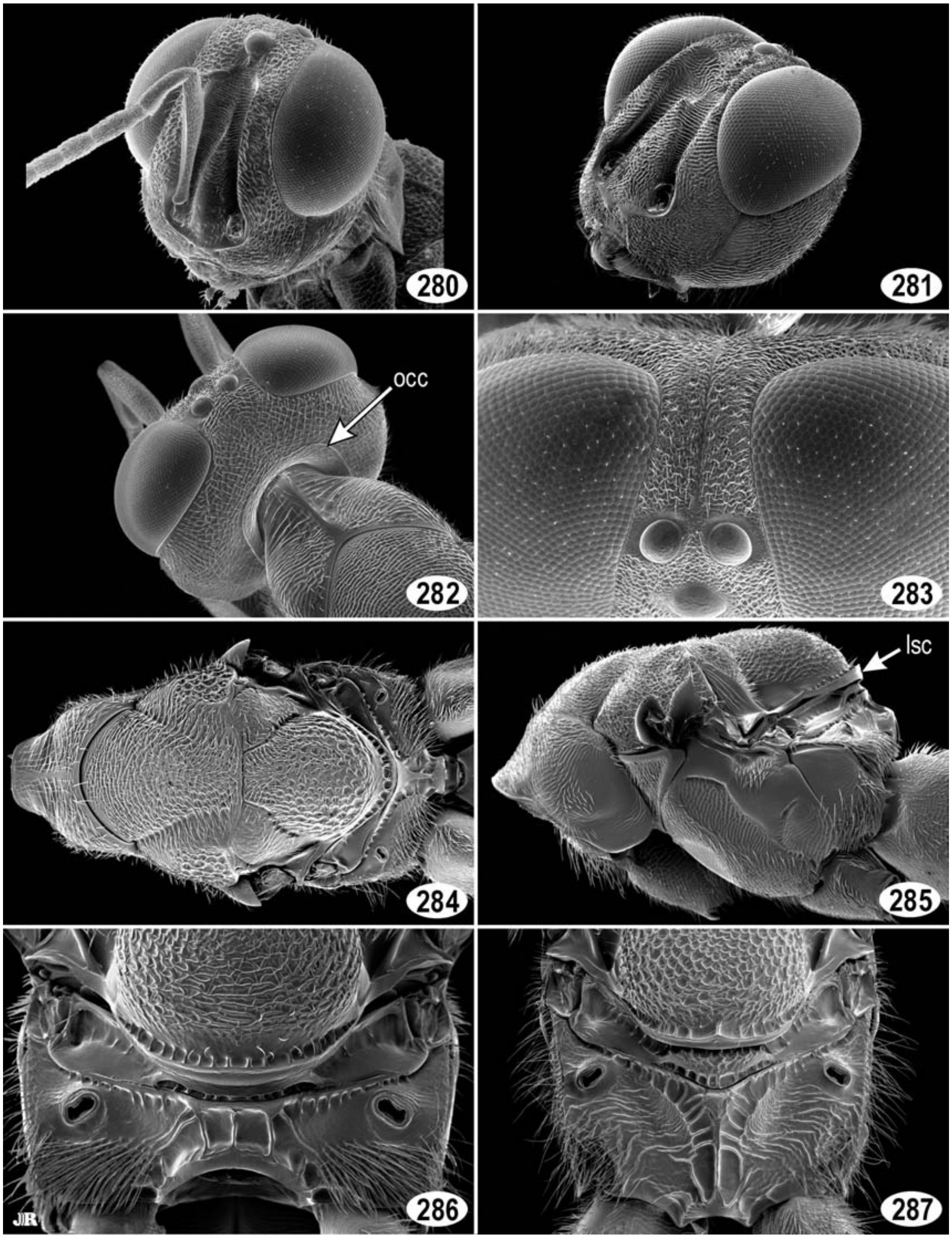
Figs 256–263. **Lyciscini, *Riekisura* n. sp. #1 (&): 256**, head, frontal; **257**, head, frontolateral; **258**, clava (arrow points to sensory band); **259**, enlargement of sensory band; **260**, mesosoma, dorsal; **261**, mesosoma, lateral; **262**, apex of scutellum to base of gaster, posterodorsal (arrow points to convex, smooth region of metapleuron); **263**, gaster, dorsolateral.



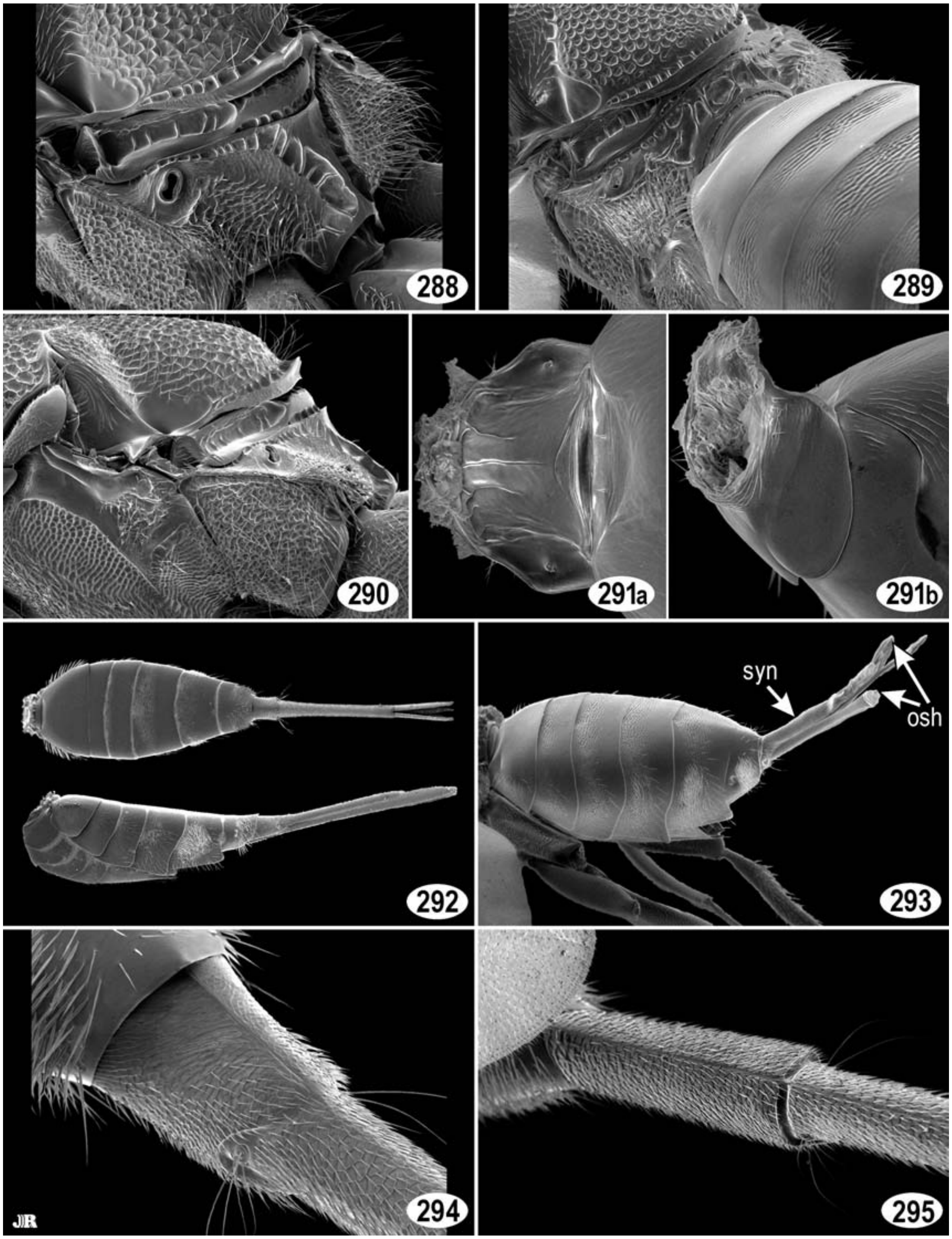
Figs 264–271. LYCISCINI, *Solenura nigra*: 264, clava (&), frontal; **265**, head (%), frontolateral; **266**, mesosoma (&), dorsal; **267**, mesosoma (&), lateral; **268**, apex of scutellum to base of gaster (&), posterodorsal; **269**, apex of scutellum to propodeum (%), posterodorsal; **270**, gaster (&), dorsal (top) and lateral (bottom); **271**, gaster (%), dorsal.



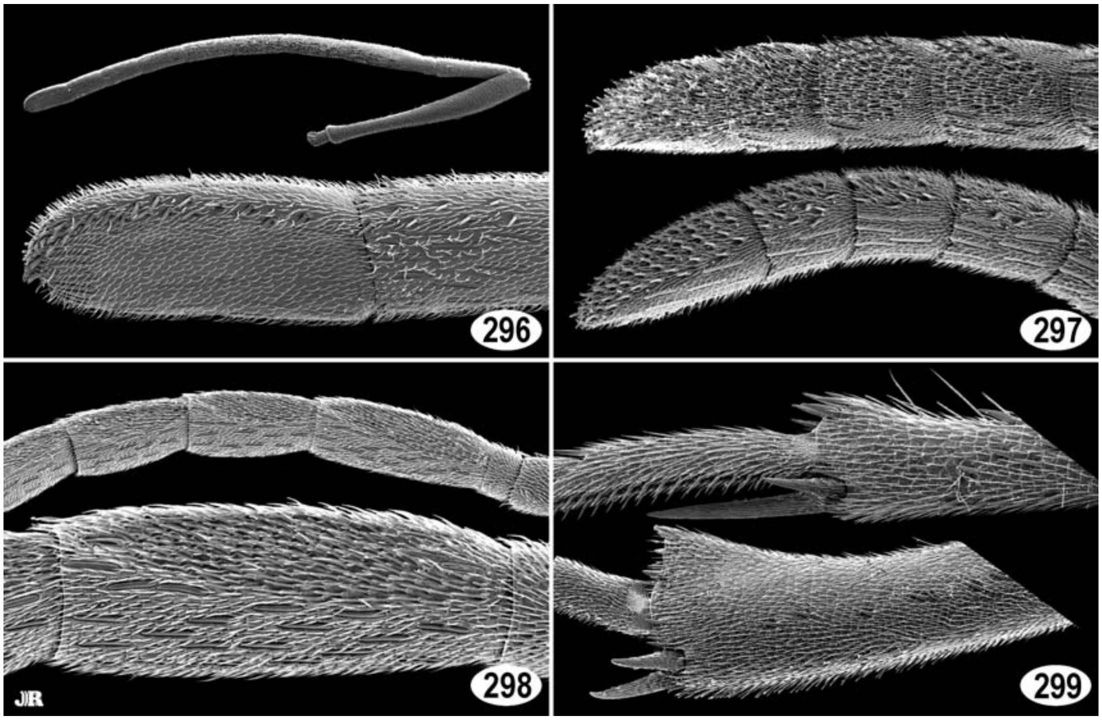
Figs 272–279. LYCISCINI, *Striatacanthus*. 272–274, *S. arcuatus*: **272**, head (%), frontolateral; **273**, head and mesosoma (&), dorsal; **274**, mesosoma (&), lateral. **275 and 276**, apex of scutellum to base of gaster, *S. abruptus* (&): **275**, dorsal; **276**, posterodorsal. **277**, petiole, *S. arcuatus* (%): ***a***, dorsal; ***b***, ventrolateral. **278 and 279**, *S. abruptus* (&): **278**, propodeum to base of Gt_4, lateral; **279**, syntergum and ovipositor sheaths, lateral.



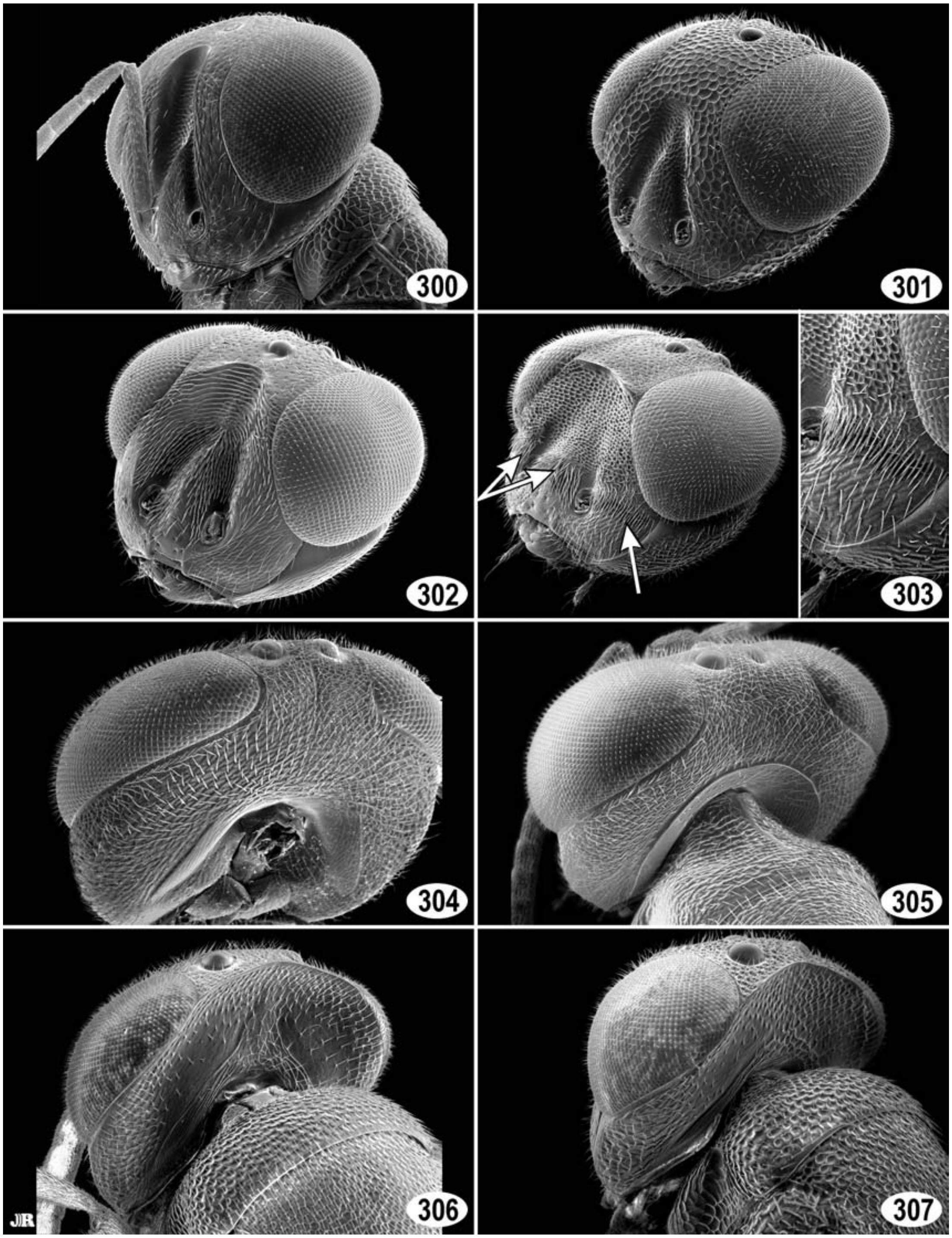
Figs 280–287. Lyciscini, *Thaumasura*. 280, *Thaumasura* sp. (&): head, frontal. **281**, *T. rubrifunicle* (%): head, frontolateral. **282**, *Thaumasura* sp. (%): head, posterodorsal, and pronotum. **283**, *Thaumasura* sp. (&): vertex, dorsal. **284 and 285**, mesosoma: **284**, *Thaumasura* sp. (%), dorsal; **285**, *T. diana* (&), lateral. **286**, *T. diana* (&): apex of scutellum to propodeum, dorsal. **287**, *T. rubrifunicle* (%): apex of scutellum to propodeum, dorsal.



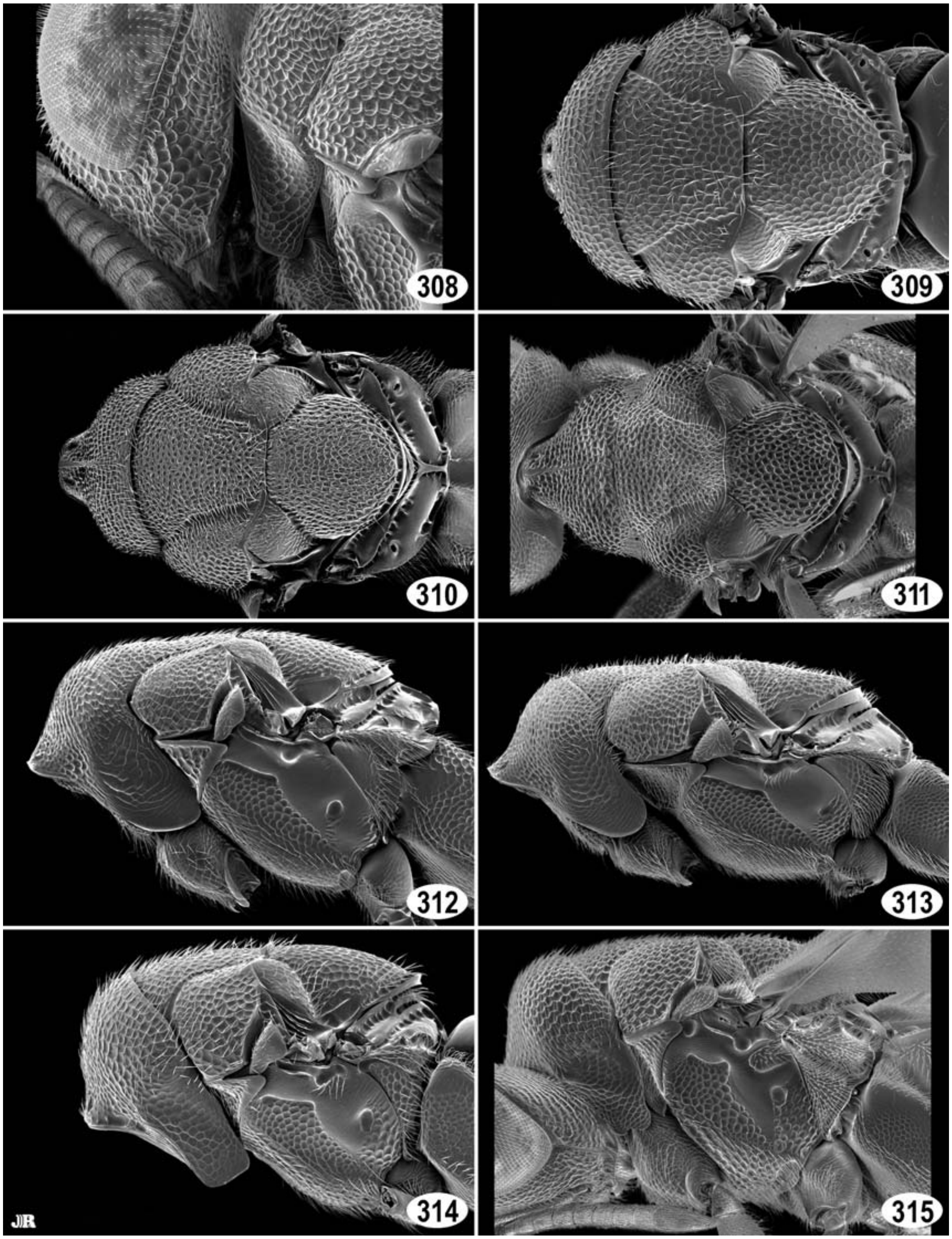
Figs 288–295. LYCISCINI, *Thaumasura*. 288 and 289, apex of scutellum to base of gaster, posterodorsal: **288**, *T. terebrator* (%); **289**, *Thaumasura* sp. (&). **290**, *T. terebrator* (%): posterior of mesosoma, lateral. **291**, *Thaumasura* sp. (%), petiole: ***a***, dorsal; ***b***, ventral. **292 and 293**, gaster (&): **292**, *T. diana*, dorsal (top) and lateral (bottom); **293**, *Thaumasura* sp., dorsolateral. **294 and 295**, syntergum (&): **294**, *T. diana*, dorsolateral; **295**, *Thaumasura* sp. nr *imperialis*, dorsal.



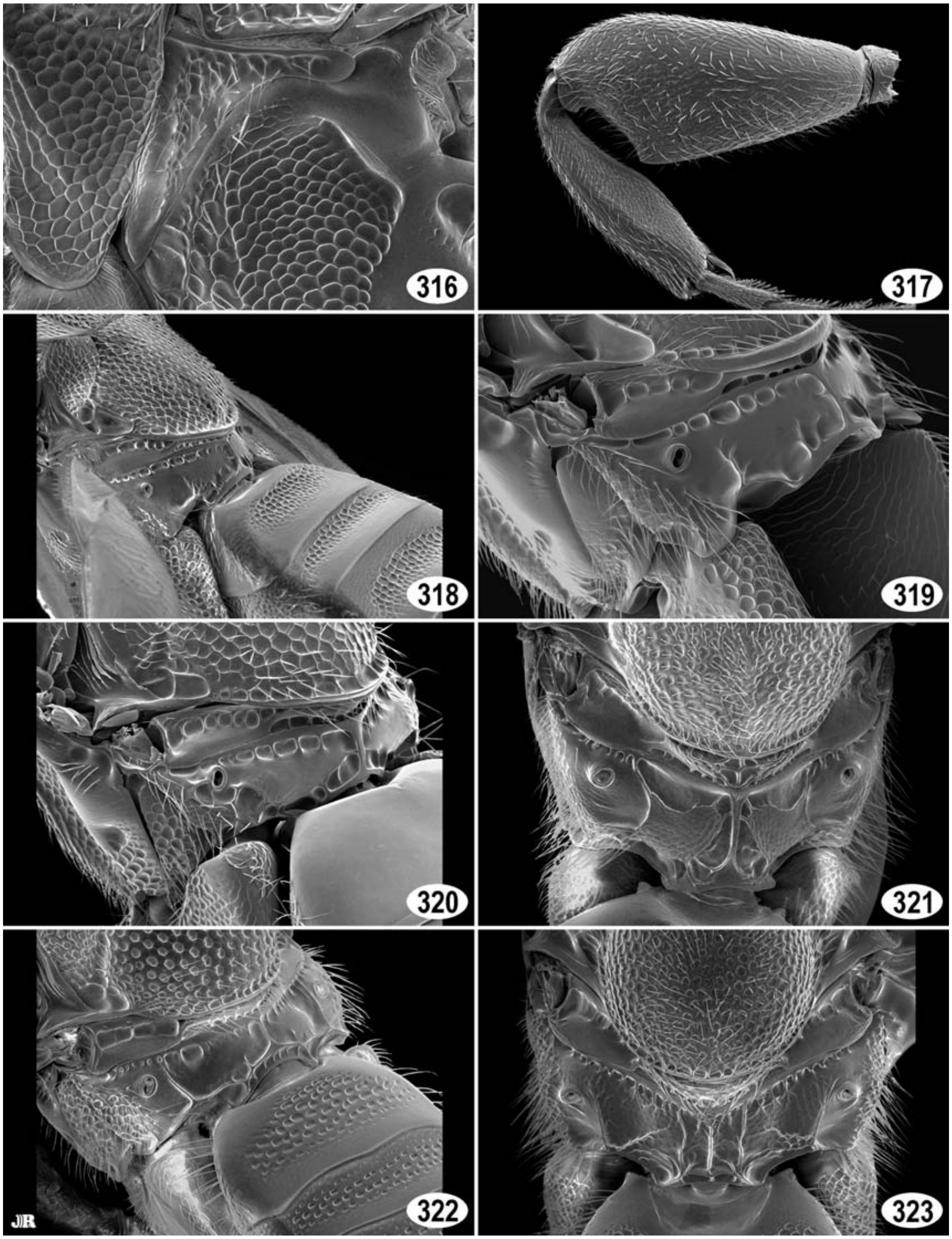
Figs 296–299. LYCISCINI, *Thaumasura*. 296, *T. diana* (&): antenna (top) and clava plus apex of preclaval segment with micropilose sensory regions (bottom). **297**, flagellum, apical four segments with micropilose sensory regions: *T. rubrifunicle* % (top) and *Thaumasura* sp. % (bottom). **298**, *T. terebrator* (%), fl$_1$ to base of fl$_5$ (top) and enlargement of fl$_2$ (bottom). **299**: apex of metatibia with metatibial spurs (%), lateral, *Thaumasura* sp. (top) and *T. terebrator* (bottom).



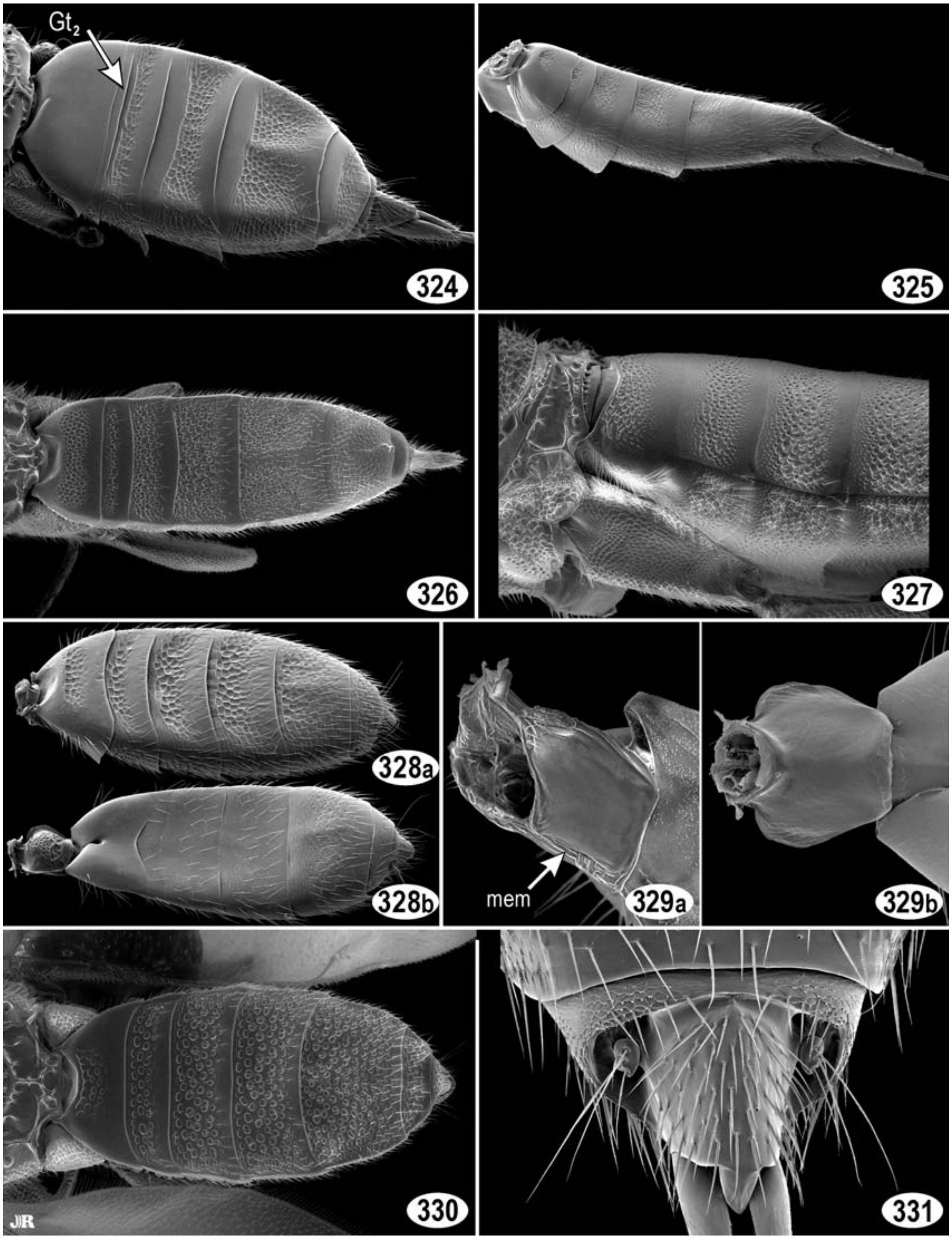
Figs 300–307. LYCISCINI, Old World *Proshizonotus*. 300–303, head, frontolateral (&): **300**, *Proshizonotus* sp. nr *arenae*; **301**, *P. devannyi*; **302**, *Proshizonotus* sp. nr *annulicornis*; **303**, *Proshizonotus* sp. nr *migneti* (arrows point to setal band). **304–307**, head, posterodorsal: **304**, *Proshizonotus* sp. (&); **305**, *Proshizonotus* sp. (New Zealand &); **306**, *P. lenticeps* (%); **307**, *Proshizonotus* sp. nr *lenticeps* (%).



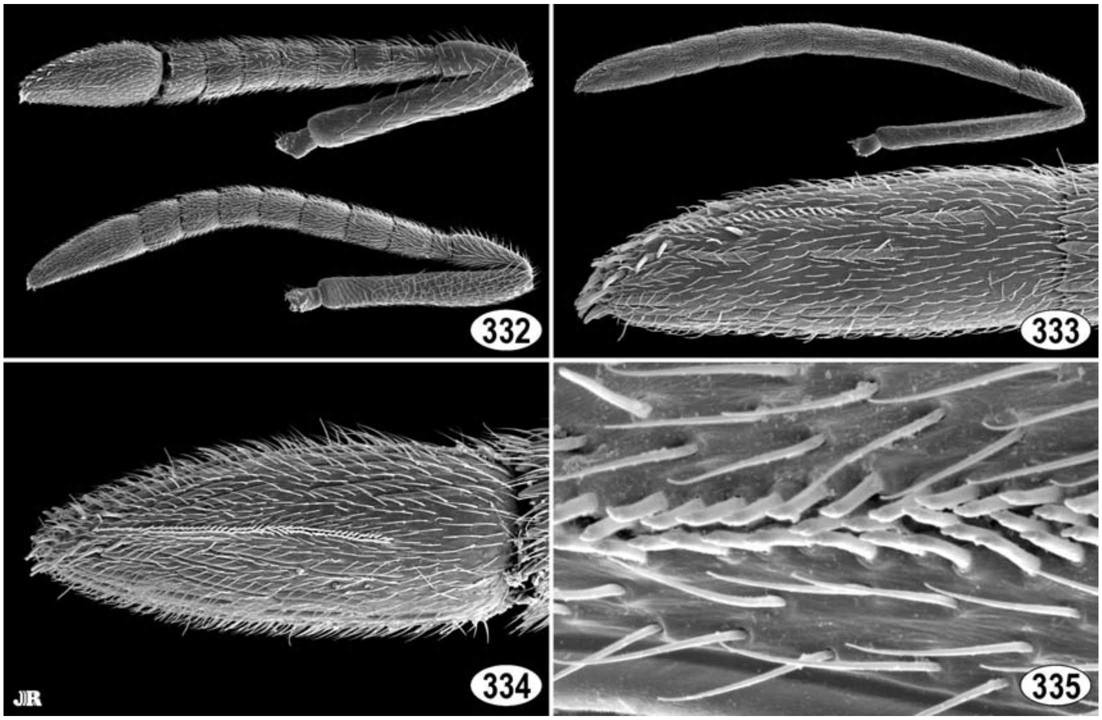
Figs 308–315. LYCISCINI, *Proshizonotus*. 308, *Proshizonotus* n. sp. #5 (&): head and anterior of mesosoma, lateral. **309–314**, Old World spp. (&), mesosoma: **309**, *P. devannyi*; **310**, *Proshizonotus* sp. nr *migneti*; **311**, *Proshizonotus* sp. nr *migneti*; **312**, *Proshizonotus* sp. nr *annulicornis*; **313**, *Proshizonotus* sp. nr *migneti*; **314**, *P. devannyi*. **315**: *Proshizonotus* n. sp. #8 (&), head and mesosoma, lateral.



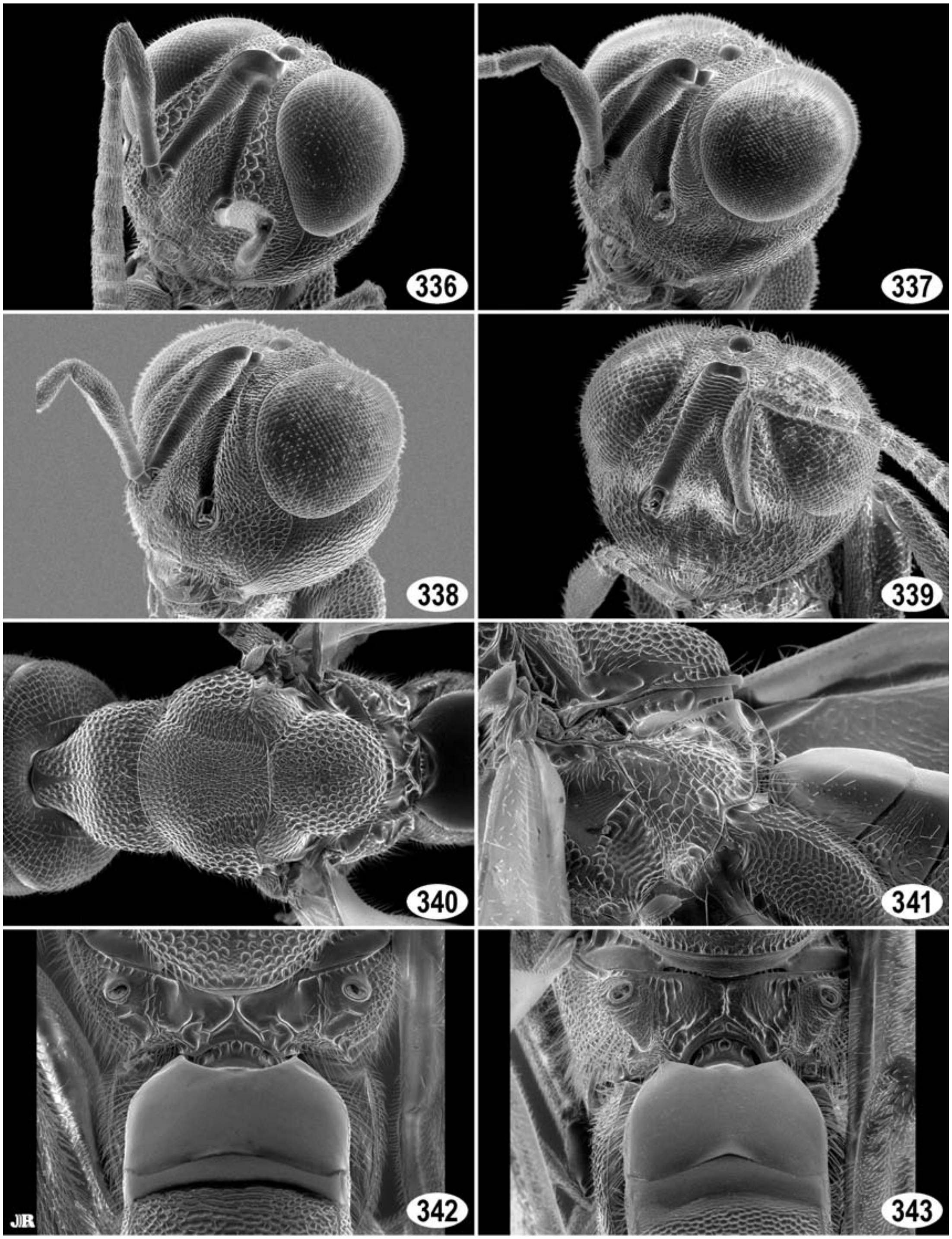
Figs 316–323. LYCISCINI, *Proshizonotus*. 316, *Proshizonotus* n. sp. #20 (&), prepectus and dorsal mesopleuron. **317**: *P. incola* (&), profemur and tibia, inner surface. **318–321**, Old World spp. (&), scutellum to base of gaster: **318**, *Proshizonotus* sp. nr *annulicornis*, posterolateral; **319**, *Proshizonotus* sp. nr *migneti*, dorsal; **320**, *P. devannyi*, posterolateral; **321**, *Proshizonotus* sp. (New Zealand). **322 and 323**, scutellum to base of gaster (&): **322**, *Proshizonotus* n. sp. #16, posterolateral; **323**, *Proshizonotus* n. sp. #11, dorsal.



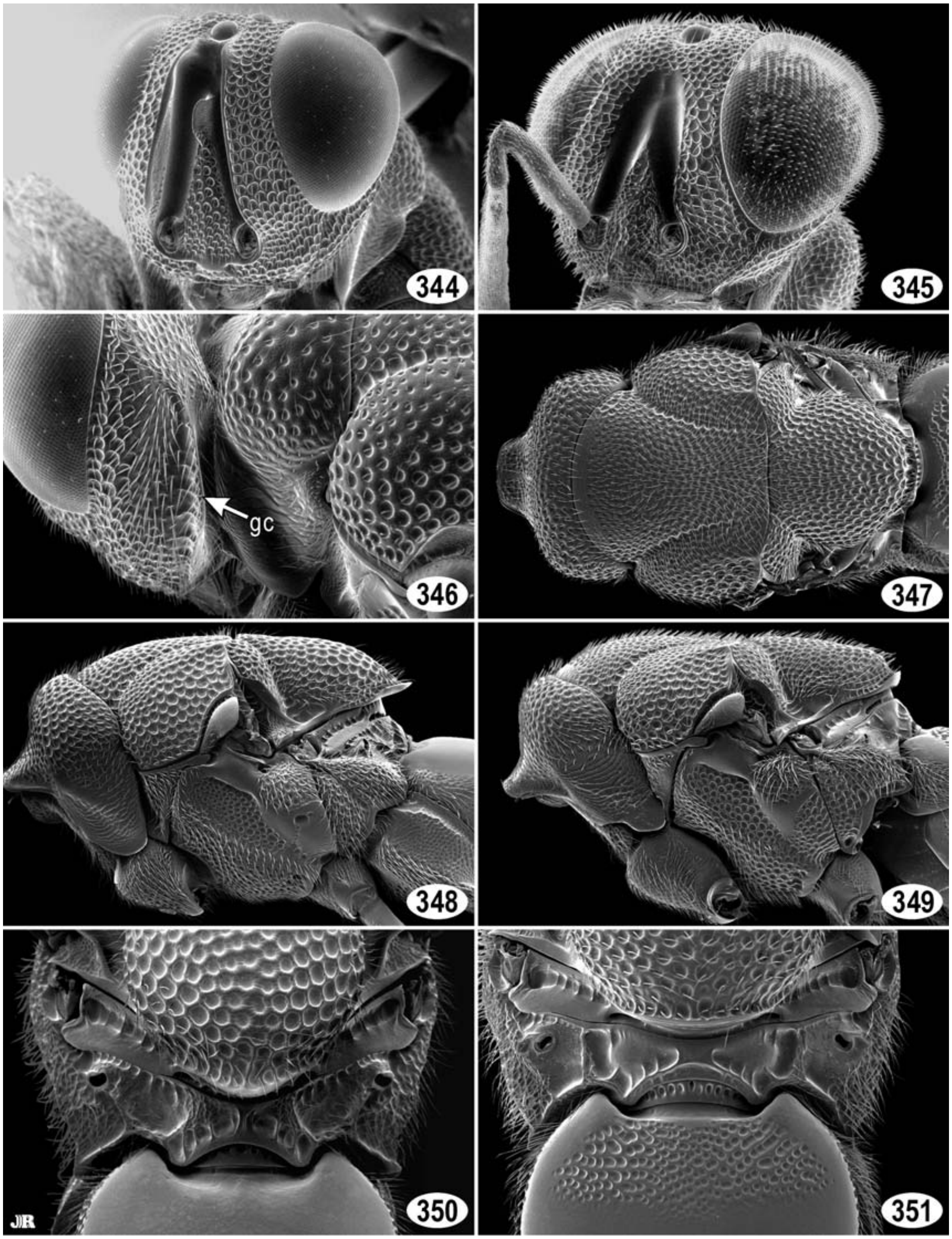
Figs 324–331. LYCISCINI, *Proshizonotus*. 324–326, gaster (&): **324**, *P. devannyi*, dorsolateral; **325**, *Proshizonotus* sp. nr *annulicornis*, dorsolateral; **326**, *Proshizonotus* n. sp. #11, dorsal. **327**, *Proshizonotus* n. sp. #20, posterior of mesosoma to Gt_4, lateral. **328*a* and 328*b***, *Proshizonotus* spp. (Old World), gaster (%), dorsolateral. **329**, *Proshizonotus* sp. (Old World), petiole (%): ***a***, ventrolateral of species comprising 328*a*; ***b***, ventral of species comprising 328*b*. **330**, *Proshizonotus* sp. (New World), gaster (%), dorsal. **331**, *P. devannyi* (&): syntergum, dorsal.



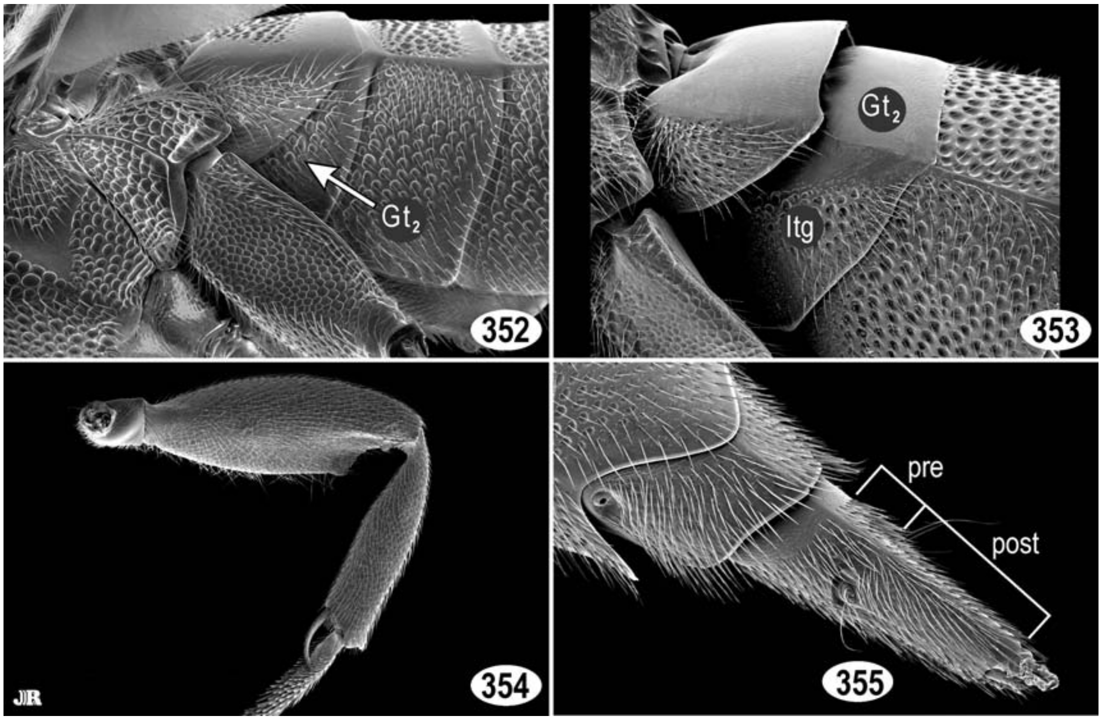
Figs 332–335. LYCISCINI, *Proshizonotus*. 332, antenna (&): *P. devannyi* (top) and *Proshizonotus* sp. (bottom). **333**, *Proshizonotus* sp. #1 nr *arenae* (&): antenna (top) and clava with micropilose sensory band (bottom). **334 and 335**, *Proshizonotus* sp. #2 nr *arenae* (&): **334**, clava with micropilose sensory band; **335**, enlargement of sensilla in micropilose sensory band.



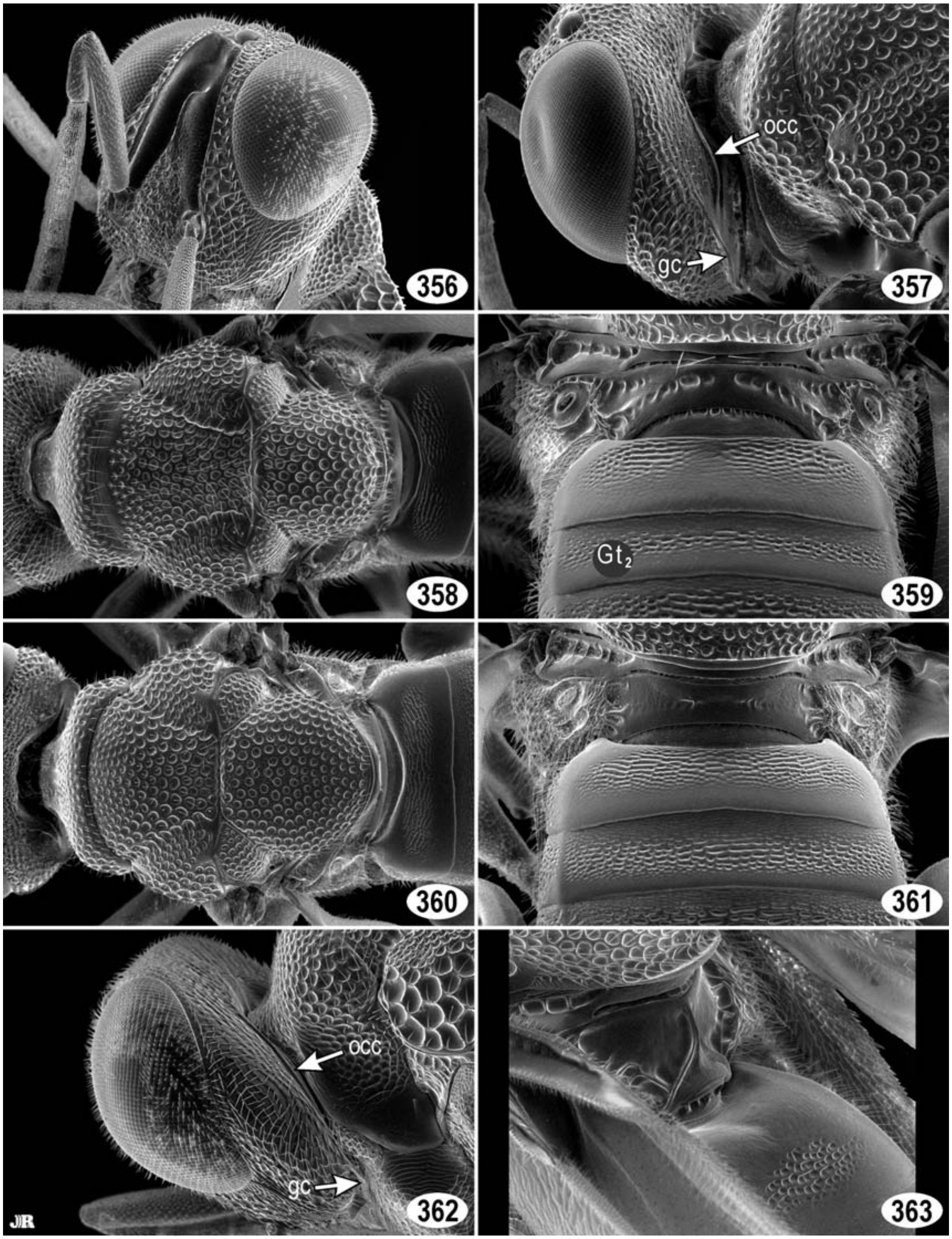
Figs 336–343. Lyciscini, *Amazonisca*. 336–339, head (&): **336**, *Amazonisca* n. sp. #1; **337**, *Amazonisca* n. sp. #8; **338**, *Amazonisca* n. sp. #9; **339**, *Amazonisca* n. sp. #11. **340**, *Amazonisca* n. sp. #7 (&): mesosoma, dorsal. **341**, *Amazonisca* n. sp. #3 (&): posterior of mesosoma, lateral. **342 and 343**, apex of scutellum to base of gaster (&), dorsal: **342**, *Amazonisca* n. sp. #1; **343**, *Amazonisca* n. sp. #8.



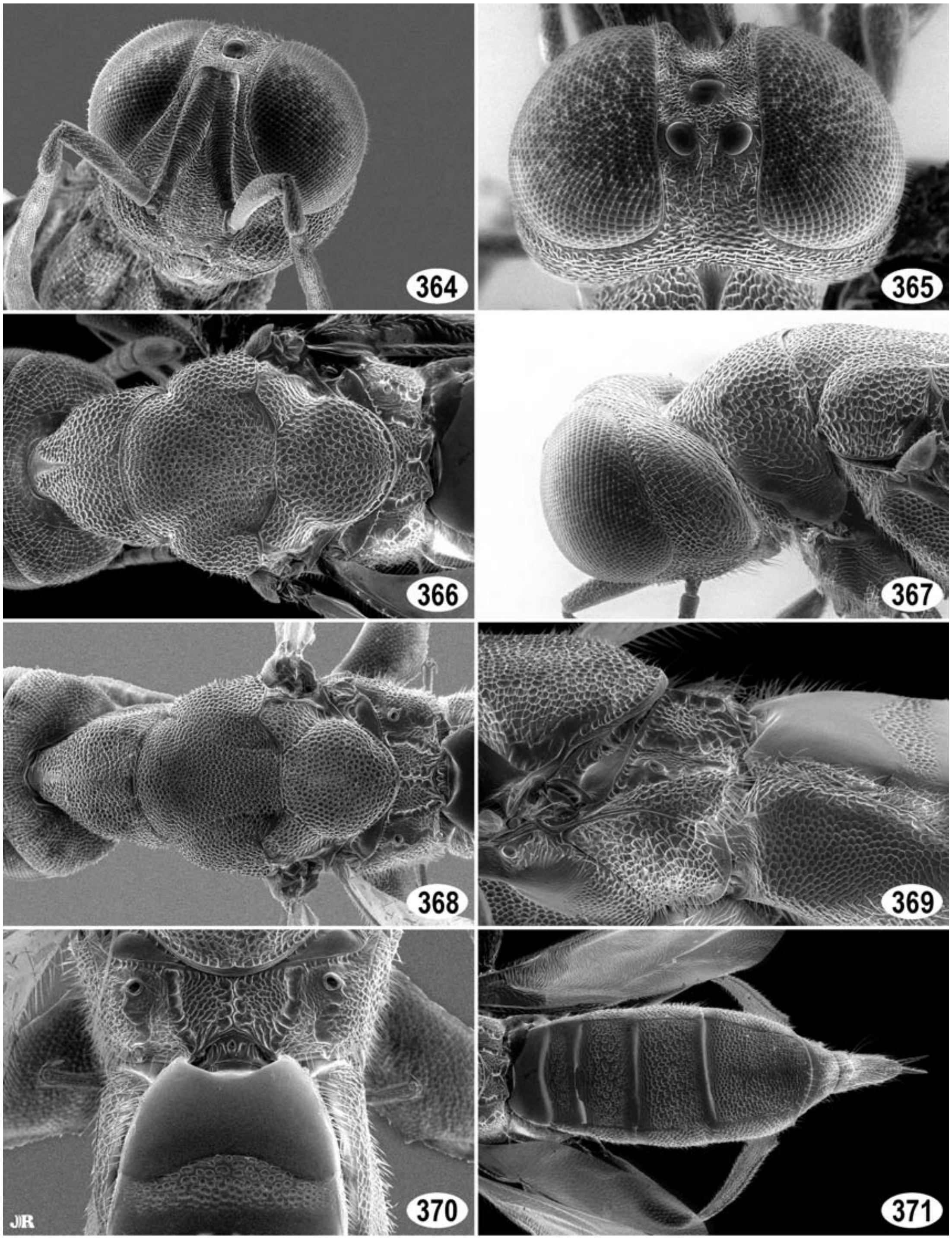
Figs 344–351. LYCISCINI, *Epistenia*. 344 and 345, head (&): **344**, *E.* (*Punctepistenia*) n. sp. #4; **345**, *E.* (*Epistenia*) sp. **346**, *E.* (*P.*) n. sp. #4 (&): head and anterior of mesosoma, lateral. **347–349**, mesosoma (&): **347**, *E.* (*P.*) n. sp. #3, dorsal; **348**, *E.* (*E.*) *coeruleata*, lateral; **349**, *E.* (*P.*) n. sp. #3, lateral. **350 and 351**, apex of scutellum to base of gaster (&), dorsal: **350**, *E.* (*E.*) *coeruleata*; **351**, *E.* (*P.*) n. sp. #3.



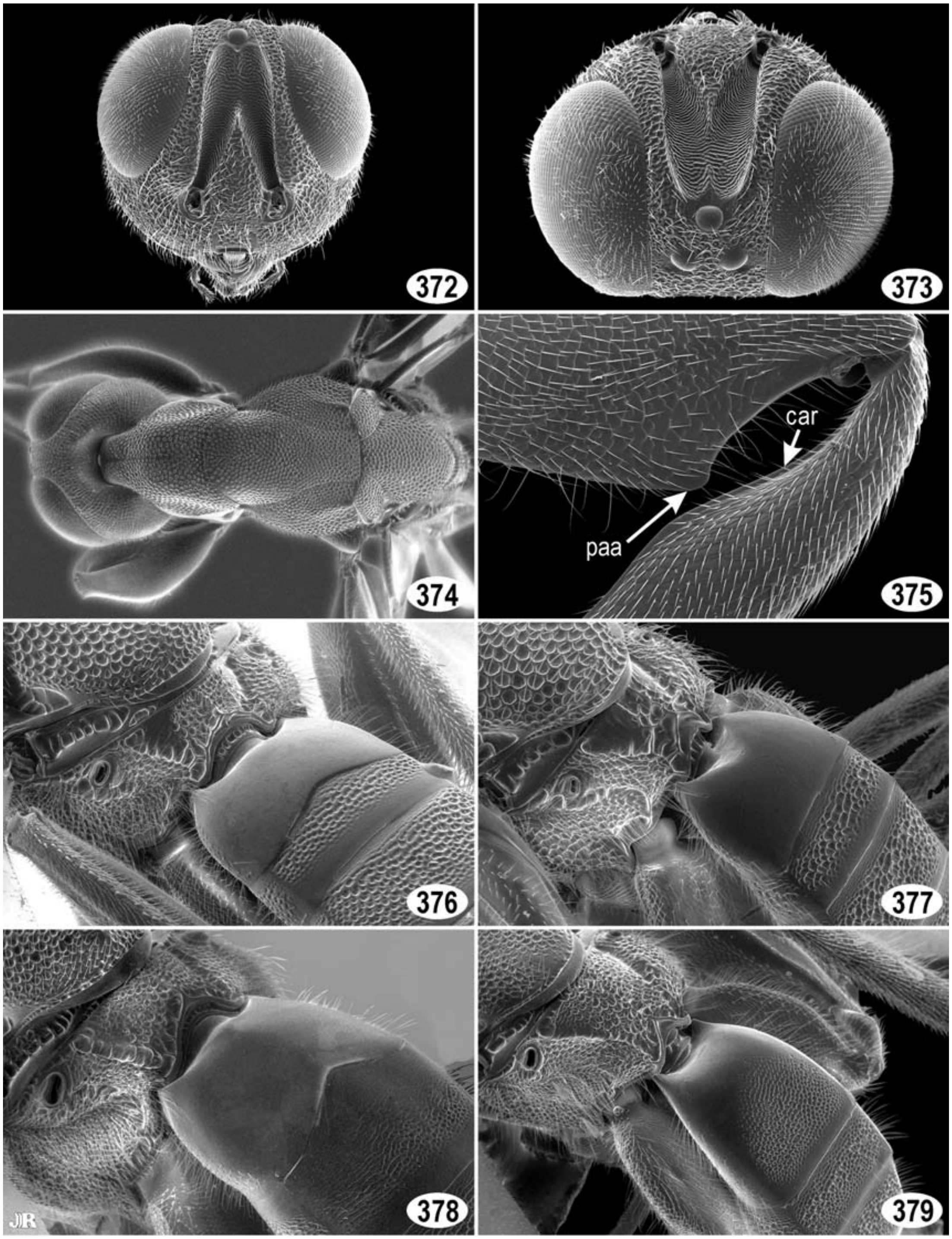
Figs 352–355. LYCISCINI, *Epistenia*. 352 and 353, base of gaster (&), lateral: **352**, *E.* (*Punctepistenia*) n. sp. #3, Gt$_2$ in natural concealed state; **353**, *E.* (*Epistenia*) *coeruleata*, Gt$_2$ secondarily exposed. **354**, *E.* (*E.*) *coeruleata* (&): profemur and tibia, inner surface. **355**, *E.* (*P.*) n. sp. #3 (&): Gt$_6$ and syntergum, dorsolateral.



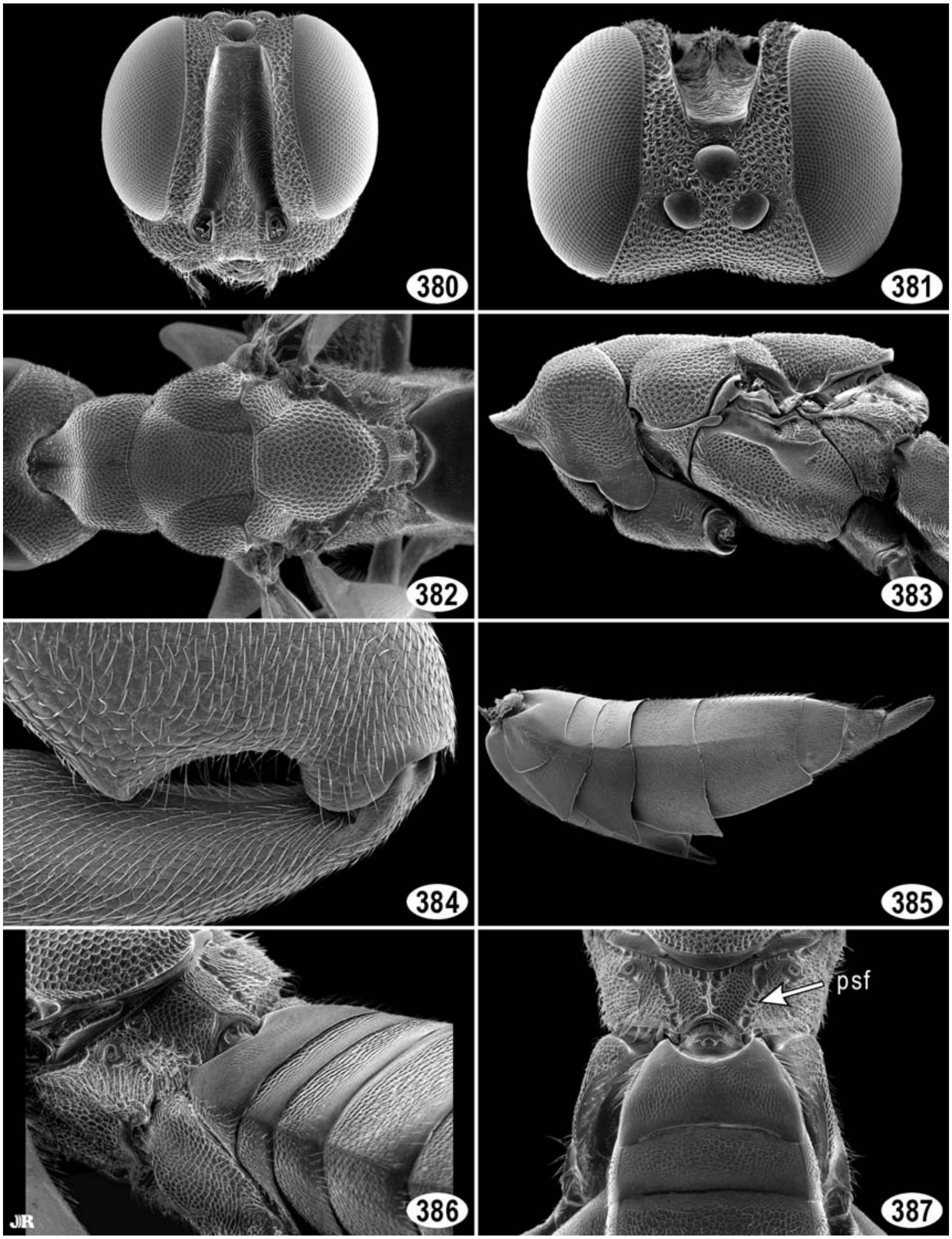
Figs 356–363. LYCISCINI, *Hadroepistenia*. 356 and 357, *H. glabra,* head: **356**, frontolateral (%); **357**, posterolateral (&). **358 and 359**, *H. erwini* (&): **358**, mesosoma, dorsal; **359**, apex of scutellum to base of Gt_3, dorsal. **360 and 361**, *H. glabra* (&): **360**, mesosoma, dorsal; **361**, apex of scutellum to base of Gt_3, dorsal. **362 and 363**, *H. glabra* (%): **362**, head and anterior of mesosoma, lateral; **363**, apex of scutellum to Gt_1.



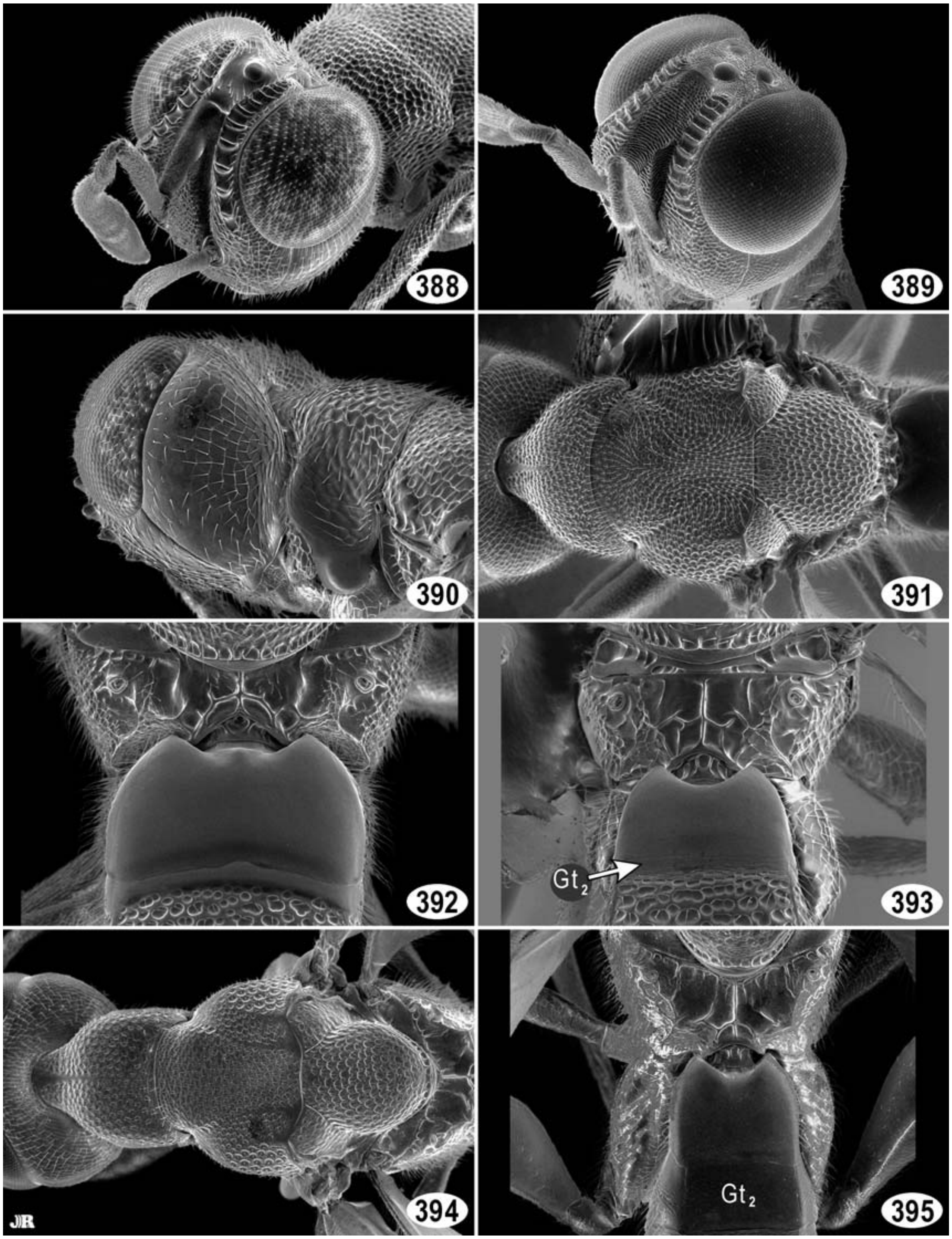
Figs 364–371. Lyciscini, *Hedqvistia*. 364–367, *Hedqvistia* n. sp. #2 (&): **364**, head, frontal; **365**, head, dorsal; **366**, mesosoma, dorsal; **367**, head and anterior of mesosoma, lateral. **368–370**, *Hedqvistia reticulata* (&): **368**, mesosoma, dorsal; **369**, posterior half of mesosoma to Gt_2, lateral; **370**, apex of scutellum to Gt_2, dorsal. **371**, *Hedqvistia* n. sp. #2 (&): gaster, dorsal.



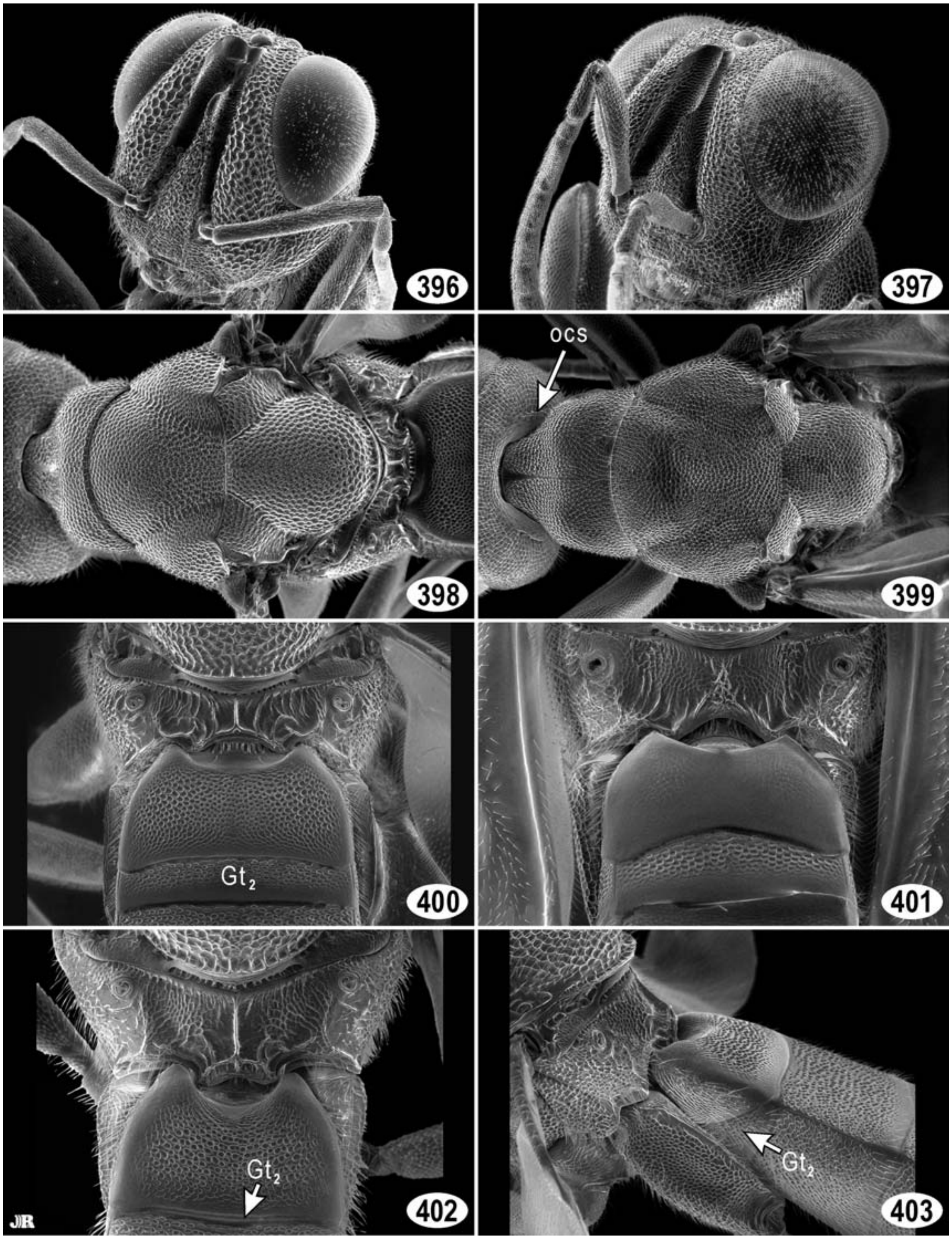
Figs 372–379. **LYCISCINI**, ***Lycisca*****.** **372 and 373**, *L. ogloblina* (&), head: **372**, frontal; **373**, dorsofrontal. **374**, *Lycisca* n. sp. #3 (&): head and mesosoma, dorsal. **375**, *L. ogloblina* (&), apex of profemur and base of protibia, inner surface. **376 and 377**, *L. amazonica*, apex of scutellum to Gt_3, dorsolateral: **376**, &; **377**, %. **378 and 379**, apex of scutellum to Gt_2, dorsolateral: **378**, *Lycisca* n. sp. #3 (&); **379**, *L. maculipes* (%).



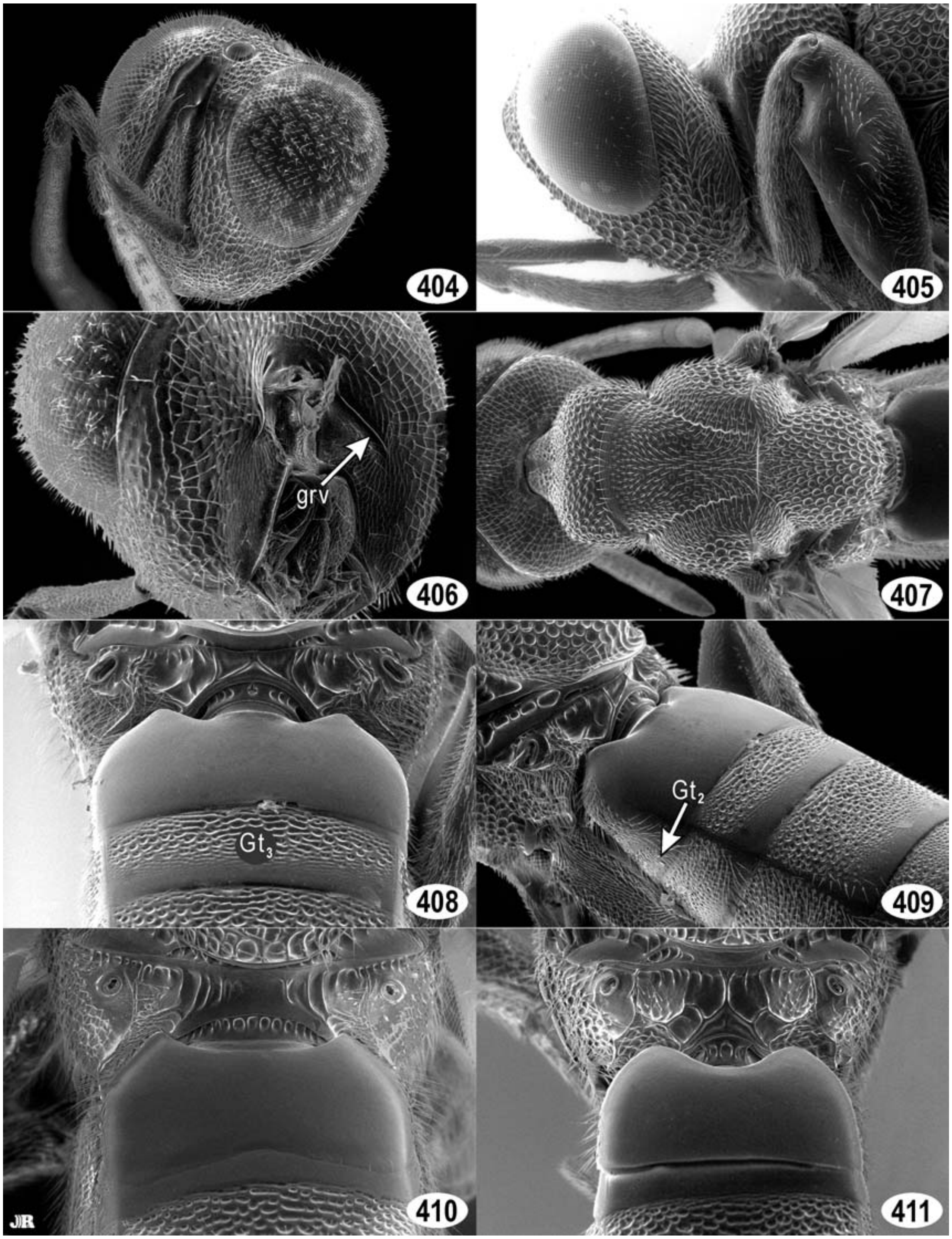
Figs 380–387. LYCISCINI, *Neoepistenia*. 380–386, *N. flavoscapus* (&): **380**, head, frontal; **381**, head, dorsal; **382**, mesosoma, dorsal; **383**, mesosoma, lateral; **384**, apex of profemur and base of protibia, outer surface; **385**, gaster, dorsolateral; **386**, apex of scutellum to Gt_4, posterodorsal. **387**, *Neoepistenia* n. sp. #1 (&): apex of scutellum to Gt_3, posterodorsal.



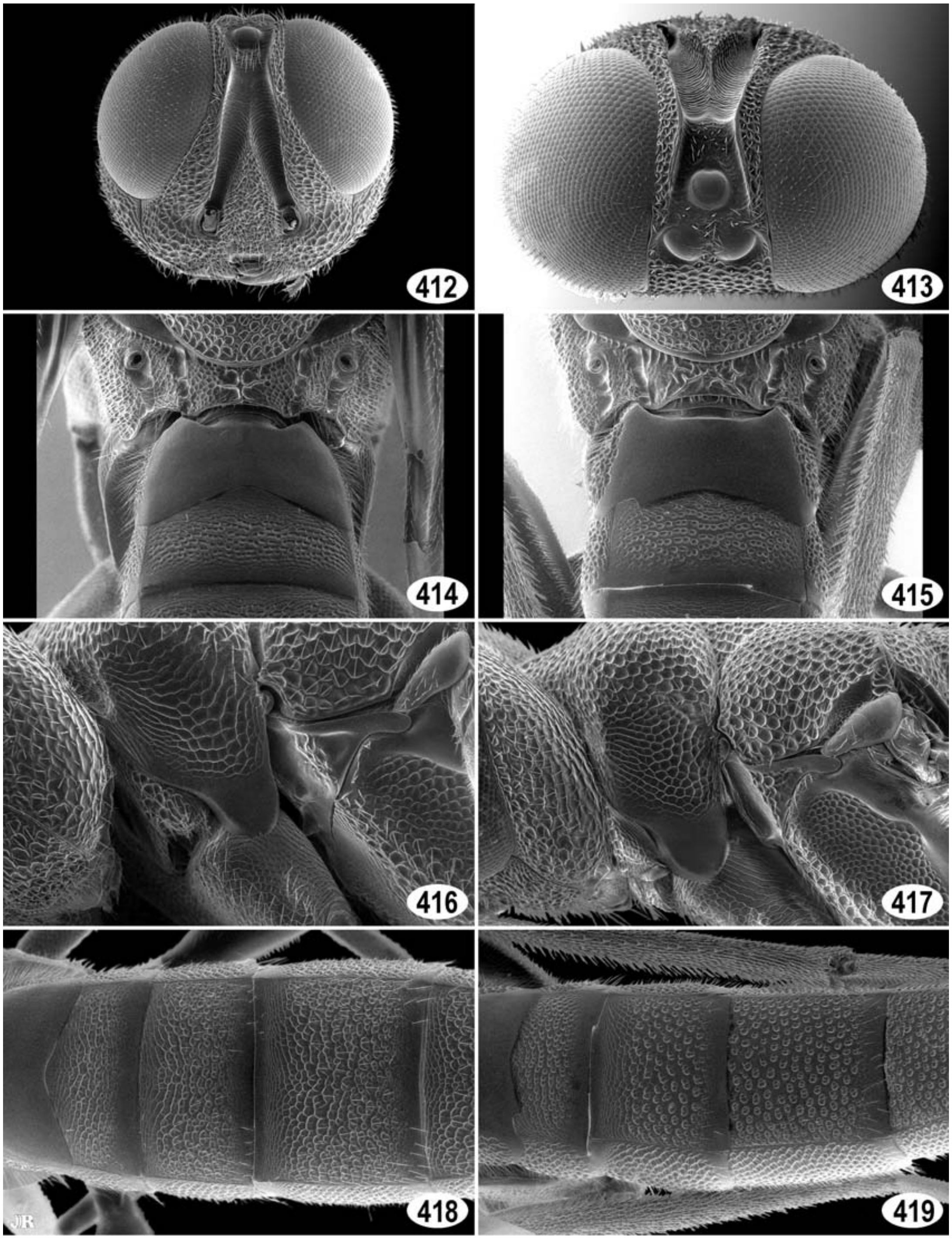
Figs 388–395. LYCISCINI, *Paralycisca*. 388–390, head: **388**, *P. cristata* (&), frontolateral; **389**, *Paralycisca* n. sp. #1 (%), frontolateral; **390**, *P. cristata* (%), posterolateral. **391–393**, *P. cristata*: **391**, mesosoma (&), dorsal; **392**, apex of scutellum to base of Gt_3 (&), dorsal; **393**, apex of scutellum to base of Gt_3 (%), dorsal. **394 and 395**, *Paralycisca* n. sp. #1 (%): **394**, mesosoma, dorsal; **395**, apex of scutellum to base of Gt_3, dorsal.



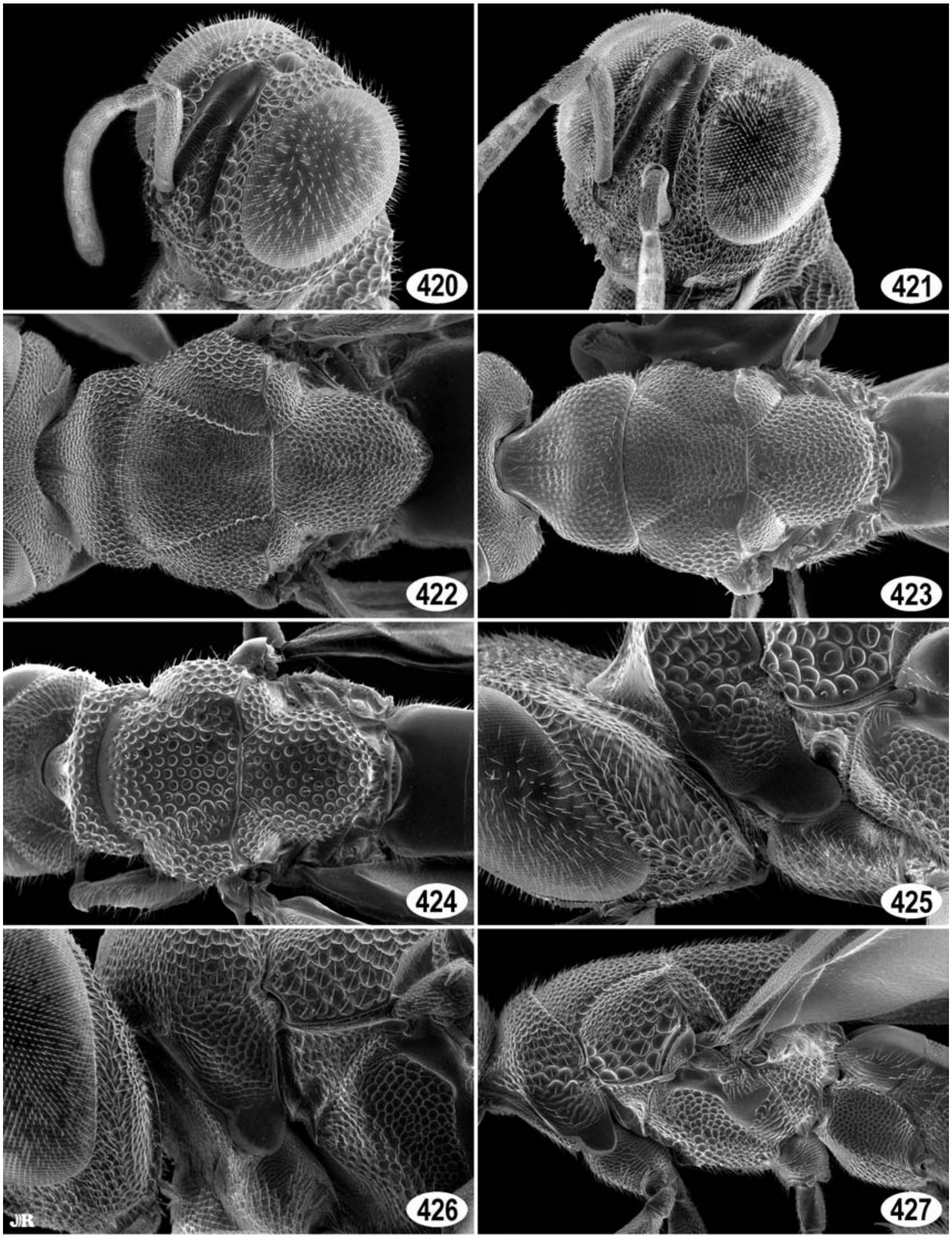
Figs 396–403. LYCISCINI, *Proglochin*. 396 and 397, head, frontolateral (&): **396**, *P. maculipennis*; **397**, *Proglochin* n. sp. #2. **398 and 399**, mesosoma (&), dorsal: **398**, *Proglochin* n. sp. #4; **399**, *Proglochin* n. sp. #2. **400 and 401**, apex of scutellum to base of Gt_3 (&), dorsal: **400**, *Proglochin* n. sp. #4; **401**, *Proglochin* n. sp. #2. **402 and 403**, *P. maculata* (%): **402**, apex of scutellum to base of Gt_3, dorsal; **403**, posterior of mesosoma to Gt_3, lateral.



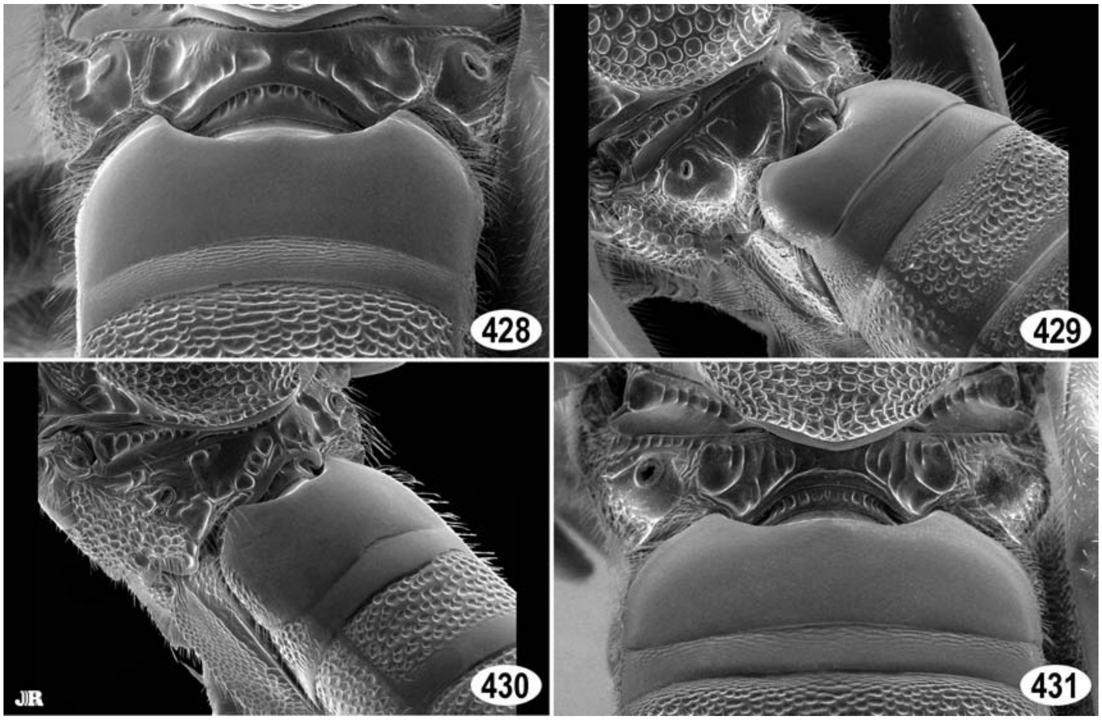
Figs 404–411. LYCISCINI, *Protoepistenia*. 404, *Protoepistenia* n. sp. #6 (&): head, frontodorsal. **405**, *Protoepistenia* n. sp. #4 (&): head and foreleg, lateral. **406**, *Protoepistenia* n. sp. #6 (&): head, posterolateral. **407**, *Protoepistenia* n. sp. #1 (&): posterior of head and mesosoma, dorsal. **408 and 409**, *Protoepistenia* n. sp. #4 (&): **408**, apex of scutellum to base of Gt$_4$, dorsal; **409**, apex of scutellum to base of Gt$_5$. **410 and 411**, apex of scutellum to base of Gt$_3$, dorsal: **410**, *Protoepistenia* n. sp. #1 (&); **411**, *P. ?melanocara* (%).



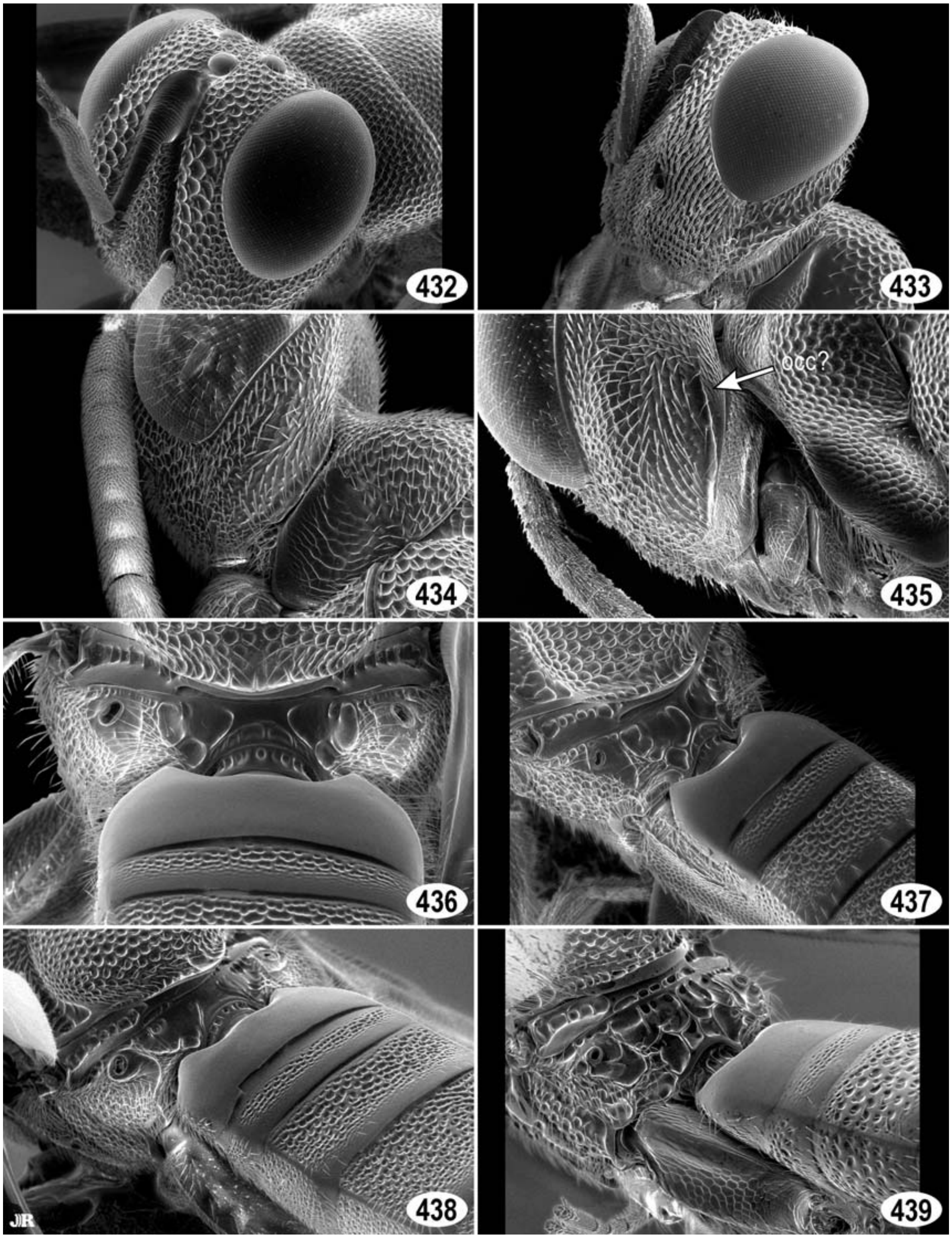
Figs 412–419. LYCISCINI, *Romanisca*. 412 and 413, *R. annulicornis* (&), head: **412**, frontal; **413**, dorsal. **414 and 415**, apex of scutellum to base of Gt$_3$ (&), dorsal: **414**, *R. annulicornis*; **415**, *Romanisca* n. sp. #1. **416 and 417**, head and anterior of mesosoma, lateral: **416**, *Romanisca* n. sp. #1 (%); **417**, *R. annulicornis* (&). **418 and 419**, gaster, apex of Gt$_1$ to base of Gt$_5$ (&), dorsal: **418**, *R. annulicornis*; **419**, *Romanisca* n. sp. #1.



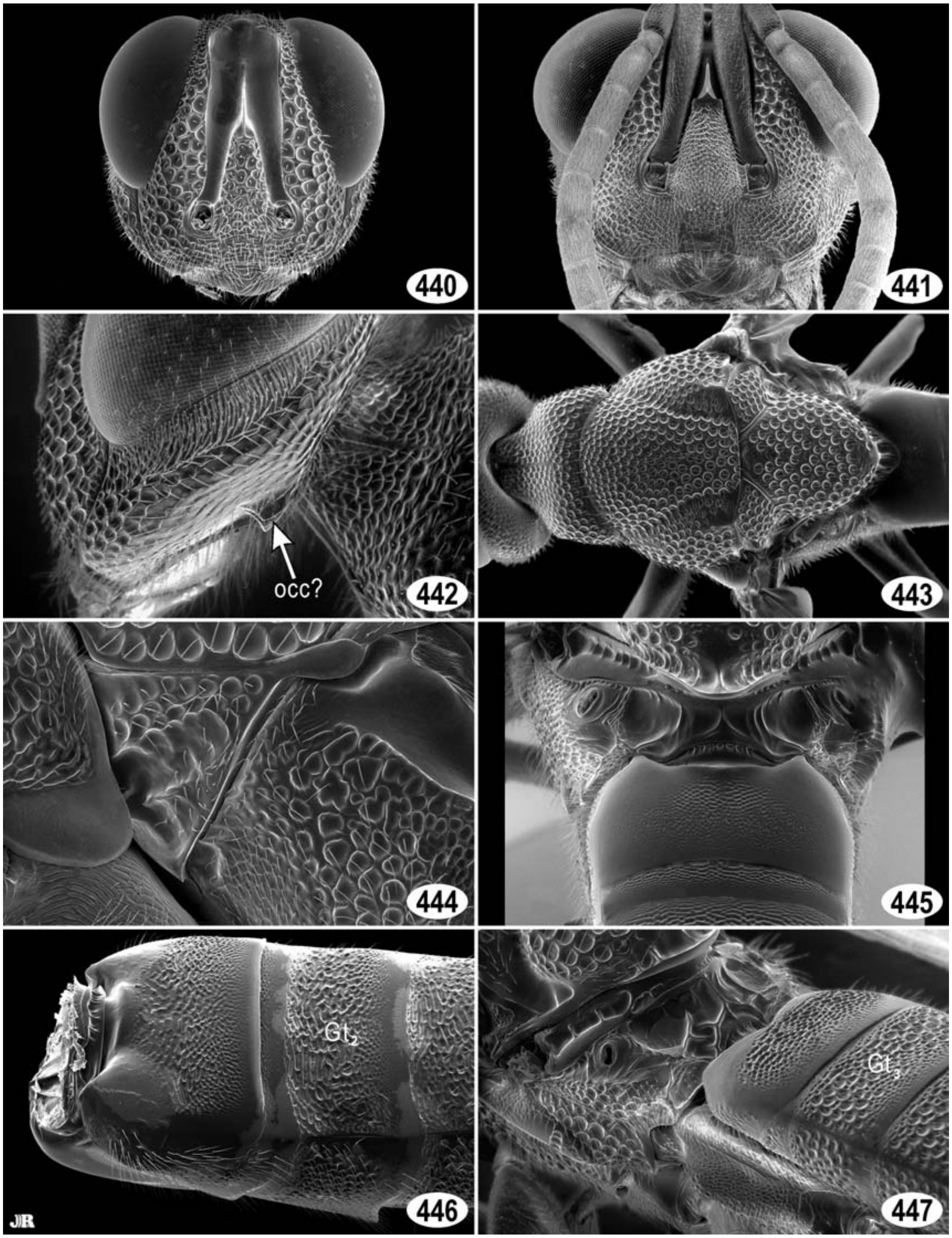
Figs 420–427. Lyciscini, *Scaphepistenia* and *Shedoepistenia*. 420 and 421, head (&), frontolateral: **420**, *Scaphepistenia scutata*; **421**, *S. quadriplagiata*. **422–424**, posterior of head and mesosoma (&), dorsal: **422**, *S. quadriplagiata*; **423**, *Scaphepistenia* n. sp. #1; **424**, *S. scutata*. **425 and 426**, head and prepectus (&), lateral: **425**, *S. scutata*; **426**, *S. quadriplagiata* (&). **427**, *Shedoepistenia* M#2 (%): mesosoma and base of gaster, lateral.



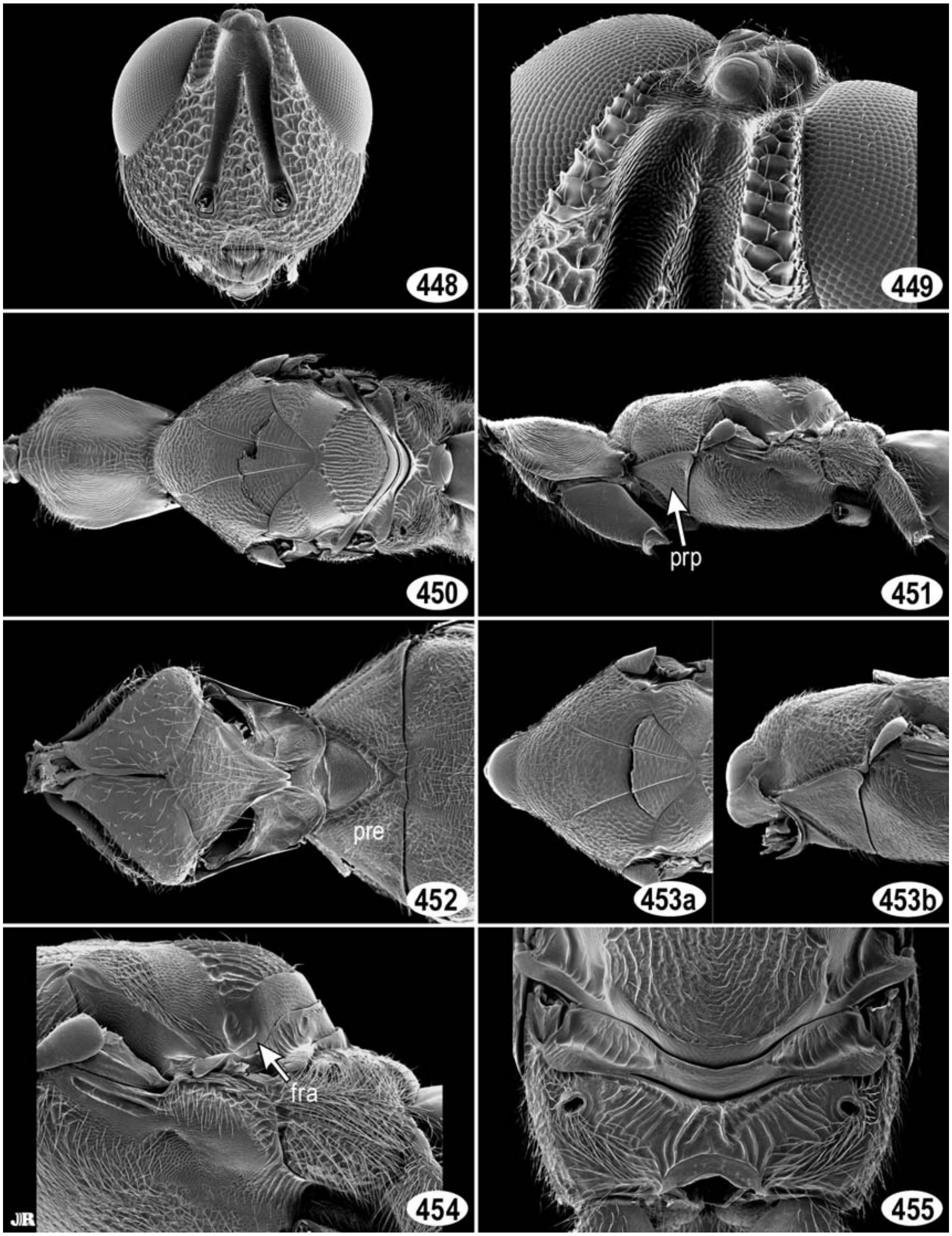
Figs 428–431. LYCISCINI, *Scaphepistenia*. 428–431, apex of scutellum to Gt_3: **428**, *S. scutata* (&), dorsal; **429**, *S. scutata* (%), posterodorsal; **430**, *Scaphepistenia* n. sp. #1 (&), posterodorsal; **431**, *S. quadriplagiata* (&), dorsal.



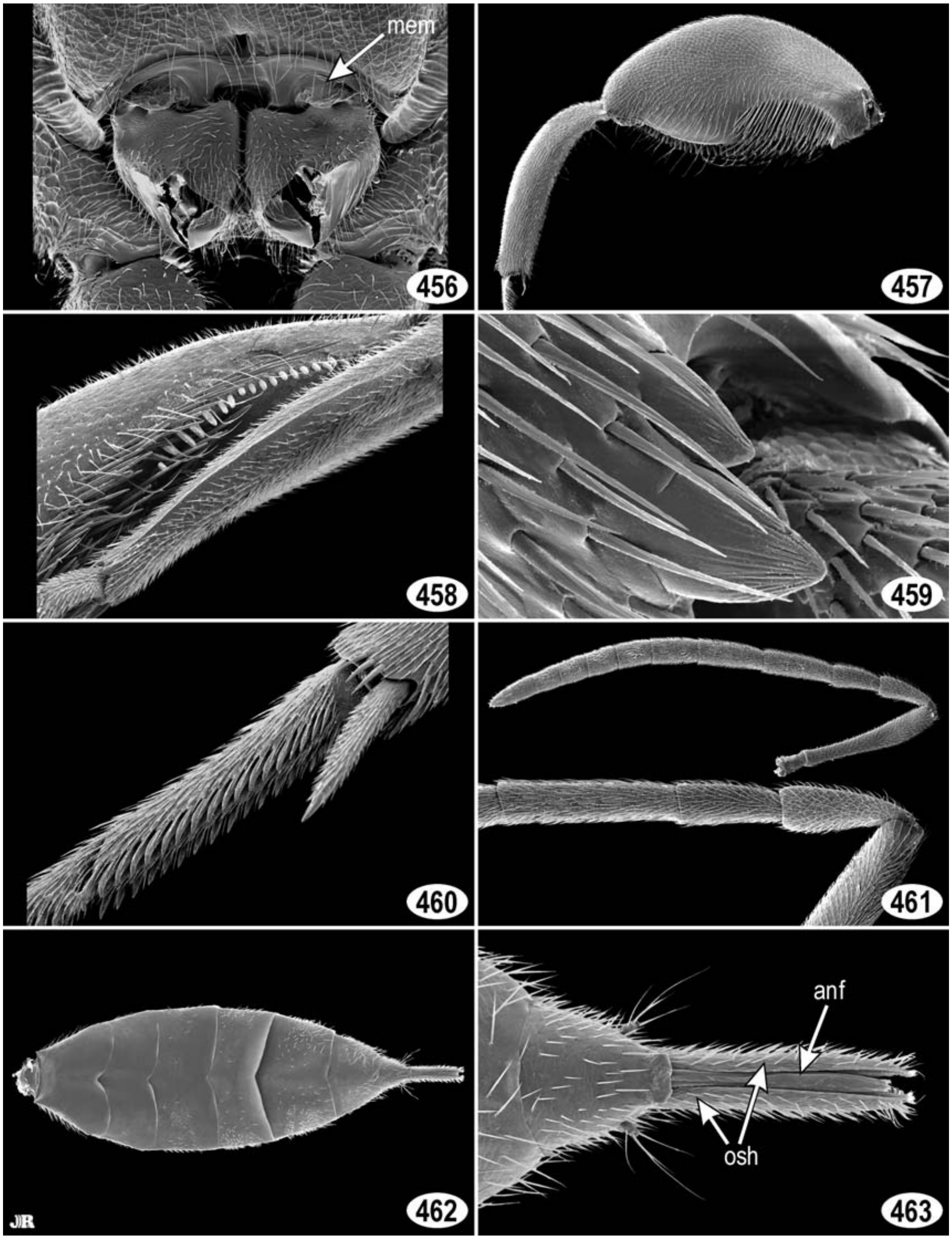
Figs 432–439. LYCISCINI, *Shedoepistenia*. 432–434, head: **432**, *Shedoepistenia* n. sp. #6 (&), frontolateral; **433**, *Shedoepistenia* sp. M#7 (%), lateral; **434**, *S. noyesi* (%). **435**, *Shedoepistenia* n. sp. #9 (&): gena, posterolateral. **436–439**, apex of scutellum to base of gaster: **436**, *S. noyesi* (&), dorsal; **437**, *S. noyesi* (%), posterolateral; **438**, *Shedoepistenia* n. sp. #6 (&), posterolateral; **439**, *Shedoepistenia* sp. M#4 (%), posterolateral.



Figs 440–447. LYCISCINI, *Urolycisca*. 440 and 441, head (&), frontal: **440**, *U. balteata*; **441**, *U. apicalis*. **442**, *Urolycisca* sp. M#1 (%): gena, lateral. **443**, *U. apicalis* (&): mesosoma, dorsal. **444**, *U. balteata* (&): prepectus. **445**, *U. apicalis* (&): apex of scutellum to base of Gt$_3$. **446 and 447**, *U. balteata*: **446**, gaster (&), Gt$_1$ to base of Gt$_3$, dorsolateral; **447**, apex of scutellum to base of Gt$_4$ (%), posterodorsal.



Figs 448–455. OODERINI, *Oodera* sp. (&) from North America: 448, head, frontal; **449**, sculpture of scrobal depression and parascrobal region; **450**, mesosoma, dorsal; **451**, mesosoma, lateral; **452**, prothorax (procoxae removed) and prepectus, ventral; **453**, anterior half of mesosoma with prothorax removed: ***a***, dorsal, ***b***, lateral; **454**, posterior of mesosoma, lateral; **455**, apex of scutellum to propodeum, dorsal.



Figs 456–463. OODERINI, *Oodera* sp. (&) from North America: 456, mesocoxal articulation, ventral; **457**, profemur and tibia, inner surface; **458**, ventral view of profemur and dorsal view of protibia; **459**, apex of profemur with two dorsoapical spicules; **460**, apex of mesotibia and basal tarsal segment; **461**, antenna (top) and pedicel to extreme base of fl$_3$; **462**, gaster, dorsal; **463**, syntergum and anal filament between ovipositor sheaths, dorsal.

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The text is indexed comprehensively for species and species-group names, but higher taxon names are indexed only for relevant keys and the primary taxon entries. Valid species and generic names are in *italics*; page location of a name in a key is in **bold**, whereas page location of a key to genera or species is underlined. Species names are cited only under their currently accepted combination.

Catalog of World Cleonyminae

Gary A.P. Gibson

This catalog is compiled from "Gibson, G.A.P. 2003. Phylogenetics and Classification of Cleonyminae (Hymenoptera: Chalcidoidea: Pteromalidae). *Memoirs on Entomology International* 16, i-v + 339 pp." The document represents a synopsis of the nomenclatural and distributional information given in the Memoir and is not to be regarded as published for the purposes of zoological nomenclature.

April 1, 2003

BOUCEKIINI

Boucekius Gibson

Boucekius Gibson, 2003: 62–63. Type species: *Boucekius primevus* Gibson; by original designation.

primevus Gibson, 2003: 63–64; ♀ holotype (USNM). DISTRIBUTION: Guyana.

Chalcidiscelis Ashmead

Chalcidiscelis Ashmead, 1899: 201. Type species: *Chalcidiscelis koebelei* Ashmead; by original designation and monotypy.

koebelei Ashmead, 1899: 201; ♀ lectotype (USNM: 25517). DISTRIBUTION: Australia (NSW).

CHALCEDECTINI

Agrilocida Steffan

Agrilocida Steffan, 1964: 104–105. Type species: *Agrilocida ferrierei* Steffan; by original designation.

Chalcedectoides Hedqvist, 1967*b*: 182. Type species: *Chalcedectoides saharensis* Hedqvist; by original designation. Synonymy by Bouček (1976*b*: 348).

ferrierei Steffan, 1964: 105–106; ♂ holotype (MHNG). DISTRIBUTION: Algeria, France, Israel.

= *Chalcedectoides saharensis* Hedqvist, 1967*b*: 182–184; ♀ holotype (MHNG). Synonymy by Bouček (1976*b*: 348).

Chalcedectus Walker

Chalcedectus Walker, 1852: 47. Type species: *Chalcedectus maculicornis* Walker; by monotypy.

Polychroma Westwood, 1874: 140. Type species: *Polychroma histrionica* Westwood; subsequent designation by Gahan and Fagan (1923: 117); preoccupied by *Polychroma* Dejean (1833), discovered by Dalla Torre (1897: 88). Synonymy with *Chalcedectus* by Ashmead (1899: 201); synonymy with *Amotura* by Bouček (1988*a*: 265); synonymy reestablished by Gibson (2003: 71).

Amotura Cameron, 1884: 130–131. Type species: *Amotura annulicornis* Cameron; by monotypy. Synonymy by Gibson (2003: 71).

Polychromatium Dalla Torre, 1897: 88. Replacement name for *Polychroma* Westwood. Synonymy with *Chalcedectus* by Ashmead (1899: 201); synonymy with *Amotura* by Bouček (1988*a*: 265); synonymy reestablished by Gibson (2003: 71).

Chalcodectus Dalla Torre, 1898: 186. Unjustified emendation.

Chalcodectes Ashmead, 1899: 201. Unjustified emendation.

Episystole Girault, 1927[416]: 317. Type species: *Episystole poeta* Girault; by original designation. Synonymy with *Chalcedectus* by Bouček (1959: 485); synonymy with *Amotura* by Bouček (1988*a*: 265); synonymy reestablished by Gibson (2003: 71).

Neochalcodectus Masi, 1936: 68. Type species: *Neochalcodectus sinaiticus* Masi; by monotypy. Synonymy with *Chalcedectus* by Bouček (1959: 485); synonymy with *Amotura* by Bouček (1988*a*: 265); synonymy reestablished by Gibson (2003: 71).

Dryadochalcis De Santis, 1970: 25. Type species: *Chalcedectes* (!) *texanus* Brues; by original designation. Synonymy by Gibson (2003: 71).

annulicornis (Cameron). *Amotura annulicornis* Cameron, 1884: 131–132; ♀ type (BMNH: 5.890). Combination by Gibson (2003: 71). DISTRIBUTION: Nicaragua.

annulipes (Ashmead). *Chalcedectes* (!) *annulipes* Ashmead, 1904: 483; ♀ holotype (USNM: 60521). *Chalcedectus annulipes* (Bouček 1959: 485), *Amotura annulipes* (Grissell 1991: 14); combination reestablished by Gibson (2003: 71). DISTRIBUTION: Argentina, Brazil.

balachowskyi Steffan, 1968: 210–212; ♀ holotype (MHNG). DISTRIBUTION: Iran.

busckii (Ashmead). *Euchrysia Busckii* Ashmead, 1900*a*: 256; ♀ syntypes (USNM: 6428). *Amotura busckii* (Grissell 1991: 14), *Chalcedectus busckii* (Gibson 2003: 71). DISTRIBUTION: Puerto Rico.

caelatus (Grissell). *Amotura caelata* Grissell, 1991: 11–14; ♀ holotype (USNM). Combination by Gibson (2003: 71). DISTRIBUTION: Mexico, USA.

cuprescens (Westwood). *Polychroma cuprescens* Westwood, 1874: 142; ♀ labelled as lectotype (OXUM: T. 665). *Polychromatium cuprescens* (Dalla Torre 1898: 186), *Chalcodectus* (!) *cuprescens* (Schmiedeknecht 1909: 151), *Chalcedectus cuprescens* (Bouček 1959: 485), *Amotura cuprescens* (Bouček 1988*a*: 265); combination reestablished by Gibson (2003: 71). DISTRIBUTION: Australia, New Caledonia.

guaraniticus (Strand). *Polychromatium 16-dentatum* var. *guaraniticum* Strand, 1911*c*: 95; ♀ holotype (ZMHB). *Chalcedectus guaraniticus* (Bouček 1959: 486), *Amotura guaranitica* (Grissell 1991: 14); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Paraguay.

histrionicus (Westwood). *Polychroma histrionica* Westwood, 1874: 141; ♀ labelled as lectotype (OXUM: T. 661). *Polychromatium histrionicum* (Dalla Torre 1898: 186), *Chalcedectes* (!) *histrionica* (Ashmead 1904: 483), *Amotura histrionica* (Grissell 1991: 14); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Brazil.

hyalinipennis (Ashmead). *Euchrysia hyalinipennis* Ashmead, 1896*a*: 231; ♀ holotype (USNM: 3334). *Amotura hyalinipennis* (Grissell 1991: 7), *Chalcedectus hyalinipennis* (Gibson 2003: 72). DISTRIBUTION: Canada, Mexico, USA.

= *Euchrysia similis* Girault, 1917[314]: 15; ♀ holotype (USNM: 20464). Synonymy by Grissell (1991: 7).

lanei De Santis, 1970: 22–25; ♀ holotype (MLPA). *Amotura lanei* (Grissell 1991: 14); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Brazil.

maculicornis Walker, 1852: 47; ♀ type (BMNH: 5.889). DISTRIBUTION: Brazil, Guyana, Peru, Venezuela.

maculipennis (Ashmead). *Euchrysia maculipennis* Ashmead, 1896*a*: 232; ♂ lectotype (USNM: 3335) designated by Grissell (1991: 10). *Amotura maculipennis* (Grissell 1991: 10), *Chalcedectus maculipennis* (Gibson 2003: 72). DISTRIBUTION: USA.

meteorus (Girault). *Episystole meteora* Girault, 1927[416]: 317. *Chalcedectus meteorus* (Bouček 1959: 485), *Amotura meteorus* (Bouček 1988*a*: 265, stated as “probably just a form of *cuprescens*”); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Australia (QLD).

poeta (Girault). *Episystole poeta* Girault, 1927[416]. *Chalcedectus poeta* (Bouček 1959: 486), *Amotura poeta* (Bouček 1988*a*: 265, stated as “probably the same as *cuprescens*”); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Australia (QLD).

regalis (Westwood). *Polychroma regalis* Westwood, 1874: 141; 2♀ syntypes, one labelled as lectotype (OXUM: T. 662). *Polychromatium regale* (Dalla Torre 1898: 186), *Chalcedectes* (!) *regalis* (Westwood) (Ashmead, 1904: 483), *Chalcedectus regalis* (Bouček 1959: 486), *Amotura regalis* (Grissell 1991: 14); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Brazil.

sedecimdentatus (Westwood). *Polychroma 16-dentata* Westwood, 1874: 141; ♀ labelled as lectotype (OXUM: T. 663). *Polychromatium sedecimdentatum* (Dalla Torre 1898: 186), *Chalcedectes* (!) *sedecimdentatus* (Ashmead 1904: 483), *Chalcedectus sedecimdentatus* (Bouček 1959: 486), *Amotura sedecimdentatum* (Grissell 1991: 14); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Brazil.

septemdentatus (Westwood). *Polychroma 7-dentata* Westwood, 1874: 142; ♀ labelled as lectotype (OXUM: T. 664). *Polychromatium septemdentatum* (Dalla Torre 1898: 186), *Chalcedectes* (!) *sedecimdentatus* (Ashmead 1904: 483), *Chalcedectus sedecimdentatus* (Bouček 1959: 486), *Amotura sedecimdentatus* (Grissell 1991: 14); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Brazil.

? = *Chalcedectus 7-dentatus* var. *pallidipes* Roman, 1920: 12; ♀ holotype (NHRS) (not found, B. Viklund, pers. comm.). Provisional synonymy by Bouček (1959: 486).

sinaiticus (Masi). *Neochalcodectus sinaiticus* Masi, 1936: 68; 1♀, 1♂ syntypes (MCSN). Combination by Bouček (1959: 485). DISTRIBUTION: Algeria, Israel.

= *Chalcedectus niger* Hedqvist, 1967*b*: 180–182; ♀ holotype (MHNG). Synonymy by Steffan (1968: 209).

superbus (De Santis). *Dryadochalcis superba* De Santis, 1977: 26; ♀ holotype (MACN). *Dryadochalcis texanus* De Santis (1970: 26) *nec* Brues, misidentification. Combination by Gibson (2003: 72). DISTRIBUTION: Brazil, Paraguay.

texanus (Brues). *Chalcedectes* (!) *texanus* Brues, 1907*b*: 106–107; ♀ holotype (USNM: 42714). *Chalcedectus texanus* (Peck 1951: 584), *Dryadochalcis texana* (De Santis 1970: 25, 1977: 26); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Costa Rica, Nicaragua, USA.

CLEONYMINI

Callocleonymus Masi

Callocleonymus Masi, 1940: 289–290. Type species: *Callocleonymus pulcher* Masi; by original designation.

beijingensis Yang, 1996: 76–77, 307; ♀ holotype (NWCF). DISTRIBUTION: China (Beijing).

bimaculae Yang, 1996: 77–78, 307; ♀ holotype (NWCF). DISTRIBUTION: China (Beijing, Shaanxi).

chuxiongensis Yang, 1996: 79, 307; ♀ holotype (NWCF). DISTRIBUTION: China (Yunnan).

ferrierei Kerrich, 1957: 270–272; ♀ holotype (BMNH: 5.2126). DISTRIBUTION: China, Papua New Guinea?.

ianthinus Yang, 1996: 72–75, 306–307; ♀ holotype (NWCF). DISTRIBUTION: China (Beijing, Shaanxi).

pulcher Masi, 1940: 291–294; 3♀ syntypes (DEZA). DISTRIBUTION: Somalia, Turkmenistan.

swezeyi (Yoshimoto and Ishii). *Ptinobius swezeyi* Yoshimoto and Ishii, 1965: 177–178; ♀ holotype (BPBM: 3618). Combination by Bouček (1988*a*: 263). DISTRIBUTION: Australia (QLD), Guam, Micronesia.

xinjiangensis Yang, 1996: 75–76, 307; ♀ holotype (NWCF). DISTRIBUTION: China (Xinjiang).

Cleonymus Latreille

Cleonymus Latreille, 1809: 29. Type species: *Diplolepis depressa* Fabricius; subsequently designated by Latreille (1810: 436).

Ptinobius Ashmead, 1896*b*: 11. Type species: *Charitopus magnificus* Ashmead; by original designation. Synonymy by Bouček (1988*a*: 263).

Aplatygerrhus Girault, 1913[175]: 77–78. Type species: *Aplatygerrhus magnificus* Girault; by original designation. Synonymy by Bouček (1988*a*: 263).

Systolomorphella Girault, 1915[240]: 222. Type species: *Systolomorphella trifasciatipennis* Girault; by original designation. Synonymy by Bouček (1988*a*: 460).

Megormyrus Cockerell, 1926: 36–37. Type species: *Megormyrus amabilis* Cockerell; by monotypy. Synonymy with *Ptinobius* by Burks (1958: 74); synonymy with *Cleonymus* by implication through transfer of type species by Heydon and Bouček (1992: 472).

Paracleonymus Masi, 1927: 340. Type species: *Paracleonymus angustatus* Masi; by monotypy. Synonymy by Kamijo (1996: 746).

Beharella Risbec, 1952: 361. Type species: *Beharella viridicyanea* Risbec; by monotypy. Synonymy by Bouček (1976*a*: 10).

agrili (Rohwer). *Ptinobius agrili* Rohwer, 1919: 5–6; ♀ holotype (USNM: 21994). Combination by Heydon and Bouček (1992: 472). DISTRIBUTION: USA (CA).

albomaculatus Hedqvist, 1960: 415; ♀ holotype (MZLU). DISTRIBUTION: South Africa.

amabilis (Cockerell). *Megormyrus amabilis* Cockerell, 1926: 37–38; ♀ holotype (MCZC: 15668). Combination by Heydon and Bouček (1992: 472). DISTRIBUTION: USA (CO).

angustatus (Masi). *Paracleonymus angustatus* Masi, 1927: 340–343; ♀ holotype (DEIC). Combination by Kamijo (1996: 756). DISTRIBUTION: Japan (Ryukyu Islands), Taiwan.

apicalis Förster, 1841: 34; (NMWA?). DISTRIBUTION: Germany.

balcanicus Bouček, 1972: 270–271; ♀ holotype (HNHM). DISTRIBUTION: Bulgaria, Greece.

brevis Bouček, 1972: 272–273; ♀ holotype (BMNH: 5.2174). DISTRIBUTION: Croatia, France, Greece, Italy, Slovakia.

californicus (Crawford). *Ptinobius californicus* Crawford, 1916: 142; ♀ holotype (USNM: 20820). Combination by Heydon and Bouček (1992: 472). DISTRIBUTION: USA (CA).

californicus Girault, 1917[310]: 11–12; ♀ holotype (USNM: 20348). Preoccupied by *C. californicus* (Crawford 1916). DISTRIBUTION: USA (CA).

canariensis Hedqvist, 1983: 129–130; ♀ holotype (NHRS). DISTRIBUTION: Canary Islands.

ceratinae Kamijo, 1996: 750–751; ♀ holotype (EIHU). DISTRIBUTION: Japan.

collaris Spinola, 1851: 46; ♀ holotype (MRSN). DISTRIBUTION: Brazil.

cyaneus Förster, 1841: 34; (NMWA?). DISTRIBUTION: Germany.

dendatifemur (Girault). *Aplatygerrhus dendatifemur* Girault, 1926[399]: 60. Combination by Bouček (1988*a*: 263). DISTRIBUTION: Australia (TAS).

elongatus Förster, 1841: 33; ♀ (NMWA?). DISTRIBUTION: Germany.

eximius Förster, 1841: 33; ♀, ♂ (NMWA?). DISTRIBUTION: Germany.

laticinctus (Girault). *Systolomorphella laticincta* Girault, 1926[399]: 59. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (NSW).

laticornis Walker, 1837: 351; ♂ holotype (NMID). DISTRIBUTION: China, Europe (Noyes 1998).

= *Ichneumon depressus* Fabricius, 1798: 231; ♀ (MNHN); primary homonym of *I. depressus* Gmelin *in* Linnaeus (1790: 2687, 2706), discovered by Graham (1969: 38). Transferred to *Cleonymus* by Westwood (1828: 16). Synonymy by Kerrich and Graham (1957: 268).

? = *Cleonymus obscurus* Walker, 1837: 352; ♂ lectotype (BMNH: 5.1627) designated by Kerrich and Graham (1957: 270). Tentative synonymy by Bouček (1972: 273). DISTRIBUTION: Europe (Noyes 1998).

= *Cleonymus thomsoni* Erdös, 1957: 361, replacement name for *Cleonymus depressus* Thomson 1878: 5–6 (♀ holotype, MZLU), preoccupied by *C. depressus* (Fabricius 1798). Synonymy by Kerrich and Graham (1957: 269).

longinervus Kamijo, 1983: 298–300; ♀ holotype (EIHU). DISTRIBUTION: Japan, Korea.

magnificus (Ashmead). *Charitopus magnificus* Ashmead, 1888*a*: iv; ♀ holotype (USNM: 27278). *Ptinobius magnificus* (Ashmead 1896*b*: 11), *Cleonymus magnificus* (Bouček 1988*a*: 264). DISTRIBUTION: Canada, USA.

= *Ptinobius dysphagae* Girault, 1915[236]: 130; ♂ holotype (USNM: 61836). Synonymy by Peck (1951: 567).

magnus Bouček, 1988*a*: 264. Replacement name and combination for *Aplatygerrhus magnificus* Girault, 1913[175]: 77 (♀ holotype, SAMA), preoccupied by *C. magnificus* (Ashmead, 1888*a*). DISTRIBUTION: Australia (TAS).

malaicus Narendran and Mini, 1997: 9–11; ♀ holotype (DZUC). DISTRIBUTION: Malaysia.

nigriclavus Girault, 1917[317]: 6–7; ♀ (USNM: 21400; lost, label in type collection reads "missing, March 1968, det. Burks"). DISTRIBUTION: USA(FL).

pentlandi (Girault). *Systolomorphella pentlandi* Girault, 1922[365]: 149–150. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

pini Yang, 1996: 80–83, 307–308; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

regalis (Dodd). *Aplatygerrhus regalis* Dodd, 1924: 164; ♀ holotype (SAMA). Combination by Bouček (1988*a*: 264). DISTRIBUTION: Solomon Islands.

reticulatus (Howard). *Eupelmus reticulatus* Howard, 1897: 146; ♂ syntype (USNM: 6547), ♂ syntype (BMNH: 5.1003). Combination by Gibson (2003: 87). DISTRIBUTION: Grenada.

rufiscapus (Girault). *Aplatygerrhus rufiscapus* Girault, 1925[381]: 3. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

ryukyuensis Kamijo, 1996: 748–750; ♀ holotype (EIHU). DISTRIBUTION: Japan (Ryukyu Islands).

serrulatus Kamijo, 1996: 752–754; ♀ holotype (EIHU). DISTRIBUTION: Japan.

silvifilia (Girault). *Systolomorphella silvifilia* Girault, 1927[416]: 316. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (TAS).

texanus (Crawford). *Ptinobius texanus* Crawford, 1916: 142–144; ♀ holotype (USNM: 20821). Combination by Heydon and Bouček (1992: 472). DISTRIBUTION: Argentina, Brazil, USA (TX).

togashii Kamijo, 1996: 748; ♀ holotype (EIHU). DISTRIBUTION: Japan.

trifasciatipennis (Girault). *Systolomorphella trifasciatipennis* Girault, 1915[240]: 222. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

***ulmi* Yang**, 1996: 83, 308; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

unfasciatipennis (Dodd and Girault). *Systolomorphella unfasciatipennis* Dodd and Girault *in* Girault, 1915[240]: 223. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

viridicyaneus (Risbec). *Beharella viridicyanea* Risbec, 1952: 361–363; ♀ holotype (MNHN). Combination by Bouček (1976*a*: 10). DISTRIBUTION: Madagascar.

viridinitens Förster, 1841: 33; ♀ (NMWA?). DISTRIBUTION: Germany.

Dasycleonymus Gibson

Dasycleonymus Gibson, 2003: 89–90. Type species: *Dasycleonymus bakeri* Gibson; by original designation.

bakeri Gibson, 2003: 91–92; ♀ holotype (BMNH). DISTRIBUTION: Indonesia (Kalimantan, Sumatra), Malaysia (Sarawak).

Notanisus Walker

Notanisus Walker, 1837: 352. Type species: *Notanisus versicolor* Walker; by monotypy.

Pannonica Erdös, 1946: 131; primary homonym of *Pannonica* Loerenthey (1895). Type species: *Pannonica sexramosa* Erdös; by original designation. Synonymy by Bouček (1991: 204).

Antsingia Risbec, 1952: 372. Type species: *Antsingia sylvatica* Risbec; by monotypy. Synonymy by Rasplus *in* Bouček (1991: 204).

Pannoniella Erdös, 1960: 306. Replacement name for *Pannonica* Erdös. Synonymy by Bouček (1991: 204).

Amarisca Delucchi, 1962: 11. Type species: *Amarisca oulmesiensis* Delucchi; by original designation. Synonymy by Bouček (1991: 204).

Anacallocleonymus Yang, 1996. Type species: *Anacallocleonymus gracilis* Yang; by original designation. Synonymy by Gibson (2003: 93).

clavatus Bouček, 1961: 471–474; ♀ holotype (NMPC). DISTRIBUTION: Cyprus, Georgia, Greece.

gracilis (Yang). *Anacallocleonymus gracilis* Yang, 1996: 85–86, 308–309; ♀ holotype (NWCF). Combination by Gibson (2003: 93). DISTRIBUTION: China: (Shaanxi).

grandis Senatos, 1996: 93–94; ♀ holotype (ZIKU). DISTRIBUTION: Tadjikistan.

imperialis (Dodd). *Aplatygerrhus imperialis* Dodd, 1924: 163; ♀ holotype (SAMA). *Cleonymus imperialis* (Bouček 1988*a*: 263), *Notanisus imperialis* (Gibson 2003: 93). DISTRIBUTION: Norfolk Island.

oulmesiensis (Delucchi). *Amarisca oulmesiensis* Delucchi, 1962: 12–13; ♀ holotype (location uncertain). Combination by Bouček (1991: 204). DISTRIBUTION: Cyprus, Greece, Morocco.

richteri (Girault). *Systolomorphella richteri* Girault, 1922[365]: 154. Combination by Bouček (1988*a*: 262). DISTRIBUTION: Australia (ACT, QLD).

= *Systolomorphella dinotipennis* Girault, 1922[365]: 154. Synonymy by Bouček (1988*a*: 262).

sexramosus (Erdös). *Pannonica sexramosa* Erdös, 1946: 132–133; ♂ holotype (HNHM). *Pannoniella sexramosa* (Erdös, 1960: 306), *Notanisus sexramosus* (Bouček 1991: 204). DISTRIBUTION: Europe (Noyes 1998).

sylvaticus (Risbec). *Antsingia sylvatica* Risbec, 1952: 373–374; ♀ holotype (MNHN). Combination by Bouček (1991: 204). DISTRIBUTION: Madagascar.

versicolor Walker, 1837: 352–353; ♀ type (BMNH: 5.1628). DISTRIBUTION: Algeria, Europe (Noyes 1998), India.

***zebra* Bouček**, 1988*a*: 262; ♀ holotype (BMNH: 5.3246). DISTRIBUTION: Papua New Guinea.

Zolotarewskya Risbec

Zolotarewskya Risbec, 1955: 180. Type species: *Zolotarewskya seyrigi* Risbec; by original designation. Synonymy with *Systolomorphella* Girault by Bouček (1976*a*: 10); reestablished as valid by Bouček *et al.* (1979: 460).

Pseudocleonymus Hedqvist, 1967*b*: 184. Type species: *Pseudocleonymus spinifer* Hedqvist; by original designation. Synonymy by Bouček *et al.* (1979: 460).

indica (Mani & Kaul). *Chalcedectus indicus* Mani and Kaul *in* Mani *et al.*, 1973: 50–53; ♂ holotype (USNM?). Combination by Bouček *et al.* (1979: 460). DISTRIBUTION: India.

longicostalia Yang, 1996: 90, 309; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

lyra (Girault). *Systolomorphella lyra* Girault 1919[347]: 167–168; ♀ lectotype (BMNH: 5.734). Combination by Bouček *et al.* (1979: 460). DISTRIBUTION: Singapore.

robusta Yang, 1996: 87–90, 309; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

seyrigi Risbec, 1956: 180–182; 2♀ syntypes (MNHN). *Systolomorphella seyrigi* (Bouček 1976*a*: 10); combination reestablished by Bouček (1988*a*: 264). DISTRIBUTION: Madagascar.

shakespearei (Girault). *Systolomorphella shakespearei* Girault, 1926[400]: 2. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

spinifera (Hedqvist). *Pseudocleonymus spinifer* Hedqvist, 1967*b*: 184–186; ♀ holotype (MHNG). *Systolomorphella spinifera* (Bouček 1976: 10); *Zolotarewskya spinifera* (Bouček *et al.* 1979: 460). DISTRIBUTION: Algeria.

unnotipennis (Girault). *Systolomorphella unnotipennis* Girault, 1915[240]: 222–223. *Cleonymus unnotipennis* (Bouček 1988*a*: 264); *Zolotarewskya unnotipennis* (Gibson 2003: 96). DISTRIBUTION: Australia (QLD).

HEYDENIINI

Heydenia Förster

Heydenia Förster, 1856: 46, 48–49. Type species: *Heydenia pretiosa* Förster; by monotypy.

Paraheydenia Cameron, 1912*a*: 653–654. Type species: *Paraheydenia longicollis* Cameron; by monotypy. Synonymy by Bouček (1988*a*: 266).

Pterooderella Risbec, 1952: 84. Type species: *Pterooderella ornata* Risbec; by original designation. Synonymy by Bouček (1988*a*: 266).

Risbecisca Hedqvist, 1960: 418. Type species: *Lycisca burgeoni* Risbec; by original designation. Synonymy by Bouček (1988*a*: 266).

Heydenisca Hedqvist, 1967*a*: 142–143. Type species: *Heydenisca mateui* Hedqvist; by original designation. Synonymy by Bouček (1988*a*: 266).

angularicoxa Yang, 1966: 94–95, 310; ♀ holotype (NWCF). DISTRIBUTION: China (Beijing, Shaanxi).

burgeoni (Risbec). *Lycisca Burgeoni* Risbec, 1955: 541; ♀ holotype (MNHN). *Risbecisca burgeoni* (Hedqvist 1960: 418); *Heydenia burgeoni* (Bouček 1988*a*: 266). DISTRIBUTION: Zaire.

coomoni Xiao and Huang, 2002: 145–148; ♀ holotype (CASB). DISTRIBUTION: China (Beijing), Vietnam.

cristatipennis (Girault). *Paraheydenia cristatipennis* Girault, 1924[373]: 3. Combination by Bouček (1988*a*: 266). DISTRIBUTION: Australia (QLD).

indica Narendran *in* Narendran *et al.*, 2001: 150–152; ♀ holotype (DZUC). DISTRIBUTION: India (Kashmir).

longicollis (Cameron). *Paraheydenia longicollis* Cameron, 1912*a*: 654–655; ♂ holotype (BMNH: 5.892). Combination by Bouček (1988*a*: 266). DISTRIBUTION: Australia (NSW, QLD).

madagascariensis (Hedqvist). *Paraheydenia madagascariensis* Hedqvist, 1961: 96; ♀ holotype (BMNH). Combination by Gibson (2003: 99). DISTRIBUTION: Madagascar.

mateui (Hedqvist). *Heydenisca mateui* Hedqvist, 1967*a*: 144–145; ♀ holotype (MNHN). Combination by Bouček (1988*a*: 266). DISTRIBUTION: Chad.

natalensis (Westwood). *Lycisca natalensis* Westwood, 1874: 149; ♂ holotype (OXUM: T. 672). Combination by Hedqvist (1959: 177). DISTRIBUTION: South Africa.

ornata (Risbec). *Pterooderella ornata* Risbec, 1952: 84–87; 4♀ syntypes (MNHN). Combination by Bouček (1988*a*: 266). DISTRIBUTION: Madagascar.

pretiosa Förster, 1856: 46, 48–49; ♀, ♂ syntypes (NMWA). DISTRIBUTION: Europe (Noyes 1998).

= *Heydenia excellens* Wachtl, 1889: 89–91; ♀, ♂ syntypes (NMWA). Synonymy by Hedqvist (1957: 39, 40).

= *Lycisca silvestrii* Russo, 1938: 195–205; 2♀, 1♂ syntypes (DEZA). Synonymy by Hedqvist (1961: 94).

scolyti Yang, 1966: 92–94, 309–310; ♀ holotype (NWCF). DISTRIBUTION: China (Beijing, Shaanxi).

seyrigi (Risbec). *Lycisca Seyrigi* Risbec, 1952: 387–390; ♀ holotype (MNHN). Combination by Hedqvist (1959: 177). DISTRIBUTION: Madagascar.

testacea Yang, 1966: 95–96, 310; ♀ holotype (NWCF). DISTRIBUTION: China (Jiangsu, Shaanxi).

trinodis Bouček, 1988*a*: 266–267; ♀ holotype (BMNH: 5.3247). DISTRIBUTION: Papua New Guinea.

tuberculata Sureshan, 2000: 197–198; ♀ holotype (ZSIK). DISTRIBUTION: India (Karnataka).

unica Cook & Davis, 1891: 15–16; ♀ holotype (USNM: 1850). DISTRIBUTION: USA (Noyes 1998).

Heydeniopsis Hedqvist

Heydeniopsis Hedqvist, 1961: 94. Type species: *Heydeniopsis cleonymoides* Hedqvist, 1961: 95–96; by original designation.

† *cleonymoides* Hedqvist, 1961: 95–96; ♀ holotype (NHRS). DISTRIBUTION: Baltic amber (Eocene).

LYCISCINI

Agamerion Haliday

Agamerion Haliday, 1844: 298. Type species: *Miscogaster gelo* Walker; by monotypy.

Euchrysia Westwood, 1874: 139. Type species: *Euchrysia cleptidea* Westwood; subsequent designation by Ashmead (1904: 281). Synonymy by Bouček (1988*a*: 252).

cleptideum (Westwood). *Euchrysia cleptidea* Westwood, 1874: 139, pl. 26; ♀ lectotype (OXUM: T. 657/1) designated by Bouček (1988*a*: 253). Combination by Bouček (1988*a*: 253). DISTRIBUTION: Australia (ACT, NSW, SA).

coeruleiventre Ashmead, 1900*b*: 340; ♀ syntype (USNM: 4890) (described as a male, but in the USNM type book the type material is listed as two females). Justified emendation from *A. coeruleiventris* by Bouček (1988*a*: 253). DISTRIBUTION: Australia (QLD).

eupelmoideum Girault, 1925[381]: 1. Justified emendation from *A. eupelmoideus* by Bouček (1989: 86); *Agamerion eupelmoides* (!) (Bouček 1988*a*: 253). DISTRIBUTION: Australia (QLD).

gelo (Walker). *Miscogaster gelo* Walker, 1839: 27; ♂ lectotype (BMNH: 5.3281) designated by Bouček (1988*a*: 253). Combination by Haliday (1844: 299). DISTRIBUTION: Australia (NSW, SA).

= *Euchrysia gemmea* Westwood, 1874: 139–140, pl. 26; ♀ lectotype (OXUM: T. 658 ½) designated by Bouček (1988*a*: 253). Synonymy by Bouček (1988*a*: 253).

metallicum Girault, 1915[240]: 216–217. Justified emendation from *A. metallica* by Bouček (1988*a*: 253). DISTRIBUTION: Australia (QLD).

mirum Girault, 1927[407]: 3. DISTRIBUTION: Australia (QLD).

monodon Bouček, 1988*a*: 253–254; ♀ holotype (BMNH: 5.3251). DISTRIBUTION: Indonesia (Irian Jaya).

prasinum (Westwood). *Euchrysia prasina*, Westwood 1874: 170; ♂ lectotype (OXUM: T. 659) designated by Bouček (1988*a*: 254). Combination by Bouček (1988*a*: 254).

DISTRIBUTION: Australia (NSW, NT, QLD).

= *Agamerion nonstylatum* (Girault). *Thaumasura nonstylata*, Girault 1922[360]: 49. Combination by Bouček (1988*a*: 254). Synonymy by Gibson (2003: 114).

= *Agamerion io* Girault, 1935[445]: 3. Synonymy by Gibson (2003: 114).

semialbicorne Girault, 1927[407]: 3. Justified emendation from *A. semialbicornis* by Bouček (1988*a*: 254). DISTRIBUTION: Australia (QLD, WA?).

variflagellum Girault, 1925[381]: 1. DISTRIBUTION: Australia (SA, TAS).

Amazonisca Hedqvist

Amazonisca Hedqvist, 1959: 196. Type species: *Amazonisca batesi* Hedqvist; by original designation and monotypy.

batesi Hedqvist, 1959: 197–198; ♀ holotype (OXUM; missing according to C. O'Toole, *in lit*.). DISTRIBUTION: Brazil, Colombia?, Peru?.

Chadwickia Bouček

Chadwickia Bouček, 1988*a*: 250–251. Type species: *Chadwickia longiceps* Bouček; by original designation and monotypy.

longiceps Bouček, 1988*a*: 251; ♀ holotype (BMNH: 5. 3245). DISTRIBUTION: Australia (NSW).

Epistenia Westwood

Epistenia Westwood *in* Griffith and Pidgeon, 1832: 432. Type species: *Epistenia coeruleata* Westwood; by monotypy.

Dasyglenes Ashmead, 1888*b*: 174–175. Type species: *Dasyglenes osmiae* Ashmead; by monotypy. Synonymy by Viereck (1916: 484).

Idiobia Brèthes, 1927: 330. Type species: *Idiobia schmidti* Brèthes; by monotypy. Synonymy by Bouček (1958: 381).

Epistenia (*Punctepistenia*) Gibson, 2003: 192, 195. Type species: *Epistenia odyneri* Ashmead *in* Davidson (1896); by original designation.

americana Girault, 1912[122]: 172–173; ♀ holotype (ZMHB: 31951). Possibly a synonym of *E. scutellata* Brèthes (Hedqvist 1961: 99). DISTRIBUTION: Paraguay.

bella Strand, 1911*a*: 153; type status uncertain. DISTRIBUTION: Peru.

chilensis Brèthes, 1916: 27–28; type status uncertain. DISTRIBUTION: Chile.

conica Brèthes, 1909: 226; type status uncertain. DISTRIBUTION: Paraguay.

gemmata Girault, 1912[122]: 173–174; ♀ holotype (ZMHB: 31952). Possibly a synonym of *E. conica* Brèthes (Hedqvist 1961: 99). DISTRIBUTION: Paraguay.

goethei Girault, 1913[157]: 56; ♀ holotype (ZMHB). DISTRIBUTION: Paraguay.

liguensis Brèthes, 1916: 28; type status uncertain. DISTRIBUTION: Chile.

scutellata Brèthes, 1909: 226–227; type status uncertain. DISTRIBUTION: Paraguay.

westwoodi (Guérin-Méneville). *Lycisca westwoodi* Guérin-Méneville, 1844: 416; type status uncertain. Combination by Hedqvist (1961: 99). DISTRIBUTION: Colombia.

Epistenia (*Epistenia*) Westwood

burksi Hedqvist, 1968: 3–4; ♀ holotype (USNM: 69556). DISTRIBUTION: USA.

coeruleata Westwood *in* Griffith and Pidgeon, 1832: 432; ♀ holotype (BMNH). DISTRIBUTION: Canada, USA.

= *Epistenia (E.) osmiae* Ashmead, 1888*b*: 174; ♀ holotype (USNM: 41400). Synonymy by Hedqvist (1968: 7).

media Hedqvist, 1968: 5–7; ♀ holotype (USNM: 69557). DISTRIBUTION: USA.

polita (Say). *Spalangia politus* Say, 1829: 79; ♀ neotype (USNM) designated by Gahan (1951: 174). Combination by Gahan (1951: 174). DISTRIBUTION: USA.

regalis Cockerell, 1934: 228; ♀ holotype (MCZC: 20132). DISTRIBUTION: USA.

rufipes Cameron, 1884: 130; ♀ holotype (BMNH: 5.906). DISTRIBUTION: Panama.

schmidti (Brèthes). *Idobia schmidti* Brèthes: 1927: 330–331; ♂ holotype (DEIC). Combination by Bouček (1958: 381). DISTRIBUTION: Costa Rica.

Epistenia (*Punctepistenia*) Gibson

basalis Walker. *Epistenia basalis* Walker, 1862: 392; ♀ holotype (BMNH: 5.904). New status by Gibson (2003: 192). DISTRIBUTION: Brazil.

cyanea (Fabricius). *Chalcis cyanea* Fabricius, 1804: 164; ♀ lectotype (ZMUC) designated by Bouček and Delvare (1992: 17). Combination by Bouček and Delvare (1992: 17). New status by Gibson (2003: 193). DISTRIBUTION: Bolivia, Brazil, Costa Rica, French Guiana, Guyana.

odyneri Ashmead. *Epistenia odyneri* Ashmead *in* Davidson, 1896: 336; ♀ holotype (USNM: 41399). New status by Gibson (2003: 193). DISTRIBUTION: Mexico, USA.

rufipes (Cameron). *Lycisca rufipes* Cameron, 1913: 123–124; described from both sexes, ♂ syntype remaining in BMNH (5.897). Combination by Gibson (2003: 193); preoccupied by *Epistenia* (*E.*) *rufipes* Cameron (1884). DISTRIBUTION: Guyana.

Eupelmophotismus Girault

Eupelmophotismus Girault, 1920[355]: 144. Type species: *Eupelmophotismus eupelmoideus* Girault; by monotypy.

Aligherinia Girault, 1922[365]: 148–149. Type species: *Aligherinia sidneyi* Girault; by monotypy. Synonymy by Bouček (1988*a*: 252).

angustifrons (Girault). *Aligherinia angustifrons* Girault, 1927[387]: 3. Combination by Bouček (1988*a*: 252). DISTRIBUTION: Australia (QLD).

eupelmoideus Girault, 1920[355]: 144. DISTRIBUTION: Australia (QLD).

pulcher (Girault). *Agamerion pulchra* Girault, 1925[387]: 3. Combination and justified emendation by Bouček (1988*a*: 252). DISTRIBUTION: Australia (ACT, NSW, NT, QLD, SA, VIC, WA); Papua New Guinea.

sidneyi (Girault). *Aligherinia sidneyi* Girault, 1922[365]: 149. Combination by Bouček (1988*a*: 252). DISTRIBUTION: Australia (NSW).

Grooca Sureshan and Narendran

Neoepistenia Sureshan and Narendran, 1995: 96; primary homonym of *Neoepistenia* Hedqvist (1959: 194–196). Type species: *Neoepistenia coorgensis* Sureshan and Narendran; by original designation and monotypy.

Grooca Sureshan and Narendran, 1997: 175. Replacement name for *Neoepistenia* Sureshan and Narendran.

coorgensis (Sureshan and Narendran). *Neoepistenia coorgensis* Sureshan and Narendran, 1995: 97–98; ♀ holotype (DZUC). Combination by Sureshan and Narendran (1997: 175). DISTRIBUTION: India (Karnataka), Malaysia, Thailand.

Hadroepistenia Gibson

Hadroepistenia Gibson, 2003: 200–201. Type species: *Hadroepistenia erwini* Gibson; by original designation.

erwini Gibson, 2003: 203–204; ♀ holotype (USNM). DISTRIBUTION: Ecuador.

glabra Gibson, 2003: 204–205; ♀ holotype (USNM). DISTRIBUTION: Bolivia, Peru.

Hedqvistia Gibson

Hedqvistia Gibson, 2003: 205–206. Type species: *Hedqvistia reticulata* Gibson; by original designation.

reticulata Gibson, 2003: 208; ♀ holotype (CNCI). DISTRIBUTION: Ecuador, Peru.

Lycisca Spinola

Lycisca Spinola, 1840: 14–18. Type species: *Lycisca raptoria* Spinola; by monotypy.

amazonica Roman, 1920: 17–18; 5♀ (3 examined), 2♂ (examined) syntypes (NHRS). DISTRIBUTION: Brazil, Colombia, Costa Rica, Mexico, Nicaragua, Peru.

auripyga Strand, 1911*b*: 25; ♀ holotype (ZMHB). Synonymy with *L. maculipes* by Hedqvist (1959: 186); synonymy with *L. ignicaudata* by Roman (1920: 15); status reestablished by Gibson (2003: 209). DISTRIBUTION: Bolivia, Brazil.

cupreoviridis (Brèthes). *Epistenia cupreoviridis* Brèthes, 1908: 11–12; ♂ holotype (MACN?). Combination by Gibson (2003: 209). DISTRIBUTION: Paraguay.

cyaniceps Roman, 1920: 19; 2♀ (1 examined) syntypes (NHRS). DISTRIBUTION: Brazil, Guyana.

decora Strand, 1911*b*: 26; 2♀ syntypes (ZMHB). Tentatively syonymized with *L. amazonica* by Roman (1920: 17). DISTRIBUTION: Paraguay.

ignicaudata Westwood, 1874: 148; ♀ lectotype (OXUM: T. 671 1/4) designated by Hedqvist (1959: 184). DISTRIBUTION: Argentina, Bolivia, Brazil, Colombia, Ecuador, Peru.

= *Lycisca signipennis* Strand, 1911*b*: 26; 3♀ syntypes (ZMHB). Synonymy by Hedqvist (1959: 184); tentative synonymy by Roman (1920: 15).

maculipes (Cameron). *Epistenia maculipes* Cameron, 1884: 130; 3♀, 2♂ syntypes (BMNH: 5.896). Combination by Hedqvist (1959: 186). DISTRIBUTION: Brazil, Colombia, Costa Rica, Panama.

nebulipennis Strand, 1911*b*: 25–26; ♀ holotype (ZMHB). DISTRIBUTION: Bolivia, Brazil, Peru.

ogloblina Hedqvist, 1961: 100–101; ♀ holotype (KHPC). DISTRIBUTION: Argentina, Brazil.

raptoria Spinola, 1840: 18–19, pl. 43; ♀ holotype (MRSN, lost). DISTRIBUTION: Brazil, French Guiana.

romandi Westwood, 1841: 84; ♀ lectotype (OXUM: T. 670) designated by Hedqvist (1959: 182). DISTRIBUTION: Brazil, French Guiana.

= *Lycisca cyanata* Strand, 1911*b*: 25; ♀ holotype (ZMHB). Synonymy by Hedqvist (1959: 181).

Marxiana Girault

Marxiana Girault, 1932[437]: 6. Type species: *Marxiana grandiosa* Girault; by monotypy.

grandiosa Girault, 1932[437]: 6. DISTRIBUTION: Australia (NSW, QLD).

Mesamotura Girault

Mesamotura Girault, 1925[381]: 3. Type species: *Mesamotura aristophani* Girault; by monotypy.

aeschyli Girault, 1927[416]: 312. DISTRIBUTION: Australia (QLD).

aristophani Girault, 1925[381]: 3. DISTRIBUTION: Australia (QLD).

corticis Girault, 1926[402]: 133–134. DISTRIBUTION: Australia (QLD).

keatsi Girault, 1927[416]: 312. DISTRIBUTION: Australia (ACT, NSW, QLD).

Neboissia Bouček

Neboissia Bouček, 1988*a*: 248–249. Type species: *Neboissia armipes* Bouček; by original designation.

armipes Bouček, 1988*a*: 249; ♀ holotype (ANIC). DISTRIBUTION: Australia (ACT, NSW, QLD, SA, VIC, WA).

lata Bouček, 1988*a*: 249–250; ♀ holotype (ANIC). DISTRIBUTION: Australia (NSW, NT, QLD, SA, WA).

Neoepistenia Hedqvist

Neoepistenia Hedqvist, 1959: 194–196. Type species: *Neoepistenia flavoscapus* Hedqvist; by original designation and monotypy.

flavoscapus Hedqvist, 1959: 196; ♀ holotype (NHRS). DISTRIBUTION: Brazil, Ecuador, French Guiana, Peru, Suriname.

Nepistenia Bouček

Nepistenia Bouček, 1988*a*: 257–258. Type species: *Nepistenia septem* Bouček; by original designation and monotypy.

Anepistenia Bouček, 1988*a*: 258–259. Type species: *Anepistenia vexans* Bouček; by original designation and monotypy. Synonymy by Gibson (2003: 142).

Nepistenia (*Anepistenia*) Bouček. New rank by Gibson (2003: 143).

***Nepistenia* (*Anepistenia*)** Bouček

vexans (Bouček). *Anepistenia vexans* Bouček, 1988*a*: 259; ♀ holotype (ANIC). Combination by Gibson (2003: 142). DISTRIBUTION: Australia (NSW, QLD, SA, WA).

***Nepistenia* (*Nepistenia*)** Bouček

septem Bouček, 1988*a*: 258; ♀ holotype (ANIC). DISTRIBUTION: Australia (QLD, SA, WA).

Paralycisca Hedqvist

Paralycisca Hedqvist, 1959: 192. Type species: *Paralycisca cristata* Hedqvist; by original designation and monotypy.

cristata Hedqvist, 1959: 192–193; ♀ holotype (NHRS). DISTRIBUTION: Brazil, Ecuador, Panama, Peru.

Parepistenia Dodd

Parepistenia Dodd *in* Girault, 1915[240]: 218. Type species: *Parepistenia varicornis* Dodd; by original designation and monotypy.

miripes (Girault). *Epistenia miripes* Girault, 1922[360]: 41–42. Combination by Bouček (1988*a*: 255). DISTRIBUTION: Australia (NSW, QLD).

speciosissima (Girault). *Epistenia speciosissima* Girault, 1927[416]: 313–314. Combination by Bouček (1988*a*: 256). DISTRIBUTION: Australia (QLD).

varicornis Dodd *in* Girault, 1915[240]: 218–219. DISTRIBUTION: Australia (ACT, NSW, QLD, SA).

= *Epistenia aedicula* Girault, 1927[407]: 3. Synonymy by Bouček (1988*a*: 256).

Proglochin Philippi

Proglochin Philippi, 1871: 288–289, figs 3a–3c. Type species: *Proglochin maculipennis* Philippi; by monotypy. Synonym of *Lycisca* Spinola (Westwood 1874: 147); synonym of *Epistenia* Westwood (Hedqvist 1959: 177) by implication through transfer of type species; reestablished as valid genus by De Santis (1960: 117).

Neolycisca Hedqvist, 1959: 198–199. Type species: *Neolycisca maculata* Hedqvist; by original designation. Synonymy by Gibson (2003: 221).

maculata (Hedqvist). *Neolycisca maculata* Hedqvist, 1959: 199–200; ♂ holotype (USNM: 64837). Combination by Gibson (2003: 221). DISTRIBUTION: Argentina.

maculipennis Philippi. *Proglochin maculipennis* Philippi, 1871: 288–289, figs 3a–3c; ♀ type (location uncertain). *Lycisca maculipennis* (Westwood 1874: 149), *Epistenia maculipennis* (Hedqvist 1959: 177; 1961: 99). DISTRIBUTION: Chile.

Proshizonotus Girault

Proshizonotus Girault, 1928[422]: 2. Type species: *Proshizonotus mosei* Girault; by monotypy. Synonymy with *Parepistenia* Dodd by Bouček (1988*a*: 254); generic status reestablished by Gibson (2003: 169).

Austrogerrhus Bouček, 1958: 371–373. Type species: *Austrogerrhus gloriosus* Bouček; by original designation. Synonymy with *Parepistenia* by Bouček (1988*a*: 254); synonymy with *Proshizonotus* by Gibson (2003: 169).

Oxyepistenia Bouček, 1988*a*: 256. Type species: *Oxyepistenia lenticeps* Bouček; by original designation and monotypy. Synonymy by Gibson (2003: 169).

Excisoclea Bouček, 1988*a*: 259–260. Type species: *Excisoclea prima* Bouček; by original designation and monotypy. Synonymy by Gibson (2003: 169).

Kraska Bouček, 1988*a*: 260–261. Type species: *Erotolepsiella migneti* Girault; by original designation and monotypy. Synonymy by Gibson (2003: 169).

annulicornis (Girault). *Platygerrhus annulicornis* Girault, 1913[175]: 78. *Parepistenia annulicornis* (Bouček 1988*a*: 255), *Proshizonotus annulicornis* (Gibson 2003: 169). DISTRIBUTION: Australia (TAS).

arenae (Girault). *Thaumasura arenae* Girault, 1932[439]: 4. *Parepistenia arenae* (Bouček 1988*a*: 255), *Proshizonotus arenae* (Gibson 2003: 169). DISTRIBUTION: Australia (QLD).

australiensis (Girault). *Platygerrhus australiensis* Girault, 1915[240]: 211–212. *Parepistenia australiensis* (Bouček 1988*a*: 255), *Proshizonotus australiensis* (Gibson 2003: 170). DISTRIBUTION: Australia (TAS).

camilli (Girault). *Epistenia camilli* Girault, 1925[381]: 1. *Parepistenia camilli* (Bouček 1988*a*: 255), *Proshizonotus camilli* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD).

corticis (Girault). *Epistenia corticis* Girault, 1925[381]: 1. *Parepistenia corticis* (Bouček 1988*a*: 255), *Proshizonotus corticis* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD).

devannyi (Girault). *Epistenia devannyi* Girault, 1937[448]: 1. *Parepistenia devannyi* (Bouček 1988*a*: 255), *Proshizonotus devannyi* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD).

froudei (Girault). *Platygerrhus froudei* Girault, 1929[431]: 318. *Parepistenia froudei* (Bouček 1988*a*: 255), *Proshizonotus froudei* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD).

fulviventris (Girault). *Platygerrhus fulviventris* Girault, 1915[240]: 212–213. *Parepistenia fulviventris* (Bouček 1988*a*: 255), *Proshizonotus fulviventris* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD).

incola (Girault). *Platygerrhus incola* Girault, 1929[431]: 317–318. *Parepistenia incola* (Bouček 1988*a*: 255), *Proshizonotus incola* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD, SA).

inusitata (Girault). *Epistenia inusitata* Girault, 1937[448]: 1. *Parepistenia inusitata* (Bouček 1988*a*: 255), *Proshizonotus inusitata* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD).

lenticeps (Bouček). *Oxyepistenia lenticeps* Bouček, 1988*a*: 256–257; ♀ holotype (AMSA). Combination by Gibson (2003: 170). DISTRIBUTION: Australia (NSW, SA).

migneti (Girault). *Erotolepsiella migneti* Girault, 1935[445]: 3. *Kraska migneti* (Bouček 1988*a*: 261). Combination by Gibson (2003: 171). DISTRIBUTION: Australia (QLD).

mosei Girault, 1928[422]: 2. *Parepistenia mosei* (Bouček 1988*a*: 255); combination reestablished by Gibson (2003: 171). DISTRIBUTION: Australia (VIC).

nigriaenea (Girault). *Epistenia nigriaenea* Girault, 1915[240]: 215–216. *Parepistenia nigriaenea* (Bouček 1988*a*: 255), *Proshizonotus nigriaenea* (Gibson 2003: 172). DISTRIBUTION: Australia (QLD).

pallidicoxa (Girault). *Platygerrhus pallidicoxa* Girault, 1929[431]: 318. *Parepistenia pallidicoxa* (Bouček 1988*a*: 256), *Proshizonotus pallidicoxa* (Gibson 2003: 172). DISTRIBUTION: Australia (QLD).

primus (Bouček). *Excisoclea prima* Bouček, 1988*a*: 260; ♀ holotype (ANIC). Combination by Gibson (2003: 172). DISTRIBUTION: Australia (NSW).

pulchripes (Girault). *Thaumasura pulchripes* Girault, 1927[416]: 314–315. *Parepistenia pulchripes* (Bouček 1988*a*: 256), *Proshizonotus pulchripes* (Gibson 2003: 172). DISTRIBUTION: Australia (QLD).

= *Austrogerrhus gloriosus* Bouček, 1958: 373–374; ♀ holotype (DEIC). Synonymy, under *Parepistenia pulchripes*, by Bouček (1988*a*: 256).

resplendens (Gourlay). *Thaumasura resplendens* Gourlay, 1928: 372; ♀ holotype (MONZ; missing, 1♀ paratype remaining according to J. Berry, *in lit.*). *Parepistenia resplendens* (Bouček 1988*a*: 256), *Proshizonotus resplendens* (Gibson 2003: 172). DISTRIBUTION: New Zealand.

tasmaniensis (Girault). *Platygerrhus tasmaniensis* Girault, 1913[175]: 79. *Parepistenia tasmaniensis* (Bouček 1988*a*: 256), *Proshizonotus tasmaniensis* (Gibson 2003: 172). DISTRIBUTION: Australia (TAS).

Protoepistenia Gibson

Protoepistenia Gibson, 2003: 224–225. Type species: *Protoepistenia melanocara* Gibson; by original designation.

melanocara Gibson, 2003: 229–230; ♀ holotype (USNM). DISTRIBUTION: Brazil.

Riekisura Bouček

Riekisura Bouček, 1988*a*: 247–248. Type species: *Agamerionella curculionis* Girault; by original designation.

auritegula (Girault). *Thaumasura auritegula* Girault, 1927[416]: 315. Combination by Bouček (1988*a*: 248). DISTRIBUTION: Australia (QLD).

curculionis (Girault). *Agamerionella curculionia* Girault, 1915[240]: 221. Combination by Bouček (1988*a*: 248). DISTRIBUTION: Australia (NSW, QLD, NT).

= *Agamerionella brisbanensis* Girault, 1915[240]: 222. Synonymy by Bouček (1988*a*: 248).

Romanisca Hedqvist

Romanisca Hedqvist, 1959: 194. Type species: *Romanisca annulicornis* Hedqvist; by original designation and monotypy.

annulicornis Hedqvist, 1959: 194; ♀ holotype (USNM: 64836). DISTRIBUTION: Brazil, Ecuador, Guyana, Peru, Trinidad.

Scaphepistenia Gibson

Scaphepistenia Gibson, 2003: 232–233. Type species: *Epistenia scutata* Walker, 1862; by original designation.

quadriplagiata (Walker). *Epistenia quadriplagiata* Walker, 1872: 87; ♀ holotype (BMNH: 5.905). Combination by Gibson (2003: 232). DISTRIBUTION: Brazil, Venezuela.

scutata (Walker). *Epistenia scutata* Walker, 1862: 391–392; ♀ holotype (BMNH: 5.903). Combination by Gibson (2003: 232). DISTRIBUTION: Brazil, Costa Rica, Ecuador, Peru.

Shedoepistenia Gibson

Shedoepistenia Gibson, 2003: 235–236. Type species: *Shedoepistenia noyesi* Gibson; by original designation.

noyesi Gibson, 2003: 243–245; ♀ holotype (BMNH). DISTRIBUTION: Costa Rica, Nicaragua, Trinidad.

Solenura Westwood

Solenura Westwood, 1868: xxxvi. Type species: *Solenura telescopica* Westwood; by monotypy.

Ormyrodes Brues, 1907*a*: 46. Type species: *Ormyrodes carinatus* Brues; by original designation and monotypy. Synonymy by Gahan (1951: 174).

Taoga Cameron, 1909: 210–211. Type species: *Taoga rufipes* Cameron; by monotypy. Synonymy by Hedqvist (1961: 98).

Thecasoma Matsumura, 1918: 158.Type species: *Thecasoma longicauda* Matsumura; by monotypy. Synonymy by Bouček (1958: 382).

Thaumasurelloides Girault, 1927[415]: 554. Type species: *Thaumasurelloides silvae* Girault; by original designation and monotypy. Synonymy by Baltazar (1961: 394).

ania (Walker). *Epistenia ania* Walker 1846: 93–94; ♀ lectotype (BMNH: 5.911) designated by Bouček *et al.* (1979: 456). Combination by Hedqvist (1961: 98). DISTRIBUTION: *Oriental* — China (Jiangsu), India, Indonesia (Borneo, Java), Malaysia (Malaya, Sabah, Sarawak), Philippines, Singapore, Sri Lanka, Taiwan, Thailand. *Palearctic* — China (Anhui, Beijing, Liaoning, Shandong, Shaanxi), Japan.

= *Solenura telescopica* Westwood, 1868: xxxvi; ♀ lectotype (OXUM: T. 653 1/3) designated by Bouček *et al.* (1979: 456). Synonymy by Bouček *et al.* (1979: 456).

= *Solenura rufipes* (Cameron). *Taoga rufipes* Cameron, 1909: 211; ♀ lectotype (BMNH: 5.909) designated by Bouček *et al.* (1979: 456). Combination by Hedqvist (1961: 98); synonymy by Bouček *et al.* (1979: 456).

= *Solenura longicauda* (Matsumura). *Thecasoma longicauda* Matsumura, 1918: 159; ♀ type (location uncertain). Combination by Bouček (1958: 382); synonymy with *S. telescopica* by Hedqvist (1961: 98) and Bouček (1958: 382), and with *S. ania* by Bouček *et al.* (1979: 456).

= *Solenura silvae* (Girault). *Thaumasurelloides silvae* Girault, 1927[415]: 554–555; ♀ syntype (QMBA), ♀ syntype (USNM: 41904). Combination by Baltazar (1961: 394); synonymy by Gibson (2003: 153).

feretrius (Walker). *Epistenia feretrius* Walker, 1846: 52, 93; ♀ holotype (BMNH: 5.901). Combination by Hedqvist (1961: 98). DISTRIBUTION: Malaysia, Philippines, Sri Lanka.

fuscoaenea Masi. *Solenura fusco-aenea* Masi, 1943: 68; ♀ holotype (MCSN?). DISTRIBUTION: Somalia.

keralensis (Narendran). *Riekisura keralensis* Narendran, 1992: 57–58; ♀ holotype (on permanent loan to CNCI: 22617). Combination by Gibson (2003: 153). DISTRIBUTION: India, Sri Lanka.

nigra (Walker). *Epistenia nigra* Walker, 1872: 87; ♀ holotype (BMNH: 5.907). *Solenura nigra* (Hedqvist 1961: 98); *Parepistenia nigra* (Bouček 1988*a*: 255); combination reestablished by Gibson (2003: 153). DISTRIBUTION: *Afrotropical* — Botswana, Ivory Coast, Kenya, South Africa, Yemen. *Palearctic* — Israel.

= *Solenura carinatus* (Brues). *Ormyrodes carinatus* Brues, 1907*a*: 47; ♀ holotype (MCPM). Combination by Gahan (1951: 175). Synonymy by Gibson (2003: 153).

Striatacanthus Gibson

Striatacanthus Gibson, 2003: 157–158. Type species: *Striatacanthus abruptus* Gibson; by original designation.

abruptus Gibson, 2003: 159–160; ♀ holotype (UCDC). DISTRIBUTION: Australia, Papua New Guinea.

arcuatus Gibson, 2003: 160–161; ♀ holotype (BPBM). DISTRIBUTION: Indonesia (Irian Jaya, Sula Islands), New Ireland, Papua New Guinea, Solomon Islands (Bougainville, San Cristobal).

Thaumasura Westwood

Thaumasura Westwood, 1868: xxxvi. Type species: *Thaumasura terebrator* Westwood; by monotypy.

Belonea Westwood, 1874: 146. Type species: *Belonea australica* Westwood; subsequently designated by Ashmead (1904: 283). Synonymy by Bouček (1988*a*: 245).

Aressida Cameron, 1911: 350–351. Type species: *Aressida carinicollis* Cameron; by monotypy. Synonymy by Girault (1917[334]: 155).

Calosetroides Girault, 1913[148]: 227–228. Type species: *Calosetroides australica* Girault; by original designation. Synonymy by Bouček (1988*a*: 245).

Agamerionella Girault, 1915[240]: 219–220. Type species: *Agamerionella locustiformis* Girault; by original designation. Synonymy by Girault (1917[334]: 155).

Primisura Bouček, 1988*a*: 244. Type species: *Primisura bidens* Bouček; by original designation and monotypy. Synonymy by Gibson (2003: 161).

annulicornis (Cameron). *Aressida annulicornis* Cameron, 1912*b*: 207–208; ♀ lectotype (BMNH: 5.898) designated by Bouček (1988*a*: 245). Combination by Bouček (1988*a*: 245). DISTRIBUTION: Australia (NSW).

arboris Girault, 1932[439]: 4. DISTRIBUTION: Australia (SA).

australica (Westwood). *Belonea australica* Westwood, 1874: 146, pl. 27; ♀ holotype (OXUM: T. 668). Combination by Bouček (1988*a*: 245). DISTRIBUTION: Australia (NSW, QLD, SA, VIC).

australiensis Bouček, 1988*a*: 245. Replacement name for *Calosetroides australica* Girault, 1913[148]: 228 (♀ holotype, QMBA), preoccupied by *Thaumasura australica* (Westwood). DISTRIBUTION: Australia (VIC).

bella Girault, 1927[416]: 315. DISTRIBUTION: Australia (SA, QLD).

bidens (Bouček). *Primisura bidens* Bouček, 1988*a*: 244; ♀ holotype (ANIC). Combination by Gibson (2003: 162). DISTRIBUTION: Australia (NT, WA).

brevicaudata (Westwood). *Belonea brevicaudata* Westwood, 1874: 147; ♀ holotype (location uncertain). Combination by Bouček (1988*a*: 245). DISTRIBUTION: Indonesia.

brevistylus (Girault). *Agamerionella brevistylus* Girault, 1915[240]: 220. Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (VIC).

carinicollis (Cameron). *Aressida carinicollis*, 1911: 351–352; ♀ holotype (BMNH: 5.899). Combination by Girault (1917[334]: 155). DISTRIBUTION: Solomon Islands (Guadalcanal).

colliscutellum Girault, 1932[439]: 3. DISTRIBUTION: Australia (NSW).

dentatibia Girault, 1927[416]: 315–316. DISTRIBUTION: Australia (QLD, VIC).

diana Girault, 1928[422]: 2. DISTRIBUTION: Australia (VIC).

eleganta Girault, 1926[405]: 1. DISTRIBUTION: Australia (VIC).

femoralis (Westwood). *Belonea femoralis* Westwood, 1874: 146–147; 1♀, 2♂ syntypes (OXUM: T. 669). Combination by Bouček (1988*a*: 246). DISTRIBUTION: Indonesia.

fera Girault, 1932[439]: 4. DISTRIBUTION: Australia (QLD).

goethei Girault, 1937[448]: 1. DISTRIBUTION: Australia (QLD).

imperialis (Froggatt). *Aressida imperialis* Froggatt, 1927: 54–55. Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (NSW).

juno Girault, 1926[405]: 1. DISTRIBUTION: Australia (VIC).

locustiformis (Girault). *Agamerionella locustiformis* Girault, 1915[240]: 219–220. Combination by Girault (1917[334]: 155). DISTRIBUTION: Australia (VIC, WA).

longa Girault, 1928[424]: 4. DISTRIBUTION: Australia (QLD).

macrocalculus Girault, 1932[439]: 4. DISTRIBUTION: Australia (TAS).

magnispina Girault, 1932[439]: 4. DISTRIBUTION: Australia (QLD).

marmoratipennis Girault, 1927[416]: 314. DISTRIBUTION: Australia (QLD).

micans Girault, 1932[439]: 4. DISTRIBUTION: Australia (QLD).

nelsoni Girault, 1932[439]: 4. DISTRIBUTION: Australia (QLD).

nigricornis (Cameron). *Aressida nigricornis* Cameron, 1912*a*: 208–209; ♀ lectotype (BMNH: 5.900) designated by Bouček (1988*a*: 246). Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (NSW).

niobe Girault, 1932[439]: 4. DISTRIBUTION: Papua New Guinea.

omnicyanea Girault, 1932[439]: 4. *Agamerion omnicyaneum* (Bouček 1988*a*: 254); combination reestablished by Gibson (2003: 163). DISTRIBUTION: Australia (QLD).

pavo (Girault). *Agamerionella pavo* Girault, 1915[240]: 221. Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (QLD).

rubrifunicle Girault, 1932[439]: 4. DISTRIBUTION: Australia (TAS).

rubritibia Girault, 1932[439]: 4. DISTRIBUTION: Australia (NSW).

rubrofemoralis Ashmead, 1900*b*: 341; ♀ holotype (USNM: 48921). DISTRIBUTION: Australia (NSW).

sanguinipes (Girault). *Agamerionella sanguinipes* Girault, 1915[240]: 220–221. Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (NSW, VIC).

scutellata (Girault). *Agamerionella scutellata* Girault, 1915[240]: 221. Combination and new status from *A. sanguinipes* var. *scutellatus* by Bouček (1988*a*: 246). DISTRIBUTION: Australia (VIC).

solis Girault, 1932[439]: 4. DISTRIBUTION: Australia (QLD).

terebrator Westwood, 1868: xxxvi; 3♀ syntypes (OXUM: T. 652). DISTRIBUTION: Australia (SA).

= *Belonea erythropoda* Cameron, 1888: 122–123; ♀ lectotype (BMNH: 5.913) designated by Bouček (1988*a*: 246). Synonymy by Bouček (1988*a*: 246).

westwoodi Girault, 1917[334]: 154–155; ♀ holotype (USNM: 20894). DISTRIBUTION: Australia (SA).

Urolycisca **Roman**

Urolycisca Roman, 1920: 19–20. Type species: *Lycisca apicalis* Walker; by original designation.

apicalis (Walker). *Lycisca apicalis* Walker, 1862: 393–394; ♀ holotype (BMNH: 5.893). Combination by Roman (1920: 20). DISTRIBUTION: Brazil, Ecuador, Guyana.

balteata (Cameron). *Epistenia balteata* Cameron, 1884: 129; 4♀, 1♂ syntype (BMNH: 5.895). Combination by Hedqvist (1961: 100). DISTRIBUTION: Costa Rica, El Salvador, Guatemala, Mexico, Panama.

hastata (Walker). *Lycisca hastata* Walker, 1862: 393; ♀ holotype (BMNH: 5.894). Synonym of *Lycisca romandi* Westwood (Hedqvist 1959: 177, 181); reestablished status and combination by Hedqvist (1961: 100). DISTRIBUTION: Brazil; Peru.

Westwoodiana Girault

Westwoodiana Girault, 1922[365]: 151. Type species: *Westwoodiana testaceiformis* Girault; by monotypy.

purpureipes Girault, 1927[416]: 316. DISTRIBUTION: Australia (QLD).

testaceiformis Girault, 1922[365]: 151. DISTRIBUTION: Australia (QLD).

OODERINI

Oodera Westwood

Oodera Westwood, 1874: 145. Type species: *Oodera gracilis* Westwood; subsequent designation by Ashmead (1904: 288).

Stellophora Risbec, 1951: 239. Type species: *Stellophora magnifica* Risbec; by monotypy. Synonymy by Bouček (1958: 375).

ahoma (Mani & Kaul). *Lycisca ahoma* Mani & Kaul *in* Mani *et al.*, 1973: 53–55; ♀ holotype (USNM: 76268). Combination by Bouček *et al.* (1979: 448). DISTRIBUTION: India, Pakistan, Sri Lanka.

albopilosa Crosby, 1909: 86–88; ♀ holotype (CUIC). DISTRIBUTION: Zambia.

bestia Nikol'skaya, 1952: 474; ♀ syntypes (ZMAS). DISTRIBUTION: Ukraine.

dakarensis Risbec, 1957: 256–260; 3♀, 1♂ syntypes (MNHN). DISTRIBUTION: Senegal.

formosa (Giraud). *Heydenia formosa* Giraud, 1863: 21–22; ♀ holotype (location uncertain). Combination by implication by Bouček (1958: 375). *Stellophora formosa* (Hedqvist 1957: 44). DISTRIBUTION: Bulgaria, France, Italy, Romania, Russia, Ukraine.

gracilis Westwood, 1874: 145; ♀ holotype (OXUM: T. 667). DISTRIBUTION: Indonesia (Irian Jaya, Sulawesi).

hoggarensis Hedqvist, 1967*b*: 186–187; ♀ holotype (MHNG). DISTRIBUTION: Algeria.

longicollis (Cameron). *Epistenia longicollis* Cameron, 1903: 97–99; ♀ lectotype (BMNH: 5.891) designated by Bouček in Bouček *et al.* (1979: 449). Combination by Hedqvist (1961: 97). DISTRIBUTION: Indonesia (Kalimantan), Malaysia (Sabah), Myanmar, Philippines.

= *Oodera ornata* Gahan, 1925: 97–99; ♀ holotype (USNM: 26762). Synonymy by Bouček *et al.* (1979: 448).

madegassa Bouček, 1958: 376–380; ♀ holotype (NMPC: 3028). DISTRIBUTION: Madagascar.

magnifica (Risbec). *Stellophora magnifica* Risbec, 1951: 239–243; ♀ type (MNHN). Combination by Bouček (1958: 375). DISTRIBUTION: Senegal.

monstrum Nikol'skaya, 1952: 474; ♀ syntypes (ZMAS). DISTRIBUTION: Russia.

obscura Westwood, 1874: 146; ♀ type (location uncertain). DISTRIBUTION: Indonesia.

pumilae Yang, 1996: 100, 311; ♀ holotype (NWCF). DISTRIBUTION: China (Heilongjiang).

regiae Yang, 1996: 98–100, 310; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

rufimana Westwood, 1874: 146; ♀ type (location uncertain). DISTRIBUTION: Cambodia.

tenuicollis (Walker). *Eupelmus tenuicollis* Walker, 1872: 86–87; ♀ type (BMNH: 5.1622). Combination by Hedqvist (1961: 98). DISTRIBUTION: Indonesia (South Moluccas).

Catalog of World Cleonyminae

Gary A.P. Gibson

This catalog is compiled from “Gibson, G.A.P. 2003. Phylogenetics and Classification of Cleonyminae (Hymenoptera: Chalcidoidea: Pteromalidae). *Memoirs on Entomology International* 16, i-v + 339 pp.” The document represents a synopsis of the nomenclatural and distributional information given in the Memoir and is not to be regarded as published for the purposes of zoological nomenclature.

April 1, 2003

BOUCEKIINI

Boucekius Gibson

Boucekius Gibson, 2003: 62–63. Type species: *Boucekius primevus* Gibson; by original designation.

primevus Gibson, 2003: 63–64; ♀ holotype (USNM). DISTRIBUTION: Guyana.

Chalcidiscelis Ashmead

Chalcidiscelis Ashmead, 1899: 201. Type species: *Chalcidiscelis koebelei* Ashmead; by original designation and monotypy.

koebelei Ashmead, 1899: 201; ♀ lectotype (USNM: 25517). DISTRIBUTION: Australia (NSW).

CHALCEDECTINI

Agrilocida Steffan

Agrilocida Steffan, 1964: 104–105. Type species: *Agrilocida ferrierei* Steffan; by original designation.

Chalcedectoides Hedqvist, 1967*b*: 182. Type species: *Chalcedectoides saharensis* Hedqvist; by original designation. Synonymy by Bouček (1976*b*: 348).

ferrierei Steffan, 1964: 105–106; ♂ holotype (MHNG). DISTRIBUTION: Algeria, France, Israel.

= *Chalcedectoides saharensis* Hedqvist, 1967*b*: 182–184; ♀ holotype (MHNG). Synonymy by Bouček (1976*b*: 348).

Chalcedectus Walker

Chalcedectus Walker, 1852: 47. Type species: *Chalcedectus maculicornis* Walker; by monotypy.

Polychroma Westwood, 1874: 140. Type species: *Polychroma histrionica* Westwood; subsequent designation by Gahan and Fagan (1923: 117); preoccupied by *Polychroma* Dejean (1833), discovered by Dalla Torre (1897: 88). Synonymy with *Chalcedectus* by Ashmead (1899: 201); synonymy with *Amotura* by Bouček (1988*a*: 265); synonymy reestablished by Gibson (2003: 71).

Amotura Cameron, 1884: 130–131. Type species: *Amotura annulicornis* Cameron; by monotypy. Synonymy by Gibson (2003: 71).

Polychromatium Dalla Torre, 1897: 88. Replacement name for *Polychroma* Westwood. Synonymy with *Chalcedectus* by Ashmead (1899: 201); synonymy with *Amotura* by Bouček (1988*a*: 265); synonymy reestablished by Gibson (2003: 71).

Chalcodectus Dalla Torre, 1898: 186. Unjustified emendation.

Chalcodectes Ashmead, 1899: 201. Unjustified emendation.

Episystole Girault, 1927[416]: 317. Type species: *Episystole poeta* Girault; by original designation. Synonymy with *Chalcedectus* by Bouček (1959: 485); synonymy with *Amotura* by Bouček (1988*a*: 265); synonymy reestablished by Gibson (2003: 71).

Neochalcodectus Masi, 1936: 68. Type species: *Neochalcodectus sinaiticus* Masi; by monotypy. Synonymy with *Chalcedectus* by Bouček (1959: 485); synonymy with *Amotura* by Bouček (1988*a*: 265); synonymy reestablished by Gibson (2003: 71).

Dryadochalcis De Santis, 1970: 25. Type species: *Chalcedectes* (!) *texanus* Brues; by original designation. Synonymy by Gibson (2003: 71).

annulicornis (Cameron). *Amotura annulicornis* Cameron, 1884: 131–132; ♀ type (BMNH: 5.890). Combination by Gibson (2003: 71). DISTRIBUTION: Nicaragua.

annulipes (Ashmead). *Chalcedectes* (!) *annulipes* Ashmead, 1904: 483; ♀ holotype (USNM: 60521). *Chalcedectus annulipes* (Bouček 1959: 485), *Amotura annulipes* (Grissell 1991: 14); combination reestablished by Gibson (2003: 71). DISTRIBUTION: Argentina, Brazil.

balachowskyi Steffan, 1968: 210–212; ♀ holotype (MHNG). DISTRIBUTION: Iran.

busckii (Ashmead). *Euchrysia Busckii* Ashmead, 1900*a*: 256; ♀ syntypes (USNM: 6428). *Amotura busckii* (Grissell 1991: 14), *Chalcedectus busckii* (Gibson 2003: 71). DISTRIBUTION: Puerto Rico.

caelatus (Grissell). *Amotura caelata* Grissell, 1991: 11–14; ♀ holotype (USNM). Combination by Gibson (2003: 71). DISTRIBUTION: Mexico, USA.

cuprescens (Westwood). *Polychroma cuprescens* Westwood, 1874: 142; ♀ labelled as lectotype (OXUM: T. 665). *Polychromatium cuprescens* (Dalla Torre 1898: 186), *Chalcodectus* (!) *cuprescens* (Schmiedeknecht 1909: 151), *Chalcedectus cuprescens* (Bouček 1959: 485), *Amotura cuprescens* (Bouček 1988*a*: 265); combination reestablished by Gibson (2003: 71). DISTRIBUTION: Australia, New Caledonia.

guaraniticus (Strand). *Polychromatium 16-dentatum* var. *guaraniticum* Strand, 1911*c*: 95; ♀ holotype (ZMHB). *Chalcedectus guaraniticus* (Bouček 1959: 486), *Amotura guaranitica* (Grissell 1991: 14); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Paraguay.

histrionicus (Westwood). *Polychroma histrionica* Westwood, 1874: 141; ♀ labelled as lectotype (OXUM: T. 661). *Polychromatium histrionicum* (Dalla Torre 1898: 186), *Chalcedectes* (!) *histrionica* (Ashmead 1904: 483), *Amotura histrionica* (Grissell 1991: 14); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Brazil.

hyalinipennis (Ashmead). *Euchrysia hyalinipennis* Ashmead, 1896*a*: 231; ♀ holotype (USNM: 3334). *Amotura hyalinipennis* (Grissell 1991: 7), *Chalcedectus hyalinipennis* (Gibson 2003: 72). DISTRIBUTION: Canada, Mexico, USA.

= *Euchrysia similis* Girault, 1917[314]: 15; ♀ holotype (USNM: 20464). Synonymy by Grissell (1991: 7).

lanei De Santis, 1970: 22–25; ♀ holotype (MLPA). *Amotura lanei* (Grissell 1991: 14); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Brazil.

maculicornis Walker, 1852: 47; ♀ type (BMNH: 5.889). DISTRIBUTION: Brazil, Guyana, Peru, Venezuela.

maculipennis (Ashmead). *Euchrysia maculipennis* Ashmead, 1896*a*: 232; ♂ lectotype (USNM: 3335) designated by Grissell (1991: 10). *Amotura maculipennis* (Grissell 1991: 10), *Chalcedectus maculipennis* (Gibson 2003: 72). DISTRIBUTION: USA.

meteorus (Girault). *Episystole meteora* Girault, 1927[416]: 317. *Chalcedectus meteorus* (Bouček 1959: 485), *Amotura meteorus* (Bouček 1988*a*: 265, stated as “probably just a form of *cuprescens*"); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Australia (QLD).

poeta (Girault). *Episystole poeta* Girault, 1927[416]. *Chalcedectus poeta* (Bouček 1959: 486), *Amotura poeta* (Bouček 1988*a*: 265, stated as "probably the same as *cuprescens*"); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Australia (QLD).

regalis (Westwood). *Polychroma regalis* Westwood, 1874: 141; 2♀ syntypes, one labelled as lectotype (OXUM: T. 662). *Polychromatium regale* (Dalla Torre 1898: 186), *Chalcedectes* (!) *regalis* (Westwood) (Ashmead, 1904: 483), *Chalcedectus regalis* (Bouček 1959: 486), *Amotura regalis* (Grissell 1991: 14); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Brazil.

sedecimdentatus (Westwood). *Polychroma 16-dentata* Westwood, 1874: 141; ♀ labelled as lectotype (OXUM: T. 663). *Polychromatium sedecimdentatum* (Dalla Torre 1898: 186), *Chalcedectes* (!) *sedecimdentatus* (Ashmead 1904: 483), *Chalcedectus sedecimdentatus* (Bouček 1959: 486), *Amotura sedecimdentatum* (Grissell 1991: 14); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Brazil.

septemdentatus (Westwood). *Polychroma 7-dentata* Westwood, 1874: 142; ♀ labelled as lectotype (OXUM: T. 664). *Polychromatium septemdentatum* (Dalla Torre 1898: 186), *Chalcedectes* (!) *sedecimdentatus* (Ashmead 1904: 483), *Chalcedectus sedecimdentatus* (Bouček 1959: 486), *Amotura sedecimdentatus* (Grissell 1991: 14); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Brazil.

? = *Chalcedectus 7-dentatus* var. *pallidipes* Roman, 1920: 12; ♀ holotype (NHRS) (not found, B. Viklund, pers. comm.). Provisional synonymy by Bouček (1959: 486).

sinaiticus (Masi). *Neochalcodectus sinaiticus* Masi, 1936: 68; 1♀, 1♂ syntypes (MCSN). Combination by Bouček (1959: 485). DISTRIBUTION: Algeria, Israel.

= *Chalcedectus niger* Hedqvist, 1967*b*: 180–182; ♀ holotype (MHNG). Synonymy by Steffan (1968: 209).

superbus (De Santis). *Dryadochalcis superba* De Santis, 1977: 26; ♀ holotype (MACN). *Dryadochalcis texanus* De Santis (1970: 26) *nec* Brues, misidentification. Combination by Gibson (2003: 72). DISTRIBUTION: Brazil, Paraguay.

texanus (Brues). *Chalcedectes* (!) *texanus* Brues, 1907*b*: 106–107; ♀ holotype (USNM: 42714). *Chalcedectus texanus* (Peck 1951: 584), *Dryadochalcis texana* (De Santis 1970: 25, 1977: 26); combination reestablished by Gibson (2003: 72). DISTRIBUTION: Costa Rica, Nicaragua, USA.

CLEONYMINI

Callocleonymus Masi

Callocleonymus Masi, 1940: 289–290. Type species: *Callocleonymus pulcher* Masi; by original designation.

beijingensis Yang, 1996: 76–77, 307; ♀ holotype (NWCF). DISTRIBUTION: China (Beijing).

bimaculae Yang, 1996: 77–78, 307; ♀ holotype (NWCF). DISTRIBUTION: China (Beijing, Shaanxi).

chuxiongensis Yang, 1996: 79, 307; ♀ holotype (NWCF). DISTRIBUTION: China (Yunnan).

ferrierei Kerrich, 1957: 270–272; ♀ holotype (BMNH: 5.2126). DISTRIBUTION: China, Papua New Guinea?.

ianthinus Yang, 1996: 72–75, 306–307; ♀ holotype (NWCF). DISTRIBUTION: China (Beijing, Shaanxi).

pulcher Masi, 1940: 291–294; 3♀ syntypes (DEZA). DISTRIBUTION: Somalia, Turkmenistan.

swezeyi (Yoshimoto and Ishii). *Ptinobius swezeyi* Yoshimoto and Ishii, 1965: 177–178; ♀ holotype (BPBM: 3618). Combination by Bouček (1988*a*: 263). DISTRIBUTION: Australia (QLD), Guam, Micronesia.

xinjiangensis Yang, 1996: 75–76, 307; ♀ holotype (NWCF). DISTRIBUTION: China (Xinjiang).

Cleonymus Latreille

Cleonymus Latreille, 1809: 29. Type species: *Diplolepis depressa* Fabricius; subsequently designated by Latreille (1810: 436).

Ptinobius Ashmead, 1896*b*: 11. Type species: *Charitopus magnificus* Ashmead; by original designation. Synonymy by Bouček (1988*a*: 263).

Aplatygerrhus Girault, 1913[175]: 77–78. Type species: *Aplatygerrhus magnificus* Girault; by original designation. Synonymy by Bouček (1988*a*: 263).

Systolomorphella Girault, 1915[240]: 222. Type species: *Systolomorphella trifasciatipennis* Girault; by original designation. Synonymy by Bouček (1988*a*: 460).

Megormyrus Cockerell, 1926: 36–37. Type species: *Megormyrus amabilis* Cockerell; by monotypy. Synonymy with *Ptinobius* by Burks (1958: 74); synonymy with *Cleonymus* by implication through transfer of type species by Heydon and Bouček (1992: 472).

Paracleonymus Masi, 1927: 340. Type species: *Paracleonymus angustatus* Masi; by monotypy. Synonymy by Kamijo (1996: 746).

Beharella Risbec, 1952: 361. Type species: *Beharella viridicyanea* Risbec; by monotypy. Synonymy by Bouček (1976*a*: 10).

agrili (Rohwer). *Ptinobius agrili* Rohwer, 1919: 5–6; ♀ holotype (USNM: 21994). Combination by Heydon and Bouček (1992: 472). DISTRIBUTION: USA (CA).

albomaculatus Hedqvist, 1960: 415; ♀ holotype (MZLU). DISTRIBUTION: South Africa.

amabilis (Cockerell). *Megormyrus amabilis* Cockerell, 1926: 37–38; ♀ holotype (MCZC: 15668). Combination by Heydon and Bouček (1992: 472). DISTRIBUTION: USA (CO).

angustatus (Masi). *Paracleonymus angustatus* Masi, 1927: 340–343; ♀ holotype (DEIC). Combination by Kamijo (1996: 756). DISTRIBUTION: Japan (Ryukyu Islands), Taiwan.

apicalis Förster, 1841: 34; (NMWA?). DISTRIBUTION: Germany.

balcanicus Bouček, 1972: 270–271; ♀ holotype (HNHM). DISTRIBUTION: Bulgaria, Greece.

brevis Bouček, 1972: 272–273; ♀ holotype (BMNH: 5.2174). DISTRIBUTION: Croatia, France, Greece, Italy, Slovakia.

californicus (Crawford). *Ptinobius californicus* Crawford, 1916: 142; ♀ holotype (USNM: 20820). Combination by Heydon and Bouček (1992: 472). DISTRIBUTION: USA (CA).

californicus Girault, 1917[310]: 11–12; ♀ holotype (USNM: 20348). Preoccupied by *C. californicus* (Crawford 1916). DISTRIBUTION: USA (CA).

canariensis Hedqvist, 1983: 129–130; ♀ holotype (NHRS). DISTRIBUTION: Canary Islands.

ceratinae Kamijo, 1996: 750–751; ♀ holotype (EIHU). DISTRIBUTION: Japan.

collaris Spinola, 1851: 46; ♀ holotype (MRSN). DISTRIBUTION: Brazil.

cyaneus Förster, 1841: 34; (NMWA?). DISTRIBUTION: Germany.

dendatifemur (Girault). *Aplatygerrhus dendatifemur* Girault, 1926[399]: 60. Combination by Bouček (1988*a*: 263). DISTRIBUTION: Australia (TAS).

elongatus Förster, 1841: 33; ♀ (NMWA?). DISTRIBUTION: Germany.

eximius Förster, 1841: 33; ♀, ♂ (NMWA?). DISTRIBUTION: Germany.

laticinctus (Girault). *Systolomorphella laticincta* Girault, 1926[399]: 59. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (NSW).

laticornis Walker, 1837: 351; ♂ holotype (NMID). DISTRIBUTION: China, Europe (Noyes 1998).

= *Ichneumon depressus* Fabricius, 1798: 231; ♀ (MNHN); primary homonym of *I. depressus* Gmelin *in* Linnaeus (1790: 2687, 2706), discovered by Graham (1969: 38). Transferred to *Cleonymus* by Westwood (1828: 16). Synonymy by Kerrich and Graham (1957: 268).

? = *Cleonymus obscurus* Walker, 1837: 352; ♂ lectotype (BMNH: 5.1627) designated by Kerrich and Graham (1957: 270). Tentative synonymy by Bouček (1972: 273). DISTRIBUTION: Europe (Noyes 1998).

= *Cleonymus thomsoni* Erdös, 1957: 361, replacement name for *Cleonymus depressus* Thomson 1878: 5–6 (♀ holotype, MZLU), preoccupied by *C. depressus* (Fabricius 1798). Synonymy by Kerrich and Graham (1957: 269).

longinervus Kamijo, 1983: 298–300; ♀ holotype (EIHU). DISTRIBUTION: Japan, Korea.

magnificus (Ashmead). *Charitopus magnificus* Ashmead, 1888*a*: iv; ♀ holotype (USNM: 27278). *Ptinobius magnificus* (Ashmead 1896*b*: 11), *Cleonymus magnificus* (Bouček 1988*a*: 264). DISTRIBUTION: Canada, USA.

= *Ptinobius dysphagae* Girault, 1915[236]: 130; ♂ holotype (USNM: 61836). Synonymy by Peck (1951: 567).

magnus Bouček, 1988*a*: 264. Replacement name and combination for *Aplatygerrhus magnificus* Girault, 1913[175]: 77 (♀ holotype, SAMA), preoccupied by *C. magnificus* (Ashmead, 1888*a*). DISTRIBUTION: Australia (TAS).

malaicus Narendran and Mini, 1997: 9–11; ♀ holotype (DZUC). DISTRIBUTION: Malaysia.

nigriclavus Girault, 1917[317]: 6–7; ♀ (USNM: 21400; lost, label in type collection reads "missing, March 1968, det. Burks"). DISTRIBUTION: USA(FL).

pentlandi (Girault). *Systolomorphella pentlandi* Girault, 1922[365]: 149–150. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

pini Yang, 1996: 80–83, 307–308; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

regalis (Dodd). *Aplatygerrhus regalis* Dodd, 1924: 164; ♀ holotype (SAMA). Combination by Bouček (1988*a*: 264). DISTRIBUTION: Solomon Islands.

reticulatus (Howard). *Eupelmus reticulatus* Howard, 1897: 146; ♂ syntype (USNM: 6547), ♂ syntype (BMNH: 5.1003). Combination by Gibson (2003: 87). DISTRIBUTION: Grenada.

rufiscapus (Girault). *Aplatygerrhus rufiscapus* Girault, 1925[381]: 3. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

ryukyuensis Kamijo, 1996: 748–750; ♀ holotype (EIHU). DISTRIBUTION: Japan (Ryukyu Islands).

serrulatus Kamijo, 1996: 752–754; ♀ holotype (EIHU). DISTRIBUTION: Japan.

silvifilia (Girault). *Systolomorphella silvifilia* Girault, 1927[416]: 316. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (TAS).

texanus (Crawford). *Ptinobius texanus* Crawford, 1916: 142–144; ♀ holotype (USNM: 20821). Combination by Heydon and Bouček (1992: 472). DISTRIBUTION: Argentina, Brazil, USA (TX).

togashii Kamijo, 1996: 748; ♀ holotype (EIHU). DISTRIBUTION: Japan.

trifasciatipennis (Girault). *Systolomorphella trifasciatipennis* Girault, 1915[240]: 222. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

ulmi **Yang**, 1996: 83, 308; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

unfasciatipennis (Dodd and Girault). *Systolomorphella unfasciatipennis* Dodd and Girault *in* Girault, 1915[240]: 223. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

viridicyaneus (Risbec). *Beharella viridicyanea* Risbec, 1952: 361–363; ♀ holotype (MNHN). Combination by Bouček (1976*a*: 10). DISTRIBUTION: Madagascar.

viridinitens Förster, 1841: 33; ♀ (NMWA?). DISTRIBUTION: Germany.

Dasycleonymus Gibson

Dasycleonymus Gibson, 2003: 89–90. Type species: *Dasycleonymus bakeri* Gibson; by original designation.

bakeri Gibson, 2003: 91–92; ♀ holotype (BMNH). DISTRIBUTION: Indonesia (Kalimantan, Sumatra), Malaysia (Sarawak).

Notanisus Walker

Notanisus Walker, 1837: 352. Type species: *Notanisus versicolor* Walker; by monotypy.

Pannonica Erdös, 1946: 131; primary homonym of *Pannonica* Loerenthey (1895). Type species: *Pannonica sexramosa* Erdös; by original designation. Synonymy by Bouček (1991: 204).

Antsingia Risbec, 1952: 372. Type species: *Antsingia sylvatica* Risbec; by monotypy. Synonymy by Rasplus *in* Bouček (1991: 204).

Pannoniella Erdös, 1960: 306. Replacement name for *Pannonica* Erdös. Synonymy by Bouček (1991: 204).

Amarisca Delucchi, 1962: 11. Type species: *Amarisca oulmesiensis* Delucchi; by original designation. Synonymy by Bouček (1991: 204).

Anacallocleonymus Yang, 1996. Type species: *Anacallocleonymus gracilis* Yang; by original designation. Synonymy by Gibson (2003: 93).

clavatus Bouček, 1961: 471–474; ♀ holotype (NMPC). DISTRIBUTION: Cyprus, Georgia, Greece.

gracilis (Yang). *Anacallocleonymus gracilis* Yang, 1996: 85–86, 308–309; ♀ holotype (NWCF). Combination by Gibson (2003: 93). DISTRIBUTION: China: (Shaanxi).

grandis Senatos, 1996: 93–94; ♀ holotype (ZIKU). DISTRIBUTION: Tadjikistan.

imperialis (Dodd). *Aplatygerrhus imperialis* Dodd, 1924: 163; ♀ holotype (SAMA). *Cleonymus imperialis* (Bouček 1988*a*: 263), *Notanisus imperialis* (Gibson 2003: 93). DISTRIBUTION: Norfolk Island.

oulmesiensis (Delucchi). *Amarisca oulmesiensis* Delucchi, 1962: 12–13; ♀ holotype (location uncertain). Combination by Bouček (1991: 204). DISTRIBUTION: Cyprus, Greece, Morocco.

richteri (Girault). *Systolomorphella richteri* Girault, 1922[365]: 154. Combination by Bouček (1988*a*: 262). DISTRIBUTION: Australia (ACT, QLD).

= *Systolomorphella dinotipennis* Girault, 1922[365]: 154. Synonymy by Bouček (1988*a*: 262).

sexramosus (Erdös). *Pannonica sexramosa* Erdös, 1946: 132–133; ♂ holotype (HNHM). *Pannoniella sexramosa* (Erdös, 1960: 306), *Notanisus sexramosus* (Bouček 1991: 204). DISTRIBUTION: Europe (Noyes 1998).

sylvaticus (Risbec). *Antsingia sylvatica* Risbec, 1952: 373–374; ♀ holotype (MNHN). Combination by Bouček (1991: 204). DISTRIBUTION: Madagascar.

versicolor Walker, 1837: 352–353; ♀ type (BMNH: 5.1628). DISTRIBUTION: Algeria, Europe (Noyes 1998), India.

***zebra* Bouček**, 1988*a*: 262; ♀ holotype (BMNH: 5.3246). DISTRIBUTION: Papua New Guinea.

Zolotarewskya Risbec

Zolotarewskya Risbec, 1955: 180. Type species: *Zolotarewskya seyrigi* Risbec; by original designation. Synonymy with *Systolomorphella* Girault by Bouček (1976*a*: 10); reestablished as valid by Bouček *et al.* (1979: 460).

Pseudocleonymus Hedqvist, 1967*b*: 184. Type species: *Pseudocleonymus spinifer* Hedqvist; by original designation. Synonymy by Bouček *et al.* (1979: 460).

indica (Mani & Kaul). *Chalcedectus indicus* Mani and Kaul *in* Mani *et al.*, 1973: 50–53; ♂ holotype (USNM?). Combination by Bouček *et al.* (1979: 460). DISTRIBUTION: India.

longicostalia Yang, 1996: 90, 309; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

lyra (Girault). *Systolomorphella lyra* Girault 1919[347]: 167–168; ♀ lectotype (BMNH: 5.734). Combination by Bouček *et al.* (1979: 460). DISTRIBUTION: Singapore.

robusta Yang, 1996: 87–90, 309; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

seyrigi Risbec, 1956: 180–182; 2♀ syntypes (MNHN). *Systolomorphella seyrigi* (Bouček 1976*a*: 10); combination reestablished by Bouček (1988*a*: 264). DISTRIBUTION: Madagascar.

shakespearei (Girault). *Systolomorphella shakespearei* Girault, 1926[400]: 2. Combination by Bouček (1988*a*: 264). DISTRIBUTION: Australia (QLD).

spinifera (Hedqvist). *Pseudocleonymus spinifer* Hedqvist, 1967*b*: 184–186; ♀ holotype (MHNG). *Systolomorphella spinifera* (Bouček 1976: 10); *Zolotarewskya spinifera* (Bouček *et al.* 1979: 460). DISTRIBUTION: Algeria.

unnotipennis (Girault). *Systolomorphella unnotipennis* Girault, 1915[240]: 222–223. *Cleonymus unnotipennis* (Bouček 1988*a*: 264); *Zolotarewskya unnotipennis* (Gibson 2003: 96). DISTRIBUTION: Australia (QLD).

HEYDENIINI

Heydenia Förster

Heydenia Förster, 1856: 46, 48–49. Type species: *Heydenia pretiosa* Förster; by monotypy.

Paraheydenia Cameron, 1912*a*: 653–654. Type species: *Paraheydenia longicollis* Cameron; by monotypy. Synonymy by Bouček (1988*a*: 266).

Pterooderella Risbec, 1952: 84. Type species: *Pterooderella ornata* Risbec; by original designation. Synonymy by Bouček (1988*a*: 266).

Risbecisca Hedqvist, 1960: 418. Type species: *Lycisca burgeoni* Risbec; by original designation. Synonymy by Bouček (1988*a*: 266).

Heydenisca Hedqvist, 1967*a*: 142–143. Type species: *Heydenisca mateui* Hedqvist; by original designation. Synonymy by Bouček (1988*a*: 266).

angularicoxa Yang, 1966: 94–95, 310; ♀ holotype (NWCF). DISTRIBUTION: China (Beijing, Shaanxi).

burgeoni (Risbec). *Lycisca Burgeoni* Risbec, 1955: 541; ♀ holotype (MNHN). *Risbecisca burgeoni* (Hedqvist 1960: 418); *Heydenia burgeoni* (Bouček 1988*a*: 266). DISTRIBUTION: Zaire.

coomoni Xiao and Huang, 2002: 145–148; ♀ holotype (CASB). DISTRIBUTION: China (Beijing), Vietnam.

cristatipennis (Girault). *Paraheydenia cristatipennis* Girault, 1924[373]: 3. Combination by Bouček (1988*a*: 266). DISTRIBUTION: Australia (QLD).

indica Narendran *in* Narendran *et al.*, 2001: 150–152; ♀ holotype (DZUC). DISTRIBUTION: India (Kashmir).

longicollis (Cameron). *Paraheydenia longicollis* Cameron, 1912*a*: 654–655; ♂ holotype (BMNH: 5.892). Combination by Bouček (1988*a*: 266). DISTRIBUTION: Australia (NSW, QLD).

madagascariensis (Hedqvist). *Paraheydenia madagascariensis* Hedqvist, 1961: 96; ♀ holotype (BMNH). Combination by Gibson (2003: 99). DISTRIBUTION: Madagascar.

mateui (Hedqvist). *Heydenisca mateui* Hedqvist, 1967*a*: 144–145; ♀ holotype (MNHN). Combination by Bouček (1988*a*: 266). DISTRIBUTION: Chad.

natalensis (Westwood). *Lycisca natalensis* Westwood, 1874: 149; ♂ holotype (OXUM: T. 672). Combination by Hedqvist (1959: 177). DISTRIBUTION: South Africa.

ornata (Risbec). *Pterooderella ornata* Risbec, 1952: 84–87; 4♀ syntypes (MNHN). Combination by Bouček (1988*a*: 266). DISTRIBUTION: Madagascar.

pretiosa Förster, 1856: 46, 48–49; ♀, ♂ syntypes (NMWA). DISTRIBUTION: Europe (Noyes 1998).

= *Heydenia excellens* Wachtl, 1889: 89–91; ♀, ♂ syntypes (NMWA). Synonymy by Hedqvist (1957: 39, 40).

= *Lycisca silvestrii* Russo, 1938: 195–205; 2♀, 1♂ syntypes (DEZA). Synonymy by Hedqvist (1961: 94).

scolyti Yang, 1966: 92–94, 309–310; ♀ holotype (NWCF). DISTRIBUTION: China (Beijing, Shaanxi).

seyrigi (Risbec). *Lycisca Seyrigi* Risbec, 1952: 387–390; ♀ holotype (MNHN). Combination by Hedqvist (1959: 177). DISTRIBUTION: Madagascar.

testacea Yang, 1966: 95–96, 310; ♀ holotype (NWCF). DISTRIBUTION: China (Jiangsu, Shaanxi).

trinodis Bouček, 1988*a*: 266–267; ♀ holotype (BMNH: 5.3247). DISTRIBUTION: Papua New Guinea.

tuberculata Sureshan, 2000: 197–198; ♀ holotype (ZSIK). DISTRIBUTION: India (Karnataka).

unica Cook & Davis, 1891: 15–16; ♀ holotype (USNM: 1850). DISTRIBUTION: USA (Noyes 1998).

Heydeniopsis Hedqvist

Heydeniopsis Hedqvist, 1961: 94. Type species: *Heydeniopsis cleonymoides* Hedqvist, 1961: 95–96; by original designation.

† *cleonymoides* Hedqvist, 1961: 95–96; ♀ holotype (NHRS). DISTRIBUTION: Baltic amber (Eocene).

LYCISCINI

Agamerion Haliday

Agamerion Haliday, 1844: 298. Type species: *Miscogaster gelo* Walker; by monotypy.

Euchrysia Westwood, 1874: 139. Type species: *Euchrysia cleptidea* Westwood; subsequent designation by Ashmead (1904: 281). Synonymy by Bouček (1988*a*: 252).

cleptideum (Westwood). *Euchrysia cleptidea* Westwood, 1874: 139, pl. 26; ♀ lectotype (OXUM: T. 657/1) designated by Bouček (1988*a*: 253). Combination by Bouček (1988*a*: 253). DISTRIBUTION: Australia (ACT, NSW, SA).

coeruleiventre Ashmead, 1900*b*: 340; ♀ syntype (USNM: 4890) (described as a male, but in the USNM type book the type material is listed as two females). Justified emendation from *A. coeruleiventris* by Bouček (1988*a*: 253). DISTRIBUTION: Australia (QLD).

eupelmoideum Girault, 1925[381]: 1. Justified emendation from *A. eupelmoideus* by Bouček (1989: 86); *Agamerion eupelmoides* (!) (Bouček 1988*a*: 253). DISTRIBUTION: Australia (QLD).

gelo (Walker). *Miscogaster gelo* Walker, 1839: 27; ♂ lectotype (BMNH: 5.3281) designated by Bouček (1988*a*: 253). Combination by Haliday (1844: 299). DISTRIBUTION: Australia (NSW, SA).

= *Euchrysia gemmea* Westwood, 1874: 139–140, pl. 26; ♀ lectotype (OXUM: T. 658 ½) designated by Bouček (1988*a*: 253). Synonymy by Bouček (1988*a*: 253).

metallicum Girault, 1915[240]: 216–217. Justified emendation from *A. metallica* by Bouček (1988*a*: 253). DISTRIBUTION: Australia (QLD).

mirum Girault, 1927[407]: 3. DISTRIBUTION: Australia (QLD).

monodon Bouček, 1988*a*: 253–254; ♀ holotype (BMNH: 5.3251). DISTRIBUTION: Indonesia (Irian Jaya).

prasinum (Westwood). *Euchrysia prasina*, Westwood 1874: 170; ♂ lectotype (OXUM: T. 659) designated by Bouček (1988*a*: 254). Combination by Bouček (1988*a*: 254).

DISTRIBUTION: Australia (NSW, NT, QLD).

= *Agamerion nonstylatum* (Girault). *Thaumasura nonstylata*, Girault 1922[360]: 49. Combination by Bouček (1988*a*: 254). Synonymy by Gibson (2003: 114).

= *Agamerion io* Girault, 1935[445]: 3. Synonymy by Gibson (2003: 114).

semialbicorne Girault, 1927[407]: 3. Justified emendation from *A. semialbicornis* by Bouček (1988*a*: 254). DISTRIBUTION: Australia (QLD, WA?).

variflagellum Girault, 1925[381]: 1. DISTRIBUTION: Australia (SA, TAS).

Amazonisca Hedqvist

Amazonisca Hedqvist, 1959: 196. Type species: *Amazonisca batesi* Hedqvist; by original designation and monotypy.

batesi Hedqvist, 1959: 197–198; ♀ holotype (OXUM; missing according to C. O'Toole, *in lit*.). DISTRIBUTION: Brazil, Colombia?, Peru?.

Chadwickia Bouček

Chadwickia Bouček, 1988*a*: 250–251. Type species: *Chadwickia longiceps* Bouček; by original designation and monotypy.

longiceps Bouček, 1988*a*: 251; ♀ holotype (BMNH: 5. 3245). DISTRIBUTION: Australia (NSW).

Epistenia Westwood

Epistenia Westwood *in* Griffith and Pidgeon, 1832: 432. Type species: *Epistenia coeruleata* Westwood; by monotypy.

Dasyglenes Ashmead, 1888*b*: 174–175. Type species: *Dasyglenes osmiae* Ashmead; by monotypy. Synonymy by Viereck (1916: 484).

Idiobia Brèthes, 1927: 330. Type species: *Idiobia schmidti* Brèthes; by monotypy. Synonymy by Bouček (1958: 381).

Epistenia (*Punctepistenia*) Gibson, 2003: 192, 195. Type species: *Epistenia odyneri* Ashmead *in* Davidson (1896); by original designation.

americana Girault, 1912[122]: 172–173; ♀ holotype (ZMHB: 31951). Possibly a synonym of *E. scutellata* Brèthes (Hedqvist 1961: 99). DISTRIBUTION: Paraguay.

bella Strand, 1911*a*: 153; type status uncertain. DISTRIBUTION: Peru.

chilensis Brèthes, 1916: 27–28; type status uncertain. DISTRIBUTION: Chile.

conica Brèthes, 1909: 226; type status uncertain. DISTRIBUTION: Paraguay.

gemmata Girault, 1912[122]: 173–174; ♀ holotype (ZMHB: 31952). Possibly a synonym of *E. conica* Brèthes (Hedqvist 1961: 99). DISTRIBUTION: Paraguay.

goethei Girault, 1913[157]: 56; ♀ holotype (ZMHB). DISTRIBUTION: Paraguay.

liguensis Brèthes, 1916: 28; type status uncertain. DISTRIBUTION: Chile.

scutellata Brèthes, 1909: 226–227; type status uncertain. DISTRIBUTION: Paraguay.

westwoodi (Guérin-Méneville). *Lycisca westwoodi* Guérin-Méneville, 1844: 416; type status uncertain. Combination by Hedqvist (1961: 99). DISTRIBUTION: Colombia.

***Epistenia* (*Epistenia*)** Westwood

burksi Hedqvist, 1968: 3–4; ♀ holotype (USNM: 69556). DISTRIBUTION: USA.

coeruleata Westwood *in* Griffith and Pidgeon, 1832: 432; ♀ holotype (BMNH). DISTRIBUTION: Canada, USA.

= *Epistenia (E.) osmiae* Ashmead, 1888*b*: 174; ♀ holotype (USNM: 41400). Synonymy by Hedqvist (1968: 7).

media Hedqvist, 1968: 5–7; ♀ holotype (USNM: 69557). DISTRIBUTION: USA.

polita (Say). *Spalangia politus* Say, 1829: 79; ♀ neotype (USNM) designated by Gahan (1951: 174). Combination by Gahan (1951: 174). DISTRIBUTION: USA.

regalis Cockerell, 1934: 228; ♀ holotype (MCZC: 20132). DISTRIBUTION: USA.

rufipes Cameron, 1884: 130; ♀ holotype (BMNH: 5.906). DISTRIBUTION: Panama.

schmidti (Brèthes). *Idobia schmidti* Brèthes: 1927: 330–331; ♂ holotype (DEIC). Combination by Bouček (1958: 381). DISTRIBUTION: Costa Rica.

***Epistenia* (*Punctepistenia*)** Gibson

basalis Walker. *Epistenia basalis* Walker, 1862: 392; ♀ holotype (BMNH: 5.904). New status by Gibson (2003: 192). DISTRIBUTION: Brazil.

cyanea (Fabricius). *Chalcis cyanea* Fabricius, 1804: 164; ♀ lectotype (ZMUC) designated by Bouček and Delvare (1992: 17). Combination by Bouček and Delvare (1992: 17). New status by Gibson (2003: 193). DISTRIBUTION: Bolivia, Brazil, Costa Rica, French Guiana, Guyana.

odyneri Ashmead. *Epistenia odyneri* Ashmead *in* Davidson, 1896: 336; ♀ holotype (USNM: 41399). New status by Gibson (2003: 193). DISTRIBUTION: Mexico, USA.

rufipes (Cameron). *Lycisca rufipes* Cameron, 1913: 123–124; described from both sexes, ♂ syntype remaining in BMNH (5.897). Combination by Gibson (2003: 193); preoccupied by *Epistenia* (*E.*) *rufipes* Cameron (1884). DISTRIBUTION: Guyana.

***Eupelmophotismus* Girault**

Eupelmophotismus Girault, 1920[355]: 144. Type species: *Eupelmophotismus eupelmoideus* Girault; by monotypy.

Aligherinia Girault, 1922[365]: 148–149. Type species: *Aligherinia sidneyi* Girault; by monotypy. Synonymy by Bouček (1988*a*: 252).

angustifrons (Girault). *Aligherinia angustifrons* Girault, 1927[387]: 3. Combination by Bouček (1988*a*: 252). DISTRIBUTION: Australia (QLD).

eupelmoideus Girault, 1920[355]: 144. DISTRIBUTION: Australia (QLD).

pulcher (Girault). *Agamerion pulchra* Girault, 1925[387]: 3. Combination and justified emendation by Bouček (1988*a*: 252). DISTRIBUTION: Australia (ACT, NSW, NT, QLD, SA, VIC, WA); Papua New Guinea.

sidneyi (Girault). *Aligherinia sidneyi* Girault, 1922[365]: 149. Combination by Bouček (1988*a*: 252). DISTRIBUTION: Australia (NSW).

Grooca Sureshan and Narendran

Neoepistenia Sureshan and Narendran, 1995: 96; primary homonym of *Neoepistenia* Hedqvist (1959: 194–196). Type species: *Neoepistenia coorgensis* Sureshan and Narendran; by original designation and monotypy.

Grooca Sureshan and Narendran, 1997: 175. Replacement name for *Neoepistenia* Sureshan and Narendran.

coorgensis (Sureshan and Narendran). *Neoepistenia coorgensis* Sureshan and Narendran, 1995: 97–98; ♀ holotype (DZUC). Combination by Sureshan and Narendran (1997: 175). DISTRIBUTION: India (Karnataka), Malaysia, Thailand.

Hadroepistenia Gibson

Hadroepistenia Gibson, 2003: 200–201. Type species: *Hadroepistenia erwini* Gibson; by original designation.

erwini Gibson, 2003: 203–204; ♀ holotype (USNM). DISTRIBUTION: Ecuador.

glabra Gibson, 2003: 204–205; ♀ holotype (USNM). DISTRIBUTION: Bolivia, Peru.

Hedqvistia Gibson

Hedqvistia Gibson, 2003: 205–206. Type species: *Hedqvistia reticulata* Gibson; by original designation.

reticulata Gibson, 2003: 208; ♀ holotype (CNCI). DISTRIBUTION: Ecuador, Peru.

Lycisca Spinola

Lycisca Spinola, 1840: 14–18. Type species: *Lycisca raptoria* Spinola; by monotypy.

amazonica Roman, 1920: 17–18; 5♀ (3 examined), 2♂ (examined) syntypes (NHRS). DISTRIBUTION: Brazil, Colombia, Costa Rica, Mexico, Nicaragua, Peru.

auripyga Strand, 1911*b*: 25; ♀ holotype (ZMHB). Synonymy with *L. maculipes* by Hedqvist (1959: 186); synonymy with *L. ignicaudata* by Roman (1920: 15); status reestablished by Gibson (2003: 209). DISTRIBUTION: Bolivia, Brazil.

cupreoviridis (Brèthes). *Epistenia cupreoviridis* Brèthes, 1908: 11–12; ♂ holotype (MACN?). Combination by Gibson (2003: 209). DISTRIBUTION: Paraguay.

cyaniceps Roman, 1920: 19; 2♀ (1 examined) syntypes (NHRS). DISTRIBUTION: Brazil, Guyana.

decora Strand, 1911*b*: 26; 2♀ syntypes (ZMHB). Tentatively syonymized with *L. amazonica* by Roman (1920: 17). DISTRIBUTION: Paraguay.

ignicaudata Westwood, 1874: 148; ♀ lectotype (OXUM: T. 671 1/4) designated by Hedqvist (1959: 184). DISTRIBUTION: Argentina, Bolivia, Brazil, Colombia, Ecuador, Peru.

= *Lycisca signipennis* Strand, 1911*b*: 26; 3♀ syntypes (ZMHB). Synonymy by Hedqvist (1959: 184); tentative synonymy by Roman (1920: 15).

maculipes (Cameron). *Epistenia maculipes* Cameron, 1884: 130; 3♀, 2♂ syntypes (BMNH: 5.896). Combination by Hedqvist (1959: 186). DISTRIBUTION: Brazil, Colombia, Costa Rica, Panama.

nebulipennis Strand, 1911*b*: 25–26; ♀ holotype (ZMHB). DISTRIBUTION: Bolivia, Brazil, Peru.

ogloblina Hedqvist, 1961: 100–101; ♀ holotype (KHPC). DISTRIBUTION: Argentina, Brazil.

raptoria Spinola, 1840: 18–19, pl. 43; ♀ holotype (MRSN, lost). DISTRIBUTION: Brazil, French Guiana.

romandi Westwood, 1841: 84; ♀ lectotype (OXUM: T. 670) designated by Hedqvist (1959: 182). DISTRIBUTION: Brazil, French Guiana.

= *Lycisca cyanata* Strand, 1911*b*: 25; ♀ holotype (ZMHB). Synonymy by Hedqvist (1959: 181).

Marxiana Girault

Marxiana Girault, 1932[437]: 6. Type species: *Marxiana grandiosa* Girault; by monotypy.

grandiosa Girault, 1932[437]: 6. DISTRIBUTION: Australia (NSW, QLD).

Mesamotura Girault

Mesamotura Girault, 1925[381]: 3. Type species: *Mesamotura aristophani* Girault; by monotypy.

aeschyli Girault, 1927[416]: 312. DISTRIBUTION: Australia (QLD).

aristophani Girault, 1925[381]: 3. DISTRIBUTION: Australia (QLD).

corticis Girault, 1926[402]: 133–134. DISTRIBUTION: Australia (QLD).

keatsi Girault, 1927[416]: 312. DISTRIBUTION: Australia (ACT, NSW, QLD).

Neboissia Bouček

Neboissia Bouček, 1988*a*: 248–249. Type species: *Neboissia armipes* Bouček; by original designation.

armipes Bouček, 1988*a*: 249; ♀ holotype (ANIC). DISTRIBUTION: Australia (ACT, NSW, QLD, SA, VIC, WA).

lata Bouček, 1988*a*: 249–250; ♀ holotype (ANIC). DISTRIBUTION: Australia (NSW, NT, QLD, SA, WA).

Neoepistenia Hedqvist

Neoepistenia Hedqvist, 1959: 194–196. Type species: *Neoepistenia flavoscapus* Hedqvist; by original designation and monotypy.

flavoscapus Hedqvist, 1959: 196; ♀ holotype (NHRS). DISTRIBUTION: Brazil, Ecuador, French Guiana, Peru, Suriname.

Nepistenia Bouček

Nepistenia Bouček, 1988*a*: 257–258. Type species: *Nepistenia septem* Bouček; by original designation and monotypy.

Anepistenia Bouček, 1988*a*: 258–259. Type species: *Anepistenia vexans* Bouček; by original designation and monotypy. Synonymy by Gibson (2003: 142).

Nepistenia (*Anepistenia*) Bouček. New rank by Gibson (2003: 143).

***Nepistenia* (*Anepistenia*)** Bouček

vexans (Bouček). *Anepistenia vexans* Bouček, 1988*a*: 259; ♀ holotype (ANIC). Combination by Gibson (2003: 142). DISTRIBUTION: Australia (NSW, QLD, SA, WA).

***Nepistenia* (*Nepistenia*)** Bouček

septem Bouček, 1988*a*: 258; ♀ holotype (ANIC). DISTRIBUTION: Australia (QLD, SA, WA).

Paralycisca Hedqvist

Paralycisca Hedqvist, 1959: 192. Type species: *Paralycisca cristata* Hedqvist; by original designation and monotypy.

cristata Hedqvist, 1959: 192–193; ♀ holotype (NHRS). DISTRIBUTION: Brazil, Ecuador, Panama, Peru.

Parepistenia Dodd

Parepistenia Dodd *in* Girault, 1915[240]: 218. Type species: *Parepistenia varicornis* Dodd; by original designation and monotypy.

miripes (Girault). *Epistenia miripes* Girault, 1922[360]: 41–42. Combination by Bouček (1988*a*: 255). DISTRIBUTION: Australia (NSW, QLD).

speciosissima (Girault). *Epistenia speciosissima* Girault, 1927[416]: 313–314. Combination by Bouček (1988*a*: 256). DISTRIBUTION: Australia (QLD).

varicornis Dodd *in* Girault, 1915[240]: 218–219. DISTRIBUTION: Australia (ACT, NSW, QLD, SA).

= *Epistenia aedicula* Girault, 1927[407]: 3. Synonymy by Bouček (1988*a*: 256).

Proglochin Philippi

Proglochin Philippi, 1871: 288–289, figs 3a–3c. Type species: *Proglochin maculipennis* Philippi; by monotypy. Synonym of *Lycisca* Spinola (Westwood 1874: 147); synonym of *Epistenia* Westwood (Hedqvist 1959: 177) by implication through transfer of type species; reestablished as valid genus by De Santis (1960: 117).

Neolycisca Hedqvist, 1959: 198–199. Type species: *Neolycisca maculata* Hedqvist; by original designation. Synonymy by Gibson (2003: 221).

maculata (Hedqvist). *Neolycisca maculata* Hedqvist, 1959: 199–200; ♂ holotype (USNM: 64837). Combination by Gibson (2003: 221). DISTRIBUTION: Argentina.

maculipennis Philippi. *Proglochin maculipennis* Philippi, 1871: 288–289, figs 3a–3c; ♀ type (location uncertain). *Lycisca maculipennis* (Westwood 1874: 149), *Epistenia maculipennis* (Hedqvist 1959: 177; 1961: 99). DISTRIBUTION: Chile.

Proshizonotus Girault

Proshizonotus Girault, 1928[422]: 2. Type species: *Proshizonotus mosei* Girault; by monotypy. Synonymy with *Parepistenia* Dodd by Bouček (1988*a*: 254); generic status reestablished by Gibson (2003: 169).

Austrogerrhus Bouček, 1958: 371–373. Type species: *Austrogerrhus gloriosus* Bouček; by original designation. Synonymy with *Parepistenia* by Bouček (1988*a*: 254); synonymy with *Proshizonotus* by Gibson (2003: 169).

Oxyepistenia Bouček, 1988*a*: 256. Type species: *Oxyepistenia lenticeps* Bouček; by original designation and monotypy. Synonymy by Gibson (2003: 169).

Excisoclea Bouček, 1988*a*: 259–260. Type species: *Excisoclea prima* Bouček; by original designation and monotypy. Synonymy by Gibson (2003: 169).

Kraska Bouček, 1988*a*: 260–261. Type species: *Erotolepsiella migneti* Girault; by original designation and monotypy. Synonymy by Gibson (2003: 169).

annulicornis (Girault). *Platygerrhus annulicornis* Girault, 1913[175]: 78. *Parepistenia annulicornis* (Bouček 1988*a*: 255), *Proshizonotus annulicornis* (Gibson 2003: 169). DISTRIBUTION: Australia (TAS).

arenae (Girault). *Thaumasura arenae* Girault, 1932[439]: 4. *Parepistenia arenae* (Bouček 1988*a*: 255), *Proshizonotus arenae* (Gibson 2003: 169). DISTRIBUTION: Australia (QLD).

australiensis (Girault). *Platygerrhus australiensis* Girault, 1915[240]: 211–212. *Parepistenia australiensis* (Bouček 1988*a*: 255), *Proshizonotus australiensis* (Gibson 2003: 170). DISTRIBUTION: Australia (TAS).

camilli (Girault). *Epistenia camilli* Girault, 1925[381]: 1. *Parepistenia camilli* (Bouček 1988*a*: 255), *Proshizonotus camilli* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD).

corticis (Girault). *Epistenia corticis* Girault, 1925[381]: 1. *Parepistenia corticis* (Bouček 1988*a*: 255), *Proshizonotus corticis* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD).

devannyi (Girault). *Epistenia devannyi* Girault, 1937[448]: 1. *Parepistenia devannyi* (Bouček 1988*a*: 255), *Proshizonotus devannyi* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD).

froudei (Girault). *Platygerrhus froudei* Girault, 1929[431]: 318. *Parepistenia froudei* (Bouček 1988*a*: 255), *Proshizonotus froudei* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD).

fulviventris (Girault). *Platygerrhus fulviventris* Girault, 1915[240]: 212–213. *Parepistenia fulviventris* (Bouček 1988*a*: 255), *Proshizonotus fulviventris* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD).

incola (Girault). *Platygerrhus incola* Girault, 1929[431]: 317–318. *Parepistenia incola* (Bouček 1988*a*: 255), *Proshizonotus incola* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD, SA).

inusitata (Girault). *Epistenia inusitata* Girault, 1937[448]: 1. *Parepistenia inusitata* (Bouček 1988*a*: 255), *Proshizonotus inusitata* (Gibson 2003: 170). DISTRIBUTION: Australia (QLD).

lenticeps (Bouček). *Oxyepistenia lenticeps* Bouček, 1988*a*: 256–257; ♀ holotype (AMSA). Combination by Gibson (2003: 170). DISTRIBUTION: Australia (NSW, SA).

migneti (Girault). *Erotolepsiella migneti* Girault, 1935[445]: 3. *Kraska migneti* (Bouček 1988*a*: 261). Combination by Gibson (2003: 171). DISTRIBUTION: Australia (QLD).

mosei Girault, 1928[422]: 2. *Parepistenia mosei* (Bouček 1988*a*: 255); combination reestablished by Gibson (2003: 171). DISTRIBUTION: Australia (VIC).

nigriaenea (Girault). *Epistenia nigriaenea* Girault, 1915[240]: 215–216. *Parepistenia nigriaenea* (Bouček 1988*a*: 255), *Proshizonotus nigriaenea* (Gibson 2003: 172). DISTRIBUTION: Australia (QLD).

pallidicoxa (Girault). *Platygerrhus pallidicoxa* Girault, 1929[431]: 318. *Parepistenia pallidicoxa* (Bouček 1988*a*: 256), *Proshizonotus pallidicoxa* (Gibson 2003: 172). DISTRIBUTION: Australia (QLD).

primus (Bouček). *Excisoclea prima* Bouček, 1988*a*: 260; ♀ holotype (ANIC). Combination by Gibson (2003: 172). DISTRIBUTION: Australia (NSW).

pulchripes (Girault). *Thaumasura pulchripes* Girault, 1927[416]: 314–315. *Parepistenia pulchripes* (Bouček 1988*a*: 256), *Proshizonotus pulchripes* (Gibson 2003: 172). DISTRIBUTION: Australia (QLD).

= *Austrogerrhus gloriosus* Bouček, 1958: 373–374; ♀ holotype (DEIC). Synonymy, under *Parepistenia pulchripes*, by Bouček (1988*a*: 256).

resplendens (Gourlay). *Thaumasura resplendens* Gourlay, 1928: 372; ♀ holotype (MONZ; missing, 1♀ paratype remaining according to J. Berry, *in lit.*). *Parepistenia resplendens* (Bouček 1988*a*: 256), *Proshizonotus resplendens* (Gibson 2003: 172). DISTRIBUTION: New Zealand.

tasmaniensis (Girault). *Platygerrhus tasmaniensis* Girault, 1913[175]: 79. *Parepistenia tasmaniensis* (Bouček 1988*a*: 256), *Proshizonotus tasmaniensis* (Gibson 2003: 172). DISTRIBUTION: Australia (TAS).

Protoepistenia Gibson

Protoepistenia Gibson, 2003: 224–225. Type species: *Protoepistenia melanocara* Gibson; by original designation.

melanocara Gibson, 2003: 229–230; ♀ holotype (USNM). DISTRIBUTION: Brazil.

Riekisura Bouček

Riekisura Bouček, 1988*a*: 247–248. Type species: *Agamerionella curculionis* Girault; by original designation.

auritegula (Girault). *Thaumasura auritegula* Girault, 1927[416]: 315. Combination by Bouček (1988*a*: 248). DISTRIBUTION: Australia (QLD).

curculionis (Girault). *Agamerionella curculionia* Girault, 1915[240]: 221. Combination by Bouček (1988*a*: 248). DISTRIBUTION: Australia (NSW, QLD, NT).

= *Agamerionella brisbanensis* Girault, 1915[240]: 222. Synonymy by Bouček (1988*a*: 248).

Romanisca Hedqvist

Romanisca Hedqvist, 1959: 194. Type species: *Romanisca annulicornis* Hedqvist; by original designation and monotypy.

annulicornis Hedqvist, 1959: 194; ♀ holotype (USNM: 64836). DISTRIBUTION: Brazil, Ecuador, Guyana, Peru, Trinidad.

Scaphepistenia Gibson

Scaphepistenia Gibson, 2003: 232–233. Type species: *Epistenia scutata* Walker, 1862; by original designation.

quadriplagiata (Walker). *Epistenia quadriplagiata* Walker, 1872: 87; ♀ holotype (BMNH: 5.905). Combination by Gibson (2003: 232). DISTRIBUTION: Brazil, Venezuela.

scutata (Walker). *Epistenia scutata* Walker, 1862: 391–392; ♀ holotype (BMNH: 5.903). Combination by Gibson (2003: 232). DISTRIBUTION: Brazil, Costa Rica, Ecuador, Peru.

Shedoepistenia Gibson

Shedoepistenia Gibson, 2003: 235–236. Type species: *Shedoepistenia noyesi* Gibson; by original designation.

noyesi Gibson, 2003: 243–245; ♀ holotype (BMNH). DISTRIBUTION: Costa Rica, Nicaragua, Trinidad.

Solenura Westwood

Solenura Westwood, 1868: xxxvi. Type species: *Solenura telescopica* Westwood; by monotypy.

Ormyrodes Brues, 1907*a*: 46. Type species: *Ormyrodes carinatus* Brues; by original designation and monotypy. Synonymy by Gahan (1951: 174).

Taoga Cameron, 1909: 210–211. Type species: *Taoga rufipes* Cameron; by monotypy. Synonymy by Hedqvist (1961: 98).

Thecasoma Matsumura, 1918: 158.Type species: *Thecasoma longicauda* Matsumura; by monotypy. Synonymy by Bouček (1958: 382).

Thaumasurelloides Girault, 1927[415]: 554. Type species: *Thaumasurelloides silvae* Girault; by original designation and monotypy. Synonymy by Baltazar (1961: 394).

ania (Walker). *Epistenia ania* Walker 1846: 93–94; ♀ lectotype (BMNH: 5.911) designated by Bouček *et al.* (1979: 456). Combination by Hedqvist (1961: 98). DISTRIBUTION: *Oriental* — China (Jiangsu), India, Indonesia (Borneo, Java), Malaysia (Malaya, Sabah, Sarawak), Philippines, Singapore, Sri Lanka, Taiwan, Thailand. *Palearctic* — China (Anhui, Beijing, Liaoning, Shandong, Shaanxi), Japan.

= *Solenura telescopica* Westwood, 1868: xxxvi; ♀ lectotype (OXUM: T. 653 1/3) designated by Bouček *et al.* (1979: 456). Synonymy by Bouček *et al.* (1979: 456).

= *Solenura rufipes* (Cameron). *Taoga rufipes* Cameron, 1909: 211; ♀ lectotype (BMNH: 5.909) designated by Bouček *et al.* (1979: 456). Combination by Hedqvist (1961: 98); synonymy by Bouček *et al.* (1979: 456).

= *Solenura longicauda* (Matsumura). *Thecasoma longicauda* Matsumura, 1918: 159; ♀ type (location uncertain). Combination by Bouček (1958: 382); synonymy with *S. telescopica* by Hedqvist (1961: 98) and Bouček (1958: 382), and with *S. ania* by Bouček *et al.* (1979: 456).

= *Solenura silvae* (Girault). *Thaumasurelloides silvae* Girault, 1927[415]: 554–555; ♀ syntype (QMBA), ♀ syntype (USNM: 41904). Combination by Baltazar (1961: 394); synonymy by Gibson (2003: 153).

feretrius (Walker). *Epistenia feretrius* Walker, 1846: 52, 93; ♀ holotype (BMNH: 5.901). Combination by Hedqvist (1961: 98). DISTRIBUTION: Malaysia, Philippines, Sri Lanka.

fuscoaenea Masi. *Solenura fusco-aenea* Masi, 1943: 68; ♀ holotype (MCSN?). DISTRIBUTION: Somalia.

keralensis (Narendran). *Riekisura keralensis* Narendran, 1992: 57–58; ♀ holotype (on permanent loan to CNCI: 22617). Combination by Gibson (2003: 153). DISTRIBUTION: India, Sri Lanka.

nigra (Walker). *Epistenia nigra* Walker, 1872: 87; ♀ holotype (BMNH: 5.907). *Solenura nigra* (Hedqvist 1961: 98); *Parepistenia nigra* (Bouček 1988*a*: 255); combination reestablished by Gibson (2003: 153). DISTRIBUTION: *Afrotropical* — Botswana, Ivory Coast, Kenya, South Africa, Yemen. *Palearctic* — Israel.

= *Solenura carinatus* (Brues). *Ormyrodes carinatus* Brues, 1907*a*: 47; ♀ holotype (MCPM). Combination by Gahan (1951: 175). Synonymy by Gibson (2003: 153).

Striatacanthus Gibson

Striatacanthus Gibson, 2003: 157–158. Type species: *Striatacanthus abruptus* Gibson; by original designation.

abruptus Gibson, 2003: 159–160; ♀ holotype (UCDC). DISTRIBUTION: Australia, Papua New Guinea.

arcuatus Gibson, 2003: 160–161; ♀ holotype (BPBM). DISTRIBUTION: Indonesia (Irian Jaya, Sula Islands), New Ireland, Papua New Guinea, Solomon Islands (Bougainville, San Cristobal).

Thaumasura Westwood

Thaumasura Westwood, 1868: xxxvi. Type species: *Thaumasura terebrator* Westwood; by monotypy.

Belonea Westwood, 1874: 146. Type species: *Belonea australica* Westwood; subsequently designated by Ashmead (1904: 283). Synonymy by Bouček (1988*a*: 245).

Aressida Cameron, 1911: 350–351. Type species: *Aressida carinicollis* Cameron; by monotypy. Synonymy by Girault (1917[334]: 155).

Calosetroides Girault, 1913[148]: 227–228. Type species: *Calosetroides australica* Girault; by original designation. Synonymy by Bouček (1988*a*: 245).

Agamerionella Girault, 1915[240]: 219–220. Type species: *Agamerionella locustiformis* Girault; by original designation. Synonymy by Girault (1917[334]: 155).

Primisura Bouček, 1988*a*: 244. Type species: *Primisura bidens* Bouček; by original designation and monotypy. Synonymy by Gibson (2003: 161).

annulicornis (Cameron). *Aressida annulicornis* Cameron, 1912*b*: 207–208; ♀ lectotype (BMNH: 5.898) designated by Bouček (1988*a*: 245). Combination by Bouček (1988*a*: 245). DISTRIBUTION: Australia (NSW).

arboris Girault, 1932[439]: 4. DISTRIBUTION: Australia (SA).

australica (Westwood). *Belonea australica* Westwood, 1874: 146, pl. 27; ♀ holotype (OXUM: T. 668). Combination by Bouček (1988*a*: 245). DISTRIBUTION: Australia (NSW, QLD, SA, VIC).

australiensis Bouček, 1988*a*: 245. Replacement name for *Calosetroides australica* Girault, 1913[148]: 228 (♀ holotype, QMBA), preoccupied by *Thaumasura australica* (Westwood). DISTRIBUTION: Australia (VIC).

bella Girault, 1927[416]: 315. DISTRIBUTION: Australia (SA, QLD).

bidens (Bouček). *Primisura bidens* Bouček, 1988*a*: 244; ♀ holotype (ANIC). Combination by Gibson (2003: 162). DISTRIBUTION: Australia (NT, WA).

brevicaudata (Westwood). *Belonea brevicaudata* Westwood, 1874: 147; ♀ holotype (location uncertain). Combination by Bouček (1988*a*: 245). DISTRIBUTION: Indonesia.

brevistylus (Girault). *Agamerionella brevistylus* Girault, 1915[240]: 220. Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (VIC).

carinicollis (Cameron). *Aressida carinicollis*, 1911: 351–352; ♀ holotype (BMNH: 5.899). Combination by Girault (1917[334]: 155). DISTRIBUTION: Solomon Islands (Guadalcanal).

colliscutellum Girault, 1932[439]: 3. DISTRIBUTION: Australia (NSW).

dentatibia Girault, 1927[416]: 315–316. DISTRIBUTION: Australia (QLD, VIC).

diana Girault, 1928[422]: 2. DISTRIBUTION: Australia (VIC).

eleganta Girault, 1926[405]: 1. DISTRIBUTION: Australia (VIC).

femoralis (Westwood). *Belonea femoralis* Westwood, 1874: 146–147; 1♀, 2♂ syntypes (OXUM: T. 669). Combination by Bouček (1988*a*: 246). DISTRIBUTION: Indonesia.

fera Girault, 1932[439]: 4. DISTRIBUTION: Australia (QLD).

goethei Girault, 1937[448]: 1. DISTRIBUTION: Australia (QLD).

imperialis (Froggatt). *Aressida imperialis* Froggatt, 1927: 54–55. Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (NSW).

juno Girault, 1926[405]: 1. DISTRIBUTION: Australia (VIC).

locustiformis (Girault). *Agamerionella locustiformis* Girault, 1915[240]: 219–220. Combination by Girault (1917[334]: 155). DISTRIBUTION: Australia (VIC, WA).

longa Girault, 1928[424]: 4. DISTRIBUTION: Australia (QLD).

macrocalculus Girault, 1932[439]: 4. DISTRIBUTION: Australia (TAS).

magnispina Girault, 1932[439]: 4. DISTRIBUTION: Australia (QLD).

marmoratipennis Girault, 1927[416]: 314. DISTRIBUTION: Australia (QLD).

micans Girault, 1932[439]: 4. DISTRIBUTION: Australia (QLD).

nelsoni Girault, 1932[439]: 4. DISTRIBUTION: Australia (QLD).

nigricornis (Cameron). *Aressida nigricornis* Cameron, 1912*a*: 208–209; ♀ lectotype (BMNH: 5.900) designated by Bouček (1988*a*: 246). Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (NSW).

niobe Girault, 1932[439]: 4. DISTRIBUTION: Papua New Guinea.

omnicyanea Girault, 1932[439]: 4. *Agamerion omnicyaneum* (Bouček 1988*a*: 254); combination reestablished by Gibson (2003: 163). DISTRIBUTION: Australia (QLD).

pavo (Girault). *Agamerionella pavo* Girault, 1915[240]: 221. Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (QLD).

rubrifunicle Girault, 1932[439]: 4. DISTRIBUTION: Australia (TAS).

rubritibia Girault, 1932[439]: 4. DISTRIBUTION: Australia (NSW).

rubrofemoralis Ashmead, 1900*b*: 341; ♀ holotype (USNM: 48921). DISTRIBUTION: Australia (NSW).

sanguinipes (Girault). *Agamerionella sanguinipes* Girault, 1915[240]: 220–221. Combination by Bouček (1988*a*: 246). DISTRIBUTION: Australia (NSW, VIC).

scutellata (Girault). *Agamerionella scutellata* Girault, 1915[240]: 221. Combination and new status from *A. sanguinipes* var. *scutellatus* by Bouček (1988*a*: 246). DISTRIBUTION: Australia (VIC).

solis Girault, 1932[439]: 4. DISTRIBUTION: Australia (QLD).

terebrator Westwood, 1868: xxxvi; 3♀ syntypes (OXUM: T. 652). DISTRIBUTION: Australia (SA).

= *Belonea erythropoda* Cameron, 1888: 122–123; ♀ lectotype (BMNH: 5.913) designated by Bouček (1988*a*: 246). Synonymy by Bouček (1988*a*: 246).

westwoodi Girault, 1917[334]: 154–155; ♀ holotype (USNM: 20894). DISTRIBUTION: Australia (SA).

Urolycisca **Roman**

Urolycisca Roman, 1920: 19–20. Type species: *Lycisca apicalis* Walker; by original designation.

apicalis (Walker). *Lycisca apicalis* Walker, 1862: 393–394; ♀ holotype (BMNH: 5.893). Combination by Roman (1920: 20). DISTRIBUTION: Brazil, Ecuador, Guyana.

balteata (Cameron). *Epistenia balteata* Cameron, 1884: 129; 4♀, 1♂ syntype (BMNH: 5.895). Combination by Hedqvist (1961: 100). DISTRIBUTION: Costa Rica, El Salvador, Guatemala, Mexico, Panama.

hastata (Walker). *Lycisca hastata* Walker, 1862: 393; ♀ holotype (BMNH: 5.894). Synonym of *Lycisca romandi* Westwood (Hedqvist 1959: 177, 181); reestablished status and combination by Hedqvist (1961: 100). DISTRIBUTION: Brazil; Peru.

Westwoodiana Girault

Westwoodiana Girault, 1922[365]: 151. Type species: *Westwoodiana testaceiformis* Girault; by monotypy.

purpureipes Girault, 1927[416]: 316. DISTRIBUTION: Australia (QLD).

testaceiformis Girault, 1922[365]: 151. DISTRIBUTION: Australia (QLD).

OODERINI

Oodera Westwood

Oodera Westwood, 1874: 145. Type species: *Oodera gracilis* Westwood; subsequent designation by Ashmead (1904: 288).

Stellophora Risbec, 1951: 239. Type species: *Stellophora magnifica* Risbec; by monotypy. Synonymy by Bouček (1958: 375).

ahoma (Mani & Kaul). *Lycisca ahoma* Mani & Kaul *in* Mani *et al.*, 1973: 53–55; ♀ holotype (USNM: 76268). Combination by Bouček *et al.* (1979: 448). DISTRIBUTION: India, Pakistan, Sri Lanka.

albopilosa Crosby, 1909: 86–88; ♀ holotype (CUIC). DISTRIBUTION: Zambia.

bestia Nikol'skaya, 1952: 474; ♀ syntypes (ZMAS). DISTRIBUTION: Ukraine.

dakarensis Risbec, 1957: 256–260; 3♀, 1♂ syntypes (MNHN). DISTRIBUTION: Senegal.

formosa (Giraud). *Heydenia formosa* Giraud, 1863: 21–22; ♀ holotype (location uncertain). Combination by implication by Bouček (1958: 375). *Stellophora formosa* (Hedqvist 1957: 44). DISTRIBUTION: Bulgaria, France, Italy, Romania, Russia, Ukraine.

gracilis Westwood, 1874: 145; ♀ holotype (OXUM: T. 667). DISTRIBUTION: Indonesia (Irian Jaya, Sulawesi).

hoggarensis Hedqvist, 1967*b*: 186–187; ♀ holotype (MHNG). DISTRIBUTION: Algeria.

longicollis (Cameron). *Epistenia longicollis* Cameron, 1903: 97–99; ♀ lectotype (BMNH: 5.891) designated by Bouček in Bouček *et al.* (1979: 449). Combination by Hedqvist (1961: 97). DISTRIBUTION: Indonesia (Kalimantan), Malaysia (Sabah), Myanmar, Philippines.

= *Oodera ornata* Gahan, 1925: 97–99; ♀ holotype (USNM: 26762). Synonymy by Bouček *et al.* (1979: 448).

madegassa Bouček, 1958: 376–380; ♀ holotype (NMPC: 3028). DISTRIBUTION: Madagascar.

magnifica (Risbec). *Stellophora magnifica* Risbec, 1951: 239–243; ♀ type (MNHN). Combination by Bouček (1958: 375). DISTRIBUTION: Senegal.

monstrum Nikol'skaya, 1952: 474; ♀ syntypes (ZMAS). DISTRIBUTION: Russia.

obscura Westwood, 1874: 146; ♀ type (location uncertain). DISTRIBUTION: Indonesia.

pumilae Yang, 1996: 100, 311; ♀ holotype (NWCF). DISTRIBUTION: China (Heilongjiang).

regiae Yang, 1996: 98–100, 310; ♀ holotype (NWCF). DISTRIBUTION: China (Shaanxi).

rufimana Westwood, 1874: 146; ♀ type (location uncertain). DISTRIBUTION: Cambodia.

tenuicollis (Walker). *Eupelmus tenuicollis* Walker, 1872: 86–87; ♀ type (BMNH: 5.1622). Combination by Hedqvist (1961: 98). DISTRIBUTION: Indonesia (South Moluccas).

Dinotiscus	0	0	2	0	1	0	0	0	0	0	1	0	0	0
Rhaphitelus	0	0	2	0	1	0	0	0	0	0	1	2	0	0
Rhopalicus	0	0	2	0	1	0	0	0	0	0	1	0	0	0
Roptrocerus	0	0	2	0	1	0	0	0	0	0	1	0	0	0
Gastracanthus	0	0	2	0	1	0	0	0	0	0	1	0	0	0
Ogloblinisca	0	0	2	0	1	0	0	0	0	0	1	0	0	0
Platygerrhus	0	0	2	0	1	0	0	0	0	0	1	0	0	0
Plutothrix	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Doddifoenus	0	0	0	0	1	0	1	0	0	0	0	0	?	0
Leptofoenus	0	0	0	0	1	0	1	0	0&2	0	0	0	0	0
Nefoenus	0	0	0	0	1	1	0	0	0	0	0	0	?	0
Macromesus	0	0	2	0	1	1	0	0	0	0	0	1	0	0
Callimomoides	1	1	0	0	0	0	0	0	0	0	1	2	1	1
Hetreulophus	1	1	0	0	1	0	0	0	0	0	0	2	1	0
Zeala	1	1	1	0	1	0	0	0	0	0	0	2	1	0
Agamerion	1	1	0	0	0	1	0	0	0	0	0	2	1	0
Chadwickia	1	1	0	0	0	1	0	0	0	0	0	2	1	0
Eupelmophotismus	1	1	0	0	0	0&1	0	0	0	0	0	2	1	0
Grooca	1	1	0	1	0	1	0	0	0	0	0	0&1	0	0&1
Marxiana	1	1	0	0	0	1	1	0	1	0	0	1	1	0
Mesamotura	1	1	0	0	0	0	0	1	0	0	0	2	1	0
Neboissia	1	1	0	0	0	1	0	0	1	0	0	2	1	0
N. (Anepistenia)	1	1	0	0	0	1	0	0	1	0	0	2	1	1
N. (Nepistenia)	1	1	0	0	0	1	0	0	1	0	0	2	1	1
Parepistenia	1	1	0	0	0	1	0	0	1	0	0	1	1	0
Proshizonotus	1	1	0	0	0	0&1	0	0&2	0&1&2	0	0	2	1	0
Riekisura	1	1	0	0	0	0&1	0	0	1	0	0	2	1	0
Solenura	1	1	0	1	0	1	0	0	0	0	0	0	0	0
Striatacanthus	1	1	0	0	0	1	0	0	0	0	0	2	1	0
Thaumasura	1	1	0	0	0	0&1	0	0&1	1&2	0	0	2	1	0
Westwoodiana	1	1	0	0	0	1	0	0	1	0	0	2	?	0
NW Proshizonotus	1	1	0	0	0	1	0	0	0&1	0&1	0	2	1	0
Amazonisca	1	1	0	0	0	1	0	0	1	0	0	2	1	0
E. (Epistenia)	1	1	0	0&1	0	1	0	0	0	1	0	2	1	0
E. (Punctepistenia)	1	1	0	0&1	0	1	0	0	0	1	0	2	1	0
Hadroepistenia	1	1	0	0&1	0	0&1	0	0	1	1	0	2	1	0
Hedqvistia	1	1	0	0	0	1	0	0	0	0	0	2	1	0
Lycisca	1	1	0	0	0	1	0	0	0	0	0	2	1	0
Neoepistenia	1	1	0	0	0	0&1	0	0	0	0	0	2	1	0
Paralycisca	1	1	0	0	0	1	1	0	0	0	0	2	1	0
Proglochin	1	1	0	0	0	1	0	0	0&1	0	0	2	1	0
Protoepistenia	1	1	0	0&1	0	1	0	0	0	0	0	2	1	0
Romanisca	1	1	0	0	0	1	0	0	0	0&1	0	2	1	0
Scaphepistenia	1	1	0	0	0	1	0	0	1	1	0	2	1	0
Shedoepistenia	1	1	0	0&1	0	0&1	0	0	0&1	0&1	0	2	1	0
Urolycisca	1	1	0	0&1	0	0&1	0	0	1	0	0	2	1	0
Boucekius	0	0	0	0	0	0	0	0	0	0	0	2	?	0
Chalcidiscelis	0	1	0	0	0	1	0	0	0	0	0	2	?	0
Agrilocida	1	0	0	0	0	1	1	0	1	0	0	2	1	0
Chalcedectus	1	1	0	0	0	0&1	0	0	0	0	0	0	0	0
Callocleonymus	1	1	2	0	0	1	0	0	0	0	0	2	1	0
Cleonymus	1	1	1&2	0	0	1	0	0	0	0	0	2	1	0
Dasycleonymus	1	0	1	0	0	1	0	0	0	0	0	2	1	0
Notanisus	1	1	2	0	0	1	0	0	0	0	0	2	1	0
Zolotarewskya	1	0&1	1&2	0	0	1	0	0	0	0	0	2	1	0
Heydenia	1	1	0	0	0	0	0	0	0	0	0	0	0	0

Oodera	1	1	0	0	0	0&1	1	0	0	0	0	0	0	0

0	0	0	0	2	?	1	1	0	0	2	0	0	0	0	0	2	2	0	0	0	0
0	1	0	0	2	?	1	1	0	0	2	0	0	0	0	0	2	2	0	0	0	0
0	0	0	0	2	?	1	1	0	0	2	0	0	0	0	0	2	2	0	0	0	0
0	0	0	0	2	?	1	2	0	0	0	0	0	0	0	0	2	2	0	0	0	0
0	0	0	0	0	0	1	0	1	0&1	2	0	0	0	0	0	2	2	0	0	0	0
0	0	0	0	0	0	1	0	1	0	2	0&1	0&1	0	0	0	0&2	2	0	0	0	0
0	0	0	0	0	0	1	2	2	0	2	0	0	0	0	0	0&2&3	2	0	0	0	0
0	0	0	0	0	0	1	0	1	0	2	0	0	0	0	0	2	2	0	0	0	0
0	0	0	0	0	0	1	3	0	1	0	0	?	0	1	0	5	0	2	0	?	0
0	0	0&1	0	0	0	0	2	2	1	0	0	0	0	0	0	0	0	2	0	0	0
0	0	0	0	0	0	0	0	1	1	0	0	?	0	0	0	0	0	0	0	?	0
0	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	2	0	0	0	0
0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	4	2	0	0	0	0
0	0	0	0	2	?	1	2	2	0	2	0	0	0	0	0	0	2	0	0	0	0
0	0	0	0	0	0	1	3	2	0	2	0	0	0	0	0	0	2	0	0	0	0
0	0	2	2	0	1	0	2	2	0	1	1	1	0	0	0	0&1	2	1	0	0	1
0	0	1&2	0	0	1	0	2	2	0	1	1	1	0	0	1	0	2	0	0	0	1
0	0	2	2	0	1	0	2	2	0	0&1	1	1	0	0	0	0&1	2	1	0	0	1
0	0	0	2	1	1	0	2	0	0	0	0&1	0&1	0	1	0&1	0	2	0&1	0	0	1
0	0	0	2	0	1	0	2	1	0	0	1	1	0	1	0	0	2	0	1	1	1
0	0	1	2	0	0	0	2	2	0	0	0	0	0	1	3	0	2	1	0	0	1
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3	1	0	2	0	1	0	2	2	0	0	0	0	0	1	0	1	2	0	0	0	1
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0	0	0	2	0	1	0	2	2	0	1	0	0	0	1	0	0	2	0	0	0	1
0	0	0	2	1	1	0	2	0	0	0	0&1	0&1	0	1	1	0	2	1	0	0	1
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0	0	1&2	2	0	0&1	0	2	2	0	0&1	0	0	0	1	0&2	0&1	2	0&1	0	0	1
0	0	0	2	0	1	0	2	2	0	0	0	?	0	1	0	0	2	0	0	?	1
0	0	0	2	0	1	0	2	2	0	0	1	1	0&1	1	0	0	2	0	0	0	1
0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0	0	2	0	0	0	1
0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0	0	2	0	0	0	1
0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0	0	2	0	0	0	1
0	0	0	2	0	1	0	2	2	0	0	0&1	0	1	1	0	0	2	0	0	0	1
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0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0	0	2	0	0	0	1
0	0	0	2	0	1	0	2	2	0	0	0	0	1	1	0	0	2	0	0	0	1
0	0	0	0	0	1	0	0	0	0	1	0	?	0	0	0	0	0	0	0	?	0
0	0	0	0	0	0	0	0	0	0	0	0	?	0	0	0	0	2	0	0	?	0
1	3	0	0	2	?	0	2	1	1	0	0	0	0	0	0	0	1	0	0	0	1
0	4	0	0&1	0	1	0	4	3	0	1	0	0	0	0&1	0	0&1	1	0&1	0	0	1
3	2	0	0	2	?	0	2	2	0	0	0	0	0	0	0	3	2	0	0	0	1
1&2	0	0	0	2	?	0	2	1&2	0	0	0	0	0	0&1	0&1	0&1&4	2	0	0	0	1
2	0	0	0	2	?	0	2	1	0	0	1	0	0	1	1	0	2	0	0	0	1
1&2	0	0	0	2	?	0	2	1&2	0	0	0	0	0	0&1	0&1	1&4	2	0	0	0	1
1&2	0	0	0	2	?	0	2	1&2	0	0	0	0	0	0&1	0&1	0	2	0	0	0	1
0	0	0	0	0&1&2	0&1	0&1	2	0	0&1	0&1	0	0	0	0	0	0&1&4	2	0&1	0	0	0

0	0	0	0	0	1	0	3	3	0	0	0	0	0	1	0	0	2	1	0	0	0

1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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3	0	0	0	0	0	1	0	?	0	0	0	0	0	?	1	0	?	0	0	?
1	0	0	0	1	0	1	0	0	0	0	0	0	0	8	1	0	0	0	0	0
0	0	0	0	0	0	0	0	?	0	0	0	0	0	?	1	0	?	0	0	?
1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
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2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
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0&2	0	0	0	0	0	0&1	0	0	0&3&5	0	0	1	0	0	0	0	0	0	0	0
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0	0	0&1	0	0	0	0&1	0&1	0&1	0&5	0	0	0&1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	1	0&1	0	0	0	0	0	0	0	0&1	1	1	0&2	0&2
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0	0	0&1	0	0	0	0	0&1	0&1	0	0	0	0	0	0	0	0	0	0&1	0&2	0&2
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0	0	0&1	0	0	0	1	0&1	0	0	0	0	0&1	0&1	2	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2
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0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	1	1	1	0&1	0&1&2
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0	0	1	0	0	0	0	0&1	1	0	0	0	0	0	0	0	1	1	1	0&2	2
0	0	0&1	0	0	0&1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0
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0	0	1	0	0	1	0	0&1	0&1	0	0	0	0	0	0	0	1	1	1	2	2
0	1	0	0	0	0	0	1	?	1	0	0	0	0	?	0	0	?	0	0	?
0	0	1	0	0	0	0	1	?	2	0	0	0	0	?	0	0	?	0	0	?
1	0	0	1	0	0	0	1	0	3	1	0	0	0	1	0	0	0	0	0	0
0&2	1	0	1	0	0	0	1	1	3&4	1&2	0&1&2	0	0	0&1	0	0	0	0	0	0
0&2	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
0&2	0	0	1	0	0	0	0	0	0&1&2	0	0	0	0	1	0	0	0	0&1	0&1	0
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0	0	0	1	0	0	0	0	0	2	0	0	0	0	1	0&1	0	0	0	0&1	0
1&2	0	0&3	0	0&1	0&1&2	0&1	0&1	0	0&5	0	0	0	0	0&1	0	0	0	0	0	0

0 1 4 0 0 2 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0

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0	0	2	0
0	0	2	0
0	0	2	0
0	0	2	0
0	0	2	0
0	0	2	0
0	0	0	1
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0	0	1	0
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0	0	2	1
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0&1	0&1&2	2	1
0	0	1	1
0	0	2	1
1	1	1	1
0	0	1	1
0	0	1	1
1	1	1	1
0&1	0&1	1	1
0	0	1&2	1
0&1&2	2	2	1
1	1	1	1
0	0	2	1
0	0	2	1
0	0	1	1
1	1	2	1
2	2	2	1
2	2	2	1
0	0	2	1
0	0	2	1
0	0	2	1
0	0	2	1
1	1	2	1
0	2	2	1
2	2	2	1
0	0	2	1
1	1&2	2	1
0	0	2	1
0	2	2	1
0	0	0	0
2	?	2	0
1	1	1	0
0&1&2	0&1&2	2	1
0&1	0&1	2	1
0&1	0&1	2	1
1	0	2	1
0&1	0&1	2	1
0&1	0&1	2	1
0	0	2	1

0 0 2 0

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