# Morphology of Baridinae and related groups (Coleoptera, Curculionidae)

*by*

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PENSOFT

Sofia–Moscow

2009

ZooKeys 10 (Special Issue)

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First published 2009
ISBN 978-954-642-486-0 (paperback)

Pensoft Publishers
Geo Milev Str. 13a, Sofia 1111, Bulgaria
Fax: +359-2-870-42-82
info@pensoft.net
www.pensoft.net

Printed in Bulgaria, May 2009

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ZooKeys 10: 1-136 (2009)
doi: 10.3897/zookeys.10.47
www.pensoftonline.net/zookeys

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# Morphology of Baridinae and related groups (Coleoptera, Curculionidae)

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Academic editor: *Miguel Alonso-Zarazaga* | Received 1 November 2008 | Accepted 7 April 2009 | Published 20 May 2009

**Citation:** Davis SR (2009) Morphology of Baridinae and related groups (Coleoptera, Curculionidae). ZooKeys 10: 1-136. doi: 10.3897/zookeys.10.47

**Abstract**

Although the phylogenetic classification of Curculionoidea is still in its infant stages, knowledge of the morphology of this large radiation of beetles also is relatively lacking. Few morphological reviews have been done at the family level, and even fewer have examined the subfamily level and below (beyond description of genital morphology). Morphological studies within the subfamily Baridinae are limited and have mostly been restricted to the study of genital morphology, with a few exceptions. This study provides a fairly comprehensive, though by no means exhaustive, review of baridine external and internal morphology to aid future studies on the group, particularly in phylogenetics.

**Keywords**

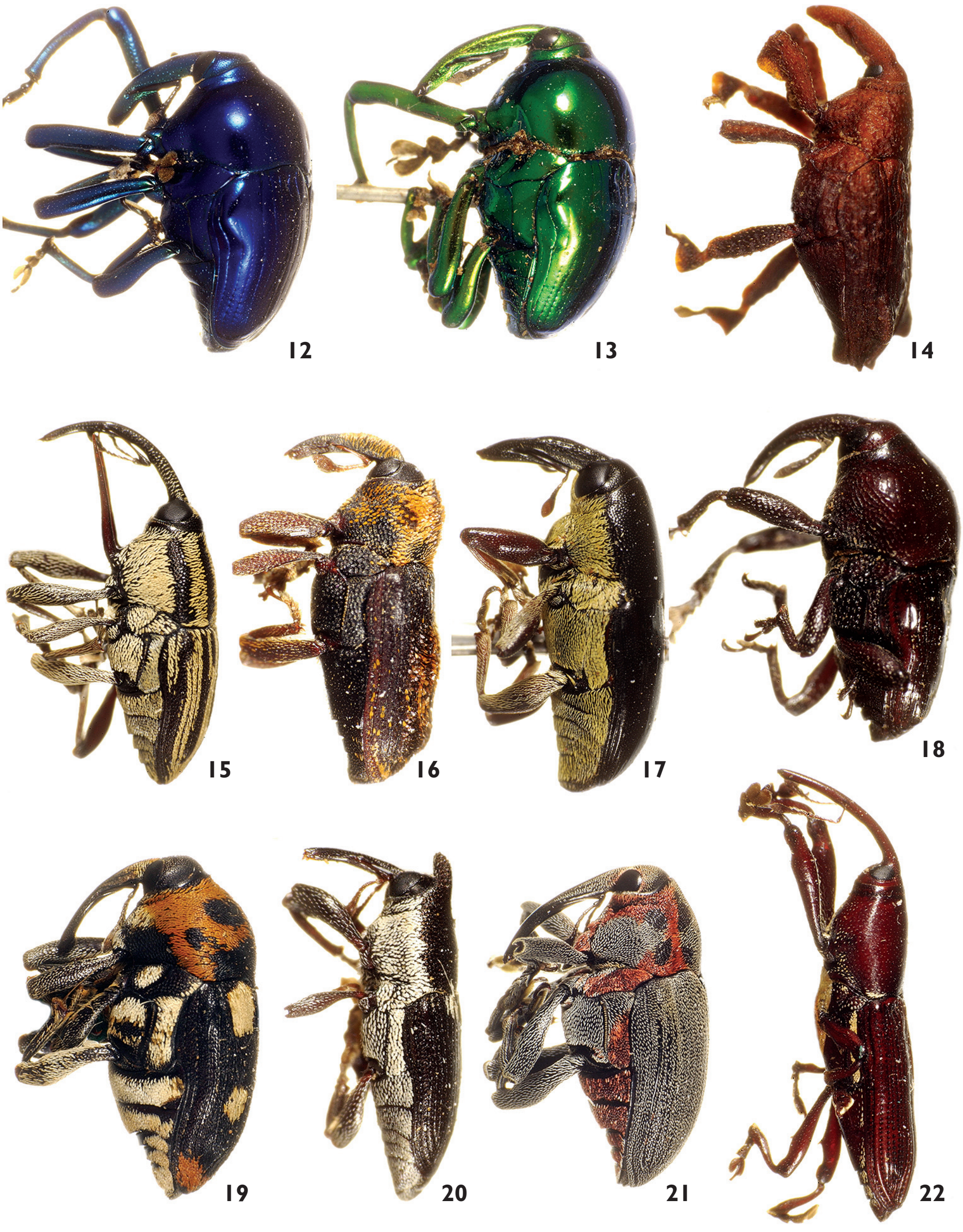
Curculionoidea, weevils, genitalia, wing-locking mechanisms, stridulation

## Introduction

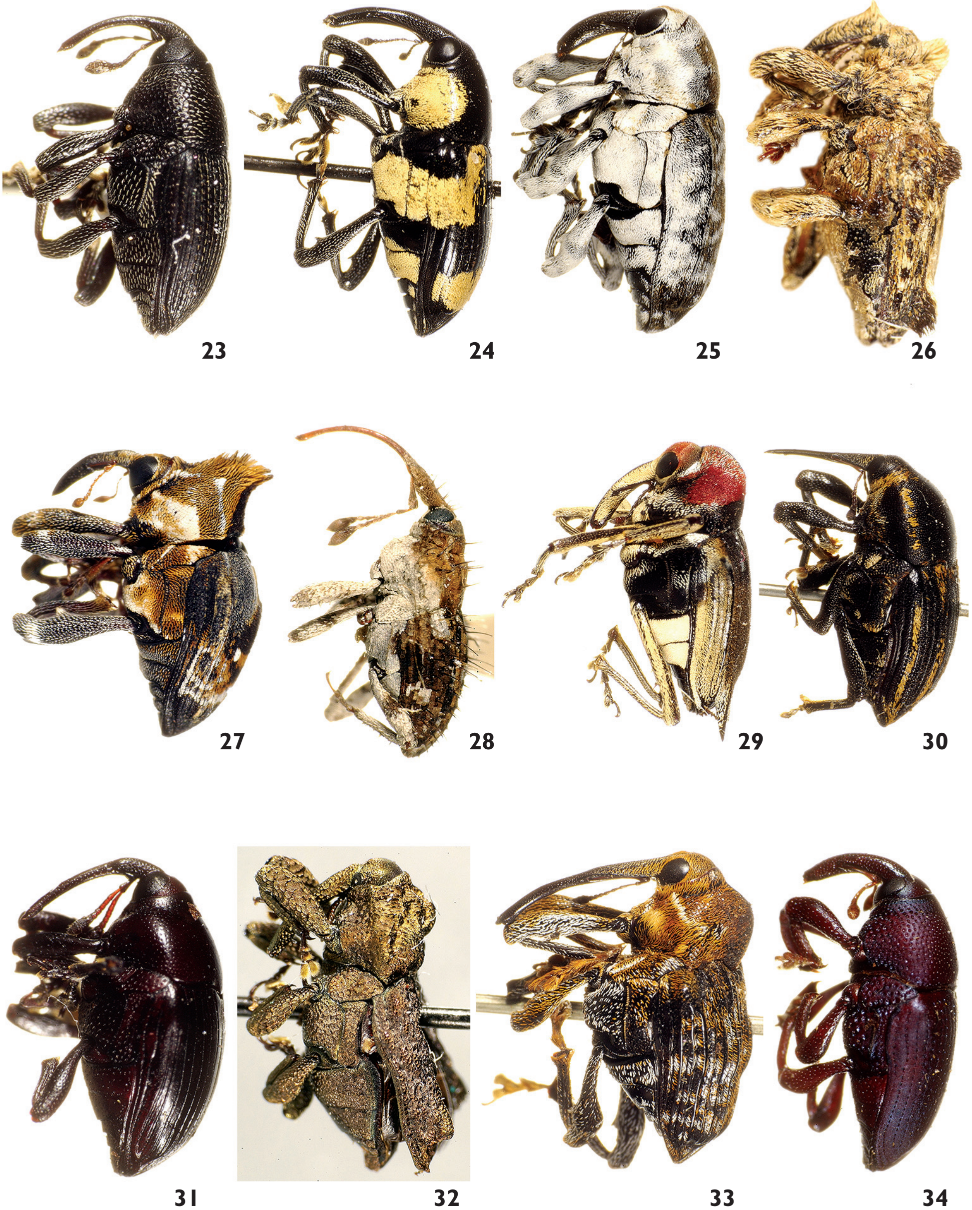
Currently there are approximately 550 genera belonging to the subfamily Baridinae (Morimoto and Yoshihara 1996), placed into 9 tribes and 17 subtribes (Alonso-Zarazaga and Lyal 1999). Other classifications have been suggested of a more inclusive group containing the baridines, such as Baridinae *s. lat.*, containing Baridini, Trigonocolini, Zygopini, Ceutorhynchini, and Orobitini in Zherikhin and Egorov (1990), or a similar grouping, Barididae, with the tribes elevated to subfamilies, thereby containing Baridinae, Ceutorhynchinae, Trigonocolinae, Orobitinae, and Zygopinae in Zherikhin and Gratshev (1995). Oberprieler et al. (2007) also follow this broad sense of Baridinae, which includes the four other weevil groups mentioned above. While the characters in support of the Baridinae *s. lat.* certainly appear to be of merit, as stated by Korotyaev et al. (2000), they do not warrant a larger grouping until greater taxon and character inclusive studies are accomplished. Also, while this broader sense of Baridinae *s. lat.* may be informative of their evolutionary histories, their taxonomic rank should not be firmly stated until rigorous phylogenetic analyses have been performed. Thus, this study will adhere to the more traditional Baridinae *s. str.* which excludes Ceutorhynchinae, Trigonocolinae, Orobitidinae, and Conoderinae (Alonso-Zarazaga and Lyal 1999).

Indeed, the morphological diversity within Baridinae is vast (Figs 1-42, 49-90). Although baridines are quite easily differentiated from most other weevil groups by their characteristic round shape and ascended mesepimeron, these traditional diagnostic characters certainly are not apomorphic to baridines only and, below the level of subfamily, baridine identification is difficult at best (Anderson 2002). Due to the scarcity in knowledge of morphological diversity in Baridinae, the following is a review of baridine morphology which may serve as a reference to those who normally might not examine features beyond known taxonomic relevance. Although studies have been done examining the adult morphology of numerous weevil groups, such as those done by Morimoto (1962a, 1962b), Morimoto et al. (2006), and Franz (2006), none to date have treated Baridinae. With the exception of Morimoto and Yoshihara (1996) and Yoshihara and Morimoto (1994), few baridine studies have illustrated structures that are beyond importance to the taxonomist (namely genitalia and some external features), though these recent, illustrated taxonomic studies, such as Prena (2001, 2005, 2006, 2008a, 2008b), Pakaluk and Carlow (1994), Vaurie (1982), Zaslavskij (1956), and Zimmerman (1992), show marked improvement over earlier baridine studies, such as those of Bondar (1942, 1942b, 1943), Casey (1892, 1920, 1922), Hustache (1938, 1949, 1951b), Lea (1931), Sleeper (1956), and Voss (1958). Given the number of morphological characters one can sample from an organism is infinite, those of particular relevance to baridine phylogeny are the foci of this treatment. Because there have been no comprehensive studies assessing character systems for baridine weevils, those characters which are thought to be of phylogenetic significance are reviewed. The morphology of most structures covered within Baridinae is also described for a few groups outside of the subfamily for comparison. This morphological treatment is being presented in advance of a morphological cladistic analysis of Baridinae (Davis, in prep.), the first treatment examining the evolution of the subfamily in a phylogenetic context and also addressing the group's relationship to other weevil subfamilies, its position within the Curculionidae, as well as taxonomic issues. Unless indicated otherwise, all morphological terms are reproduced from Morimoto et al. (2006), Morimoto (1962a), Morimoto and Kojima (2003), Chaboo (2007), Ting (1936), and Velázquez De Castro (1998, 2002; metendosternite morphology).


**Figures 1-11**. Adults, lateral view. 1, *Amercedes subulirostris*; 2, *Baris torquata*; 3, *Centrinus curvirostris*; 4, *Barymerus binarius*; 5, *Conoproctus quadripustulatus*; 6, *Cylindrocerus comma*; 7, *Cyrionyx camelus*; 8, *Demoda vittata*; 9, *Diastethus eurhinoides*; 10, *Diorymerus lancifer*; 11, *Embates chaetopus*.




**Figures 12-22**. Adults, lateral view. 12, *Eurhinus festivus*; 13, *Eurhinus festivus*; 14, *Fryella mutilata*; 15, *Geraeus lineellus*; 16, *Lepidobaris acnisti*; 17, *Loboderes citriventris*; 18, *Madarellus ebenus*; 19, *Megabaris quadriguttata*; 20, *Microstrates cocois*; 21, *Optatus palmaris*; 22, *Pacomes subglaber*.




**Figures 23-34**. Adults, lateral view. 23, *Palmelampius heinrichi*; 24, *Pardisomus biplagiatus*; 25, *Peridinetus suturalis*; 26, *Phacelobarus singularis*; 27, *Pistus galeatus*; 28, *Plocamus echidna*; 29, *Pteracanthus smidtii*; 30, *Remertus marginatus*; 31, *Reveniopsis* sp.; 32, *Rhytidoglymma aenescens*; 33, *Telemus* sp.; 34, *Zygobarinus coelestinus*.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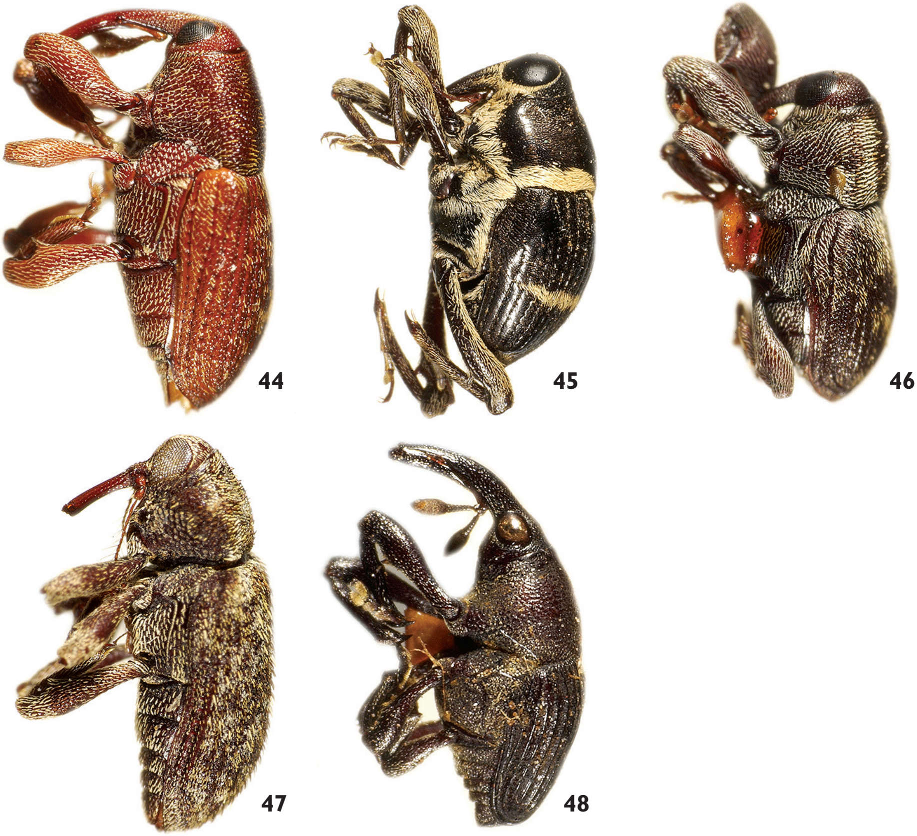
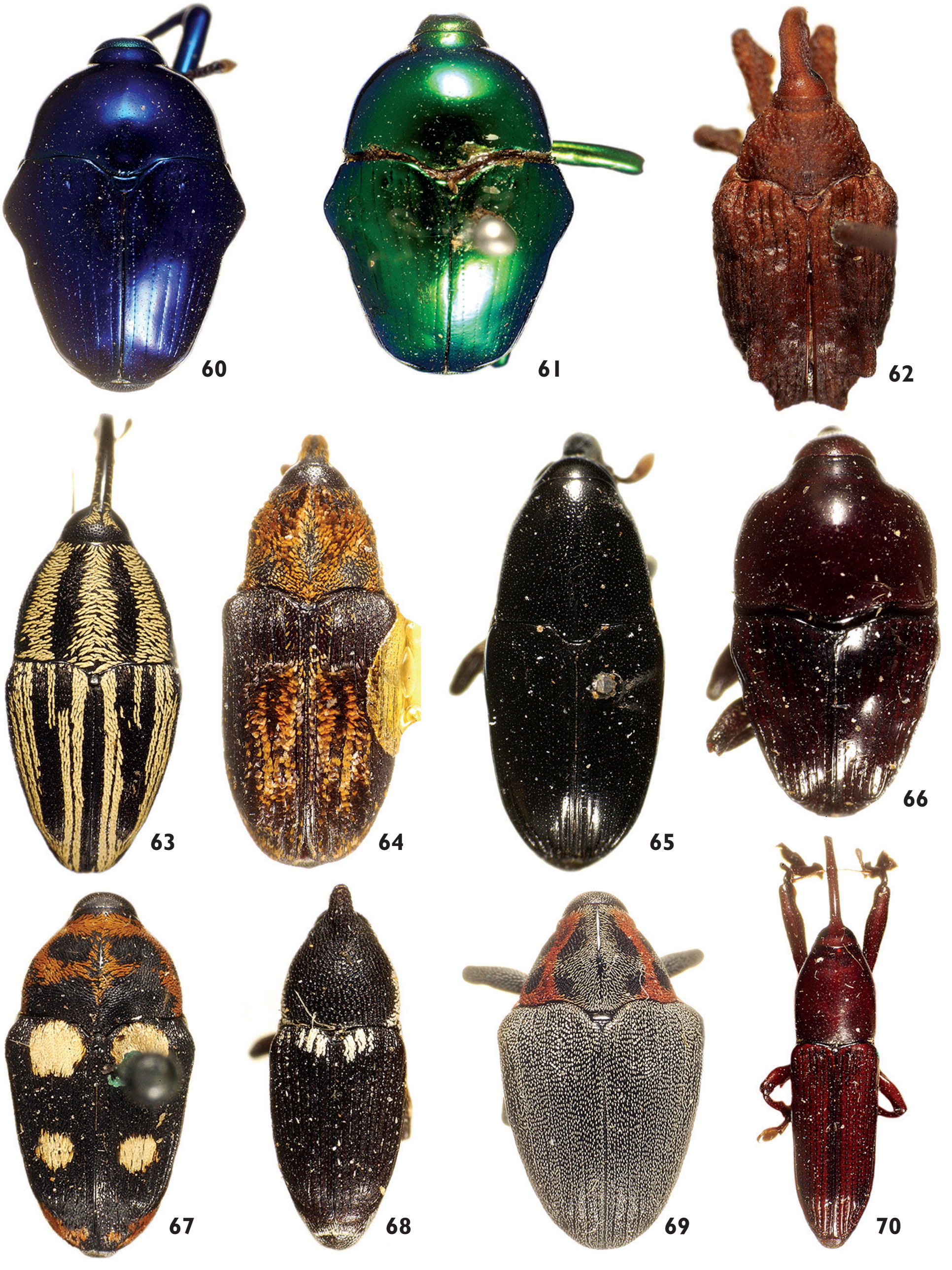
**Figures 35-43**. Adults, lateral view. 35, *Allomegops* sp.; 36, *Cymatobaris impressifrons*; 37, *Hiotus inflatus*; 38, *Megalobaris viridana*; 39, *Ortycus setifer*; 40, *Testalthea* sp.; 41, *Tonesia* sp.; 42, *Trichobaris texana*; 43, *Arachnobas gazella*.

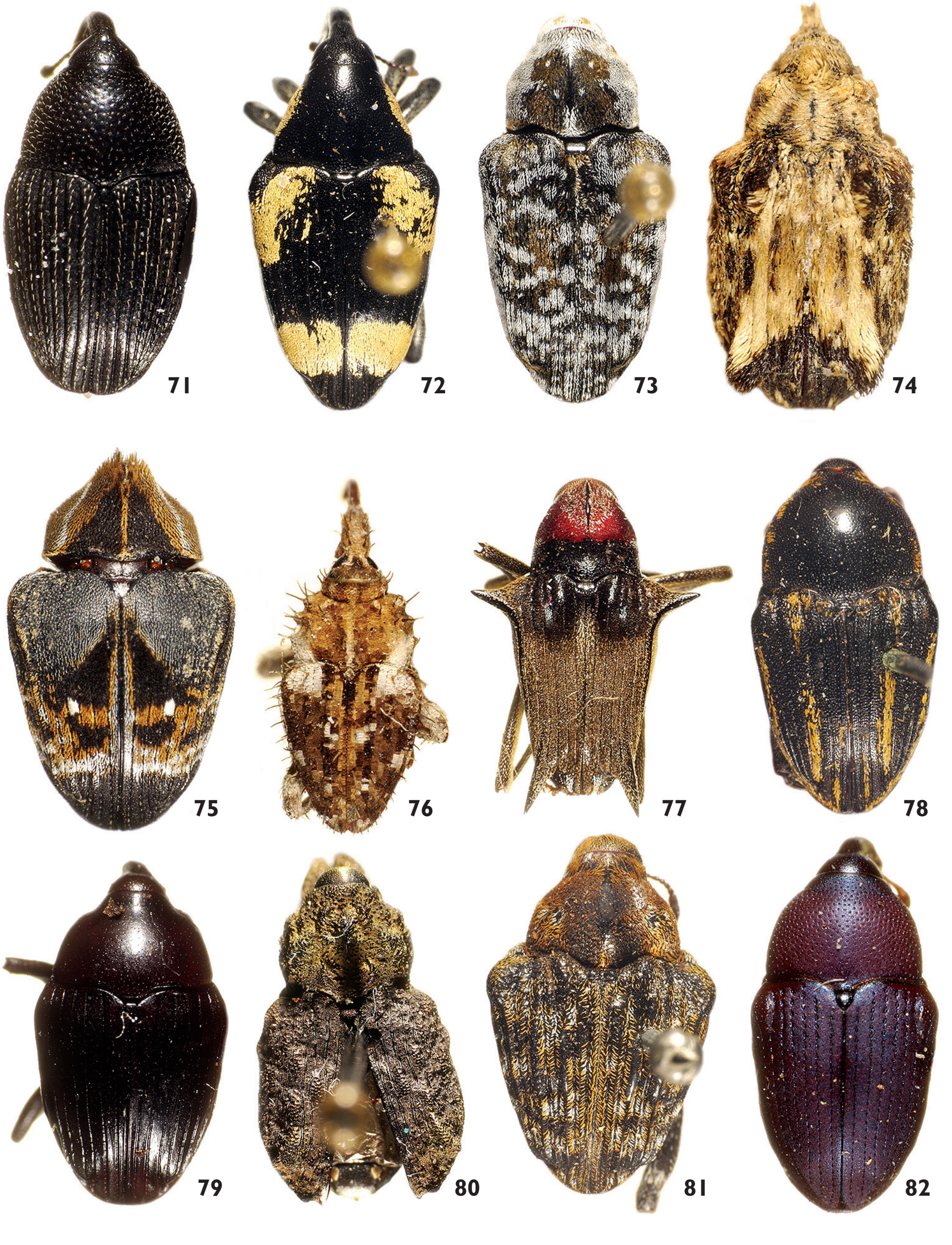



**Figures 44-48**. Adults, lateral view. 44, *Balanogastris kolae*; 45, *Cyllophorus fasciatus*; 46, *Telephae oculata*; 47, *Trichodocerus* sp.; 48, *Trigonocolus curvipes*.

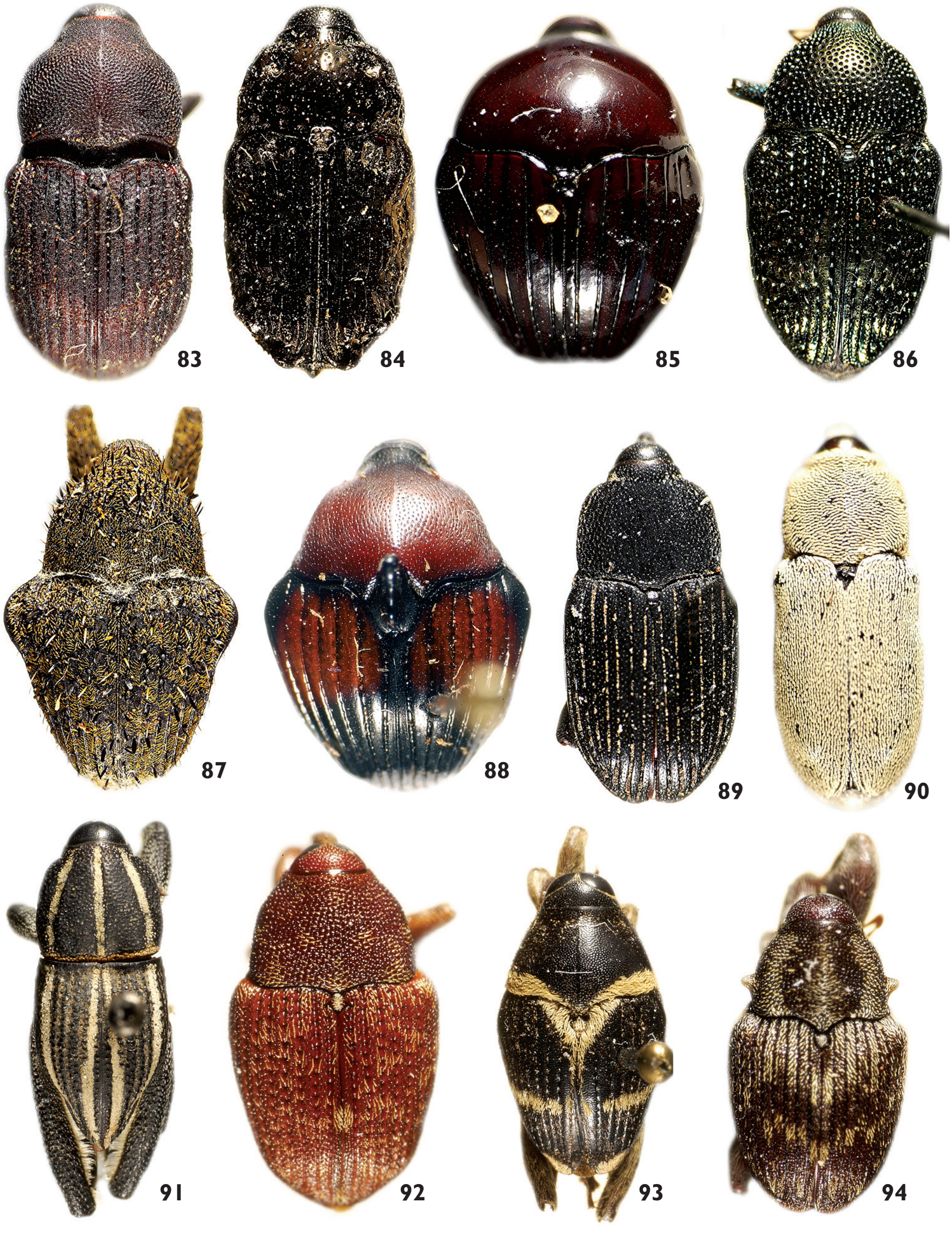
**Figures 49-59**. Adults, dorsal view. 49, *Amercedes subulirostris*; 50, *Baris torquata*; 51, *Centrinus curvirostris*; 52, *Barymerus binarius*; 53, *Conoproctus quadripustulatus*; 54, *Cylindrocerus comma*; 55, *Cyrionyx camelus*; 56, *Demoda vittata*; 57, *Diastethus eurhinoides*; 58, *Diorymerus lancifer*; 59, *Embates chaetopus*.



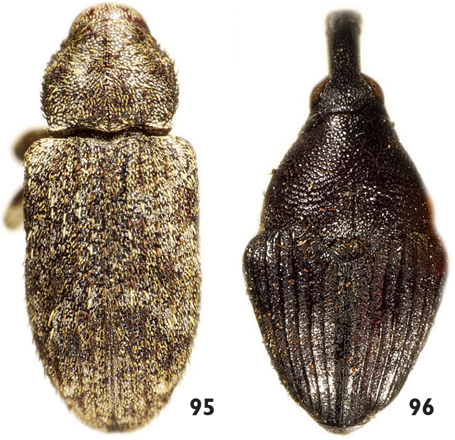

**Figures 60-70**. Adults, dorsal view. 60, *Eurhinus festivus*; 61, *Eurhinus festivus*; 62, *Fryella mutilata*; 63, *Geraeus lineellus*; 64, *Lepidobaris acnisti*; 65, *Loboderes citriventris*; 66, *Madarellus ebenus*; 67, *Megabaris quadriguttata*; 68, *Microstrates cocois*; 69, *Optatus palmaris*; 70, *Pacomes subglaber*.




**Figures 71-82**. Adults, dorsal view. 71, *Palmelampius heinrichi*; 72, *Pardisomus biplagiatus*; 73, *Peridinetus suturalis*; 74, *Phacelobarus singularis*; 75, *Pistus galeatus*; 76, *Plocamus echidna*; 77, *Pteracanthus smidtii*; 78, *Remertus marginatus*; 79, *Reveniopsis* sp.; 80, *Rhytidoglymma aenescens*; 81, *Telemus* sp.; 82, *Zygobarinus coelestinus*.




**Figures 83-94**. Adults, dorsal view. 83, *Allomegops* sp.; 84, *Cymatobaris impressifrons*; 85, *Hiotus inflatus*; 86, *Megalobaris viridana*; 87, *Ortycus setifer*; 88, *Testalthea* sp.; 89, *Tonesia* sp.; 90, *Trichobaris texana*; 91, *Arachnobas gazella*; 92, *Balanogastris kolae*; 93, *Cyllophorus fasciatus*; 94, *Telephae oculata*.



**Figures 95-96**. Adults, dorsal view. 95, *Trichodocerus* sp.; 96, *Trigonocolus curvipes*.

## Materials and methods

***Taxon sampling*** (Appendix I)

Following Alonso-Zarazaga and Lyal (1999), species were sampled from each of the 9 tribes and 17 subtribes in Baridinae, with a total of 283 baridine species, representing 231 genera, included in this study. A total of 29 species were sampled as outgroup taxa, consisting of 12 subfamilies outside of Baridinae. The complete study encompassed a total of 302 taxa (Appendix I). Outgroup selection was based on phylogenies produced by Marvaldi et al. (2002), and previous baridine classifications by Zherikhin and Egorov (1990), and Zherikhin and Gratshev (1995).

Taxa were borrowed from the following institutions:

USNM National Museum of Natural History (United States National Museum), Smithsonian Institution, Washington, D.C., USA.
SEMC Snow Entomological Museum, University of Kansas, Lawrence, Kansas, USA.
CMNC Canadian Museum of Nature, Ottawa, Canada.
IZCAS Institute of Zoology, Chinese Academy of Sciences, Beijing, China.
CAS California Academy of Sciences, San Francisco, California, USA.
FMNH Field Museum of Natural History, Chicago, Illinois, USA.

### *Specimen dissection and preparation*

Body and genitalia dissection:
All dissections were performed using an Olympus SZ60 microscope. For each taxon in which multiple specimens were available, a full-body dissection was done for the male and abdominal dissection for the female (including genitalia). For taxa in which only holotype or paratypes were available (Table 2), no dissections were made and only external characters were coded. In some taxa, full-body dissections were not permitted by the borrowing institution and thus only abdominal dissections were done for those males.

For body dissections, specimens were first relaxed by soaking them in warm water for ~10-15 minutes, the duration depending on the size of the specimen. The head, pro-thorax, meso- meta-thorax complex, and abdomen were then separated. Before digesting any internal tissues, the elytra and hind wings were removed and stored in glycerin, as digesting was not required for these parts. The remaining dissected parts were digested in a 10% KOH solution for 10-15 minutes, again depending on the size of the specimen. Following digestion, all remaining internal tissues were removed and the sclerotized parts cleaned. The meso- and meta-nota were separated from the mesepimera, metepisterna, and metepimera, and subsequently separated from each other. The terga were separated from the sterna along one side, and the genitalia removed together with the $8^{th}$ terga. After dissections were completed, all parts were stored in glycerin.

Mouthpart dissection:
Following dissection of the body, the head was digested further in 10% KOH for ~15-30 minutes, depending on specimen size. Under the microscope, the head was placed with the ventral side facing upwards. One pair of fine-tipped forceps was used to stabilize the rostrum while another pair was used to gently separate the postmentum of the labium from the submentum of the rostrum. The maxilla were subsequently removed in a similar fashion, separating them from the submentum at the cardo-submentum junction. The mandibles were then removed, separating them from the postcoila.

Hind wing and mouthpart preparation:
Following dissection of the hind wing from the thorax and mouthparts from the rostrum, these parts were then mounted on glass microscope slides for further examination. One hind wing from each body dissection was mounted on a slide in Euparal mounting medium. The labium, maxilla, and mandibles from the same specimen were mounted on the same slide as the hind wing, but in Canadian balsam. The slide was then placed on a slide warmer to dry the mounting mediums.

Scanning Electron Microscopy:
All SEM images were captured using a LEO 1550 FESEM. Specimens were mounted on an SEM stub using Leit-C-Plast adhesive and an isopropanol-based colloidal graphite. Whole specimens were placed on insect pins or glued to paper points, securing the pin or point on an SEM stub using Leit-C-Plast. Dissected parts were mounted on a

stub by securing them with a thin layer of colloidal graphite. After the desired parts were mounted, coating was performed using gold.

## Adult morphology

***General appearance*** (Figs 1-42, 49-90, 97-109)

In comparing possible sistergroups, such as Conoderinae, Orobitidinae, Ceutorhynchinae, and Molytinae (Figs 43-48, 91-96), to Baridinae, many adult baridines have a characteristic rounded appearance as viewed dorsally and laterally (Figs 13, 23, 31, 61, 71, 79, 97-99), where all anterior, posterior, dorsal, and ventral margins are smooth and contiguous. This common body form usually is also complemented by a dark color (brown/black) and a largely glabrous derm. However, as one might expect from any large insect lineage, there are many aberrant taxa that fall beyond the stereotypic form. For instance, the body can be relatively round as viewed dorsally, ball-like and strongly arcuate as viewed laterally (Figs 101, 102); round as viewed dorsally, dorso-ventrally compressed as viewed laterally (Figs 103, 104); elongate as viewed dorsally, relatively round as viewed laterally (Figs 105-107). In the dorsal view, although many taxa have a round appearance formed by the pronotum and elytra, this round quality can be quite different when making comparisons, mostly due to contrasting size ratios of the posterior margin of the pronotum and anterior margins of the elytra. A round appearance is formed in the following ways: the posterior margin of the pronotum is narrower than the elytra, mostly due to wide, projecting elytral shoulders; the posterior margin of the pronotum is contiguous with the anterior margin of the elytra; the pronotum is slightly expanded laterally, thus wider than the elytra.

Many baridines are largely glabrous, in which the derm is bare dorsally, with scales usually present laterally and ventrally in each cuticular puncture. Few, though, actually appear to be entirely glabrous (Fig. 109). The majority have varying degrees of vestiture on the prothorax, legs, abdomen, and elytra (Fig. 108).

***Scales*** (Figs 110-126, 131)

In Baridinae, variously modified scales are present on different areas of the body. Typical scales present on the thorax, elytra, and occasionally on the ventrites, are ribbed, often with short, acute projections or spines along the lateral and apical margins (Figs 113-118). These scales have varying numbers of ribs and can range from being narrow to broad and more rounded. Although scales mostly are appressed against the body, some taxa (*Plocamus*) bear ones that protrude from the pronotum and elytra and are more narrow and elongate (Fig. 110). Types of specialized scales include those present medially on the basal ventrites of some male taxa. These scales are quite distinct from surrounding ones on the ventrites, being erect and slightly elongate (Fig. 119). The apex of these scales seem to form fimbriate fringes (Fig. 120), suggesting they may function as a type of sex scale, possibly similar to those present in Lepidoptera. The tergites bear quite unusual scales, owing to their involvement in fastening the wings (Gorb 1998). Those on the 7th tergite are usually fan-like with numerous long lobes projecting from the apex (Figs 121-123). The spiculate patches, which are most developed on the 7th tergite but typically are present on most tergites in baridines, are also composed of highly modified scales or setae, functioning in wing-locking (Figs 125). Structures known as plectra, which are formed by raised ridges, each bearing a small, spiniform scale, are also present on the 7th tergite (Figs 122, 124). These structures are responsible for sound production and function by scraping against a file on the inner side of the elytra. It is likely that some of the strangest scales in Baridinae are those along the dorsal margin of the metasternum-the sclerolepidia. Although observations have shown there to be four general forms of sclerolepidia (Lyal et al. 2006), baridines possess only two of these forms. One is usually trifurcate, but can have more furcations (~5) and is more appressed against the body (Figs 111, 112). The second form bears many fimbriate flanges along the apical margin and protrudes from the body. For further discussion on sclerolepidia see below.

## ***Head and rostrum*** (Figs 127-165)

The compound eyes in the majority of genera are not particularly noteworthy, as compared to those of ceutorhynchines, conoderines, and some molytines, which are large and anteriorly situated on the frons (Figs 152-154). Those of baridines typically are elongate, although many genera possess sub-circular eyes, and are situated antero-ventrally (Figs 137, 139, 149).

Between the compound eyes in some genera (*Peridinetus*, *Pteracanthus*, *Tenemotes*) is a fovea (Figs 133, 138, 139, 149), which can be relatively large (i.e. the size of a puncture) or small (smaller than a puncture). A fovea is normally present when the junction between the rostrum and frons is smooth and flush.

The fashion of how the rostrum meets the head also differs between taxa. The junction between the rostrum and frons may be contiguous and flush (Fig. 165), form a slight depression or sulcus (Figs 160, 161, 163), or form a strong sulcus (Figs 156-159, 162). There is great variation with regard to rostrum form, both in length and width. The majority of baridines possess a relatively long rostrum, which is wider basally, gradually narrows apically, and is broadly curved, as viewed laterally (Figs 156, 157). In some groups, however, this type is also present, but the rostrum is strongly curved (Figs 158, 162). Punctation on these types of rostra follows the general pattern of larger punctures present basally and punctures becoming smaller apically. A similar type of rostrum, possessed by groups such as *Crotanius*, *Dactylocrepis*, and *Myctides*, is again wide basally, gradually narrowing apically, only more elongate (Figs 159-161). A few taxa (*Myctides*) possessing this type also bear an elongate, dense patch of setae along the apico-ventral region of the rostrum (Fig. 161). A modification of this moderately long, broadly curved type of rostrum is the enlargement or inflation of the basal part (Fig. 162). This type is distinct from the more gradually narrowing type in that the basal third or half of the rostrum is markedly enlarged, and the apical remainder abruptly narrower. Another more distinctive, but less common, rostrum form is shorter and thicker/more robust (Fig. 163). The last general type of rostrum is slender, linear (or only with a slight curve), and cylindrical (Fig. 164), but can be dorso-ventrally flattened in some taxa . Punctures on this rostrum type often are subequal in size along the length of the rostrum.

**Antenna** (Figs 166-182): The baridine antenna appears to bear 12 articles (Morimoto et al. 2006), though this number is not agreed upon by all systematists. The scape often is fairly elongate when inserted at the middle of the rostrum or beyond, but can be extremely short when inserted near the base. The funicle consists of 7 articles, which may be almost moniliform and bead-like (Figs 137, 149, 169) to cylindrical with the articles flush and often compacted (Figs 144, 146, 177, 181). The first funicular article, the pedicel, always is longer than the other funicular articles. The club contains the remaining articles. In most genera, the club appears to consists of 3 articles; however, it clearly also bears an annulation dividing the third article, which may represent a 4$^{th}$ article (Figs 166-168, 181) that is often small and difficult to distinguish. If this fourth article is indeed as distinct as the others, then the 3$^{rd}$ article in the apparent 3-article condition may actually be formed by the fusion of the 2 apical articles. The club is of 2 general forms: the first, in which the club is compact, and the first basal article is longest, with the remaining 3 articles short (Figs 168, 178); the second, in which all of the articles are subequal in length (Figs 135, 171, 172). When this second type is observed, the club may be only slightly longer than the first type or may be elongate (Figs 140, 151, 179, 180). In a few genera the funicular articles may be modified, with lateral pectinations (Fig. 143, 173), and the club may be as well (Fig. 173), though any modification of the antenna is rare in baridines.

### *Mouthparts*

**Labium** (Figs 183, 186, 195-269): The labium in Baridinae (Fig. 183) does not appear to possess any apomorphic characters that are particularly diagnostic for the group, a somewhat unsurprising find in Curculionidae given their wide diet breadth and rather low amount of host specialization. Most characters, therefore, show relatively little variation and are quite homoplasious due to convergence among baridine species, as well as between non-baridine groups, and are fairly uninformative. Until detailed information can be gathered and synthesized regarding baridine host-plants, much of the observed variation and potential convergence in mouthpart morphology is untenable. Although variation in the labium is seen in the length and size of the prementum, palpus, and setae on these parts, the number of palpal segments is constant in Baridinae (three). The palpus is usually moderately elongate, but can be small in some taxa where the prementum is enlarged (Figs 200, 206, 208, 233). The basal two palpal segments are large and globular to slightly elongate, while the third apical segment typically is smallest and elongate and bears a number (~5-10) of small sensilla on the apical margin (Fig. 190). Setae can be present on all three palpal segments, however the largest setae are present on the basal two. Those taxa possessing setae on the basal two segments often bear 1-2 larger setae on the first basal segment, while any other setae present on this segment are much smaller. The prementum typically is moderate in size, but can be smaller in some taxa where the palpus is elongate (Figs 202, 210, 218, 222) and larger in others where the palpus often is shortened (Figs 227, 234). Setae appear in 2 general patterns on the prementum: the first is a sparse to dense bunch or patch of elongate setae along the antero-lateral margins (Figs 198, 203, 218); the second is a distinct transverse (although sometimes angled) row of setae near the anterior margin (Figs 183, 197, 201, 212, 225). Seemingly independent of the setal arrangement, there often are 1-3 larger setae positioned at the antero-lateral margins, similar to those on the first basal segment of the palpus (Figs 234, 238, 239). The postmentum often is long, although its length, like the palpus and prementum, is proportional to the other parts. When the prementum is enlarged, the postmentum typically is shorter (Figs 206, 208, 233, 244, 245). Likewise, when the prementum is smaller, the postmentum tends to be elongate (Figs 205, 210, 218, 229). Outside of Baridinae (Figs 245-252, 258-269), the labia tend to possess a much longer labial palpus, and thus also a smaller prementum and postmentum (Figs 247, 263, 269), although a few also possess an enlarged prementum and reduced palpus (Figs 248, 262). The labia of Conoderinae and Ceutorhynchinae all are very similar to those of baridines (Figs 259-269), suggesting close phylogenetic relationships.

**Maxilla** (Figs 184, 186, 189, 270-352): Like the labium, it is evident that characters of the maxilla are not particularly apomorphic for the subfamily and undoubtedly show convergence with many non-baridine groups; however, the variation may be of importance for tribal or even generic diagnosis. The shape of baridine maxillae is relatively conserved, and variation is seen in shape, relative size of the various parts, as well as number in reference to setae. The palpus always is 3-segmented and relatively long, though it may be shortened and more compact in some taxa (Figs 285, 299, 325). Setae are found on all palpal segments, but mainly are concentrated on the basal two. The basal two palpal segments tend to be larger and slightly compact, while the third apical segment often is elongate and narrow, with numerous (5-12) sensilla along the apical margin (Figs 187, 189). This apical segment also bears elongate sensilla that are positioned laterally (Figs 187, 189, 278, 345) and vary in number between taxa (~3-20). While setae on the basal two segments are often sparse, when setae are present, there usually are 1-2 larger setae at the apico-lateral margins (Figs 273, 289, 296). The palpiger is relatively uniform in shape and size, although it can be slightly smaller or larger in different taxa. Setae are most often present and are arranged in 3 general patterns: the first is a sparse patch of elongate setae along the antero-lateral margins (Figs 276, 279, 286, 288, 289, 296); the second is a fairly dense scattering of setae throughout the palpiger, including along the lateral and anterior margins (Figs 274, 277, 317, 323); the third is a distinct transverse row of setae near the anterior margin (Figs 272, 294, 313, 322). Also appearing independent of the setal arrangement, there often are ~1-3 large, elongate setae positioned at the antero-lateral margin of the palpiger (Figs 289, 295, 309), similar to those on the first basal segment of the palpus but larger. Only in a few taxa do these enlarged setae appear absent (Figs 274, 298, 299, 300). The cardo and stipes are conserved in shape and size, although they may vary in length. The stipes often bears 1-3 elongate setae, though these may be absent. The lacinia and galea are separate, though seemingly fused in many taxa, with the galea slightly more developed. The lacinia often possesses some elongate setae, although the majority of setae are present on the galea. Setae on the galea and lacinia are seen in 3 general types: the first being massive, teeth-like setae that vary in shape and size, some elongate and rectangular (Fig. 284, 300, 302, 322) and the others triangular or crescent-shaped (Figs 272, 284, 294, 298, 317). This type is found along the lateral margin of the galea and lacinia and often in a dense row. The second type are smaller setae, though still slightly enlarged, and they are found interspersed throughout types one and three, though mostly situated posterior to type 1. The third type of setae are more normal in appearance, thin and elongate, and are interspersed throughout the first and second type; they are present along the posterior region of the lacinia and interspersed throughout the galea and lacinia (Figs 281, 304, 310, 318). Maxillae in the outgroups (Figs 326-352) are very similar to those in Baridinae, especially when considering the great diversity within Baridinae. Within the bounds of taxa studied, only maxillae in Entiminae were found to differ distinctly (Fig. 326). Also, although certainly not particular to Baridinae and a feature of all weevils with elongate rostra, the tendons attaching to the maxillae are quite long and notably fascinating, narrow while extending throughout the length of the rostrum, then suddenly widening for attachment to the tentorium (Fig. 432).

**Mandibles** (Figs 185, 191-194, 353-431): The mandibles do not possess features apomorphic for the subfamily, but their value in tribal or generic diagnoses seems significant. Mandibles in Baridinae are quite variable, although this variation is fairly easy to categorize. Mandibles, in the case of baridines, can be atomized into bearing a variable number of incisors and a molar region. The right and left mandibles are consistently different, often not only in the number of incisors but also in shape. The difference in incisor number between the left and right mandible is one, with the right mandible always bearing one more incisor than the left. When comparing the right mandible only, incisor number varies from 1-3. In regards to a mandible with 1 incisor, this quality is also variable because there distinctly are taxa with 1 incisor and a molar region (Figs 362, 370) and then there are taxa with a fused incisor and molar region (Figs 368, 388). Mandibles bearing 2 (Figs 361, 366, 376) and 3 (Figs 355, 367, 374, 384, 395) incisors and a molar region are unambiguous. In accordance with incisor number, the mandible also forms two general shapes, which can be determined from the striations (thin longitudinal grooves) present on the incisors. The first is a more or less linear shape, where the first incisor is enlarged and straight, with any other incisors and the molar region positioned laterally (Figs 359, 366, 376, 378, 388). The second shape is angled or curved, where the incisors and molar region all fall on a lateral or angled axis (Figs 357, 363, 383, 391, 410). In this second type, the incisors vary in size, in which the first, second, or sometimes even third incisor may be larger than the others. A curious form that has been found in a few taxa is what appears to be the presence of a deciduous tooth or cusp on the first incisor (Fig. 399). This tooth is thought to be deciduous due to ease in detaching it from the remainder of the mandible. Another peculiarity is the presence of strong lateral lacerations on the incisors (usually the first) (Figs 360, 366, 374, 388). These cuts can penetrate quite deep into the incisor and often can lead to detachment of the apical half of the incisor (Fig. 370). It is possible that these marks form as a result of generalized feeding, but exactly how they come to be is unknown.

Outside of Baridinae (Figs 406-431), the mandibles tend to be quite different from the general baridine types, mainly due to the overall shapes of the mandible as a whole and the incisors (Figs 406, 409, 411-414). Those mandibles most similar to ones in Baridinae include Ceutorhynchinae (Figs 421, 422, 424) and Conoderinae (Figs 420, 423, 426-431). Again, although not particular to Baridinae, the tendons attaching to the mandibles are worth noting (Figs 433, 434).

### *Proventriculus and associated internal structures*

The external morphology of the proventriculus is quite conserved within Baridinae and in related genera outside of the subfamily (Figs 435-450). The only notable variation is in shape, where it can range from short and round (Figs 442, 446, 447, 450) to elongate and cylindrical (Figs 435, 439-441, 444). Internal features of the proventriculus, however, were not examined in this study. As indicated by Velázquez de Castro et al. (2007), useful character information can be extracted from internal features of the proventriculus.

Although not unique in Baridinae, other internal structures are illustrated in Figs 451-459 (according to Snodgrass 1935 and Calder 1989), including the various divisions of the digestive system and the ventral nerve ganglia (Fig. 458).

### *Prothorax*

The prothorax in baridines is usually narrow anteriorly, widening posteriorly, as viewed dorsally (Figs 460); however, in some groups it is widest at the middle and narrower both anteriorly and posteriorly (Figs 461). Punctures most often are round to slightly elongate (Figs 462-464), although in some taxa the punctures become oriented in such a way as to form a pattern of longitudinal ridges, normally only present on the pronotum (Figs 465, 466). A mid-dorsal longitudinal smooth line may be present (Figs 463-465) or absent (Fig. 462). Along the collar there typically is a ring of punctures that varies in size and puncture-depth among genera. The punctures are small and shallow along the dorsal portion of the collar and become larger towards the ventral side, sometimes terminating in two large punctures anterior to the procoxae (Figs 471, 472). Some taxa possess a puncture collar that is developed, with large, deep punctures (Figs 467, 469, 470), others possess a weakly developed puncture collar, where the punctures are nearly absent (Fig. 473), but the vast majority have a puncture collar that is intermediate between these two extremes (Fig. 468).

Zherikhin and Egorov (1990), Zherikhin and Gratshev (1995), and Oberprieler et al. (2007) all mention that Baridinae *s. lat.* share a transverse carina along the hind margin of the pronotum. Although present in many taxa, this feature certainly is not shared by all or even most Baridinae *s. str.* The pronotum may possess various modifications of the typical form. In most genera there is a central, longitudinal smooth line which does not bear any punctures or scales (Figs 463-465). This line may be absent in some taxa, in which case punctures and scales are evenly distributed across the dorsal surface (Figs 462, 466). Also along this central line there may be a developed hump or crest (Figs 474, 475). Although the pronotum often is relatively flat and broadly convex, a more inflated and globular form may be present (Figs 476).

The prosternum is typically flat and smooth (Fig. 483), often with a small depression along the anterior margin on the basisternum, bearing small lateral carina along the margins of the pleuro-sternal suture (Figs 484a, b). Sometimes there may be a depression anterior to the procoxae or what may appear to be a very shallow canal for the reception of the rostrum. When a canal for the reception of the rostrum is present it is always obvious and moderately deep, often with strong carina along the lateral margins. Although other related groups also possess a ventral canal (Cryptorhynchinae, Conoderinae), those present in Baridinae are restricted to the prosternum. The procoxae are always separated and often are positioned relatively close (less than one diameter of a procoxa), although the inter-coxal distance varies from less than one to greater than one diameter of a procoxa. The intercoxal prosternal process (Chamorro-Lacayo & Konstantinov 2004) in baridines usually is developed, the margin forming a quadrate process (Figs 484b, 492), a slightly concave process (similar to the quadrate process but with a slight concavity along the posterior margin) (Figs 485, 486, 489, 496, 497), or a bilobed process (or one with a central cleft) (Figs 490, 491). The basisternum is located medially, anterior to the procoxae and meets the sternellum at the middle of the procoxae at a transverse suture, the sternacostal suture. The intercoxal prosternal process often has the sternellum enlarged and interrupting the connection to the lateral sides of the prothorax (hypomeron), thereby forming the postero-medial margin of the prosternum in Baridinae when it is developed and projecting (Figs 485, 489, 490, 491, 493). The intercoxal prosternal process may also be reduced, with a posterior margin that is straight (or slightly curved), projecting (Fig. 493, 494), or with a central cleft (Fig. 488, 495, 498). In these reduced (also when a prosternal canal is present) and clefted conditions, the sternellum may be reduced and does not reach the posterior margin of the prosternum. Here the lateral sides of the hypomeron form the posterior margin of the prosternum, meeting mesally at the posterior margin with the sternellum located directly anterior (Fig. 498). Of course there are many intermediate stages between these two distinct states. The sternellum sometimes barely touches the posterior margin of the prosternum, with the lateral sides of the hypomeron also nearly joining or just touching mesally (Fig. 494).

Closely allied outgroups, such as Ceutorhynchinae, Conoderinae, Molytinae, and Orobitidinae possess fairly similar prosternal processes, though the lateral sclerites of the prothorax typically are not continuous ventrally and are divided to various degrees by the sternellum. In Ceutorhynchinae, because of the prosternal canal, the sternellum typically divides the lateral sclerites of the prothorax by the width of the canal.

Also on the prosternum of many baridine taxa (as well as some taxa in Conoderinae) are a pair of horns. These horns have been observed to be associated with male-male sparring during mating competitions (Eberhard and Garcia-C. 2000). The horns themselves, although simple in structure, do not appear homologous across all of the taxa in which they are present (Davis in prep.). Although in many groups they arise in approximately the same region, namely slightly anterior to the procoxae, this position may shift anteriorly. They also may be directed anteriorly at variable angles. The horns can be cylindrical, dorso-ventrally flattened, and laterally flattened, and vary in length, from being small stubs or protrusions near the procoxae (Figs 507, 508) to elongate tusks (Figs 509, 510). Often also associated with these horns is an invagination located between the pair or horns (Fig. 501-506). This invagination, also termed "horn sheath," often extends quite far posteriorly into the prothorax and can be a simple invagination (Figs 502-504, 506) or bifurcate (Fig. 501, 505). Although present in many taxa, the invagination can also be small or absent. This invagination might also be termed an acarinarium, as mites often are found dwelling inside.

## *Mesothorax*

**Mesonotum** (Figs 511, 514-577): The structure of the mesonotum in Baridinae is relatively conserved, but with some exceptions of course (such as *Eisonyx*, Fig. 532), with most variation found in the mesoscutellum, followed by the axillary cord, the mesoscutum, and the posterior margin of the mesonotum. The central posterior margin of the mesonotum is always developed, a characteristic of baridines and related outgroups. In Baridinae the posterior margin can form an acute angle (Figs 518, 528) or form a subacute protrusion (Figs 511, 522, 579-581). In most outgroups, this margin is reduced and relatively flat (not produced) (Figs 563-577). The postero-lateral margins can also be different in form, being either relatively linear (Figs 521, 534, 536, 543) or concave (Figs 514, 518, 544). The mesoscutellum is quite variable in form in Baridinae. The anterior margin often is broadly round (Figs 587, 592, 593) to truncate (Figs 585, 589, 590), but can also be acute, oval, or cordiform, with a central cleft (Figs 582, 588). Likewise, the posterior margin is just as variable, being concave (Figs 587, 590, 593, 599), concave with an acute central projection (Figs 583, 591, 596), convex and broadly round (Figs 582, 584, 600), acute, oval, quadrate (Figs 585, 588, 589, 591, 592, 595), or cordiform (Figs 586, 598). The axillary cord is produced and probably is the most notable and diagnostic feature of the mesonotum grouping the baridines. It can either be round (Fig. 523) and lobe-like (Figs 527, 537, 540, 541) or more truncate and quadrate (Figs 522, 531, 536, 539). In most outgroups (Figs 558-577) it is reduced and broadly rounded. The mesoscutum in Baridinae bears a few areas that are different among taxa. The general shape can be quadrate (Figs 518, 531, 547), longitudinally elongate (Figs 526, 537, 541, 542), or transversely elongate (Figs 515, 521, 534, 543). The posterior margin may be continuous and smooth (Figs 527, 531, 548) or may have a cleft of variable size at the longitudinal mesothoracic suture (Figs 518, 535, 556). Punctures may be present on the entire or part of the surface of the mesoscutum (Fig. 526, 529, 541), restricted to the posterior margin (Figs 515, 520, 543), or may be absent entirely.

### *Elytra*

The elytra are of various shapes and lengths, ranging from moderately wide and short to slender and elongate. Most taxa possess some degree of a raised shoulder or hump at the posterior region (at the elytral declivity; Figs 605, 608, 609), and it may be difficult to distinguish between its presence or absence when very small, given the broad, round elytra of most Baridinae. All elytra possess 10 striae along the dorsal surface, with variation seen in the punctures present along the striae and number and length of setae (Figs 601-628). The intervals are typically flat, though may form elevated ridges in a few genera (Figs 602, 605, 613). They also may be smooth (lack punctures), possess a single row of punctures (Figs 614, 624, 626, 628), or possess multiple punctures not organized into rows (Figs 612, 617, 623, 625). Another feature of the elytral intervals of some taxa is that they appear to have small pores situated at regular intervals (Figs 619-621).

The elytral suture is densely clothed with elongate setae (Fig. 629). Together with the spiculate patches on the abdomen and ventral surface of the elytra, these setae likely are also involved in a wing-locking function.

Along the ventral surface, the elytra possess a number of particular areas where modified setae are present that function in securing the elytra to the tergites and thorax. While these areas are generally along the anterior, posterior, and lateral margins of the elytra, the most significant of these wing-locking patches are along the right and left anterior margins (Figs 634, 635, 638-640, 652), the central region along the lateral margin (Figs 630, 631), and the apico-lateral margin (Figs 632, 633, 636, 637, 641-651). The microtrichial patches along the anterior and lateral margins consist of flattened, spade-like projections, whereas the apical patch consists of large spines that interlock with a corresponding patch of spines of the 7$^{th}$ tergite. Another particularly modified area is along the postero-medial margin where a file of 2 general types may be present for involvement in acoustic communication. One type of file consists of many dense, parallel ridges (Figs 644, 646, 648, 650), and the second type consists of fewer, more sparsely situated ridges.

The strongly-curved submarginal fold on the ventro-lateral surface of the elytra (Figs 630, 631, 636, 638-640, 643, 645, 647, 649) has been used as a feature unifying the Baridinae *s. lat.* (Zherikhin and Egorov 1990; Zherikhin and Gratshev 1995; Oberprieler et al. 2007). This character was present, and certainly was strongly curved, in all of the baridine taxa studied and therefore may indeed be present in all of Baridinae *s. str.* The submarginal fold also is present in Conoderinae, Ceutorhynchinae, Molytinae (Trigonocolini), and Orobitidinae, and appears more strongly curved in Conoderinae. This character may be a good diagnosis for these groups as a homoplasious synapomorphy, but it also appears in at least members of Anthribidae, Brentidae, Scolytinae, Hyperinae, Cryptorhynchinae, Curculioninae, Mesoptilinae, Bagoinae, Dryophthorinae, and Entiminae, if not in more. Because the submarginal fold most likely functions together with the other spicule and microtrichial patches on the thorax and abdomen in fastening the elytra to the body, due to the various microtrichial patches present along its surface (Figs 631, 639, 640), it is broadly present within many groups of Curculionoidea. Thus, although it may prove useful in weevil classification, its morphology and distribution throughout the families and subfamilies needs greater scrutiny, and it appears not to be informative of the wider concept of Baridinae *s. lat.*

### *Metathorax*

As noted by Zherikhin and Egorov (1990) and Zherikhin and Gratshev (1995), the metepisternum and metepimeron are fused in Baridinae *s. lat.* (Fig. 578), and the characteristic large, ascending mesepimeron is also present in this broader group (Fig. 578).

**Metanotum** (Figs 655-716): The thorax is a significant structure in terms of examining differences among baridine taxa. Although closely related groups to Baridinae possess a thorax similar in appearance, the baridine thorax is distinctively unique and has certain diagnostic features. The anterior margin of the prescutum bears a pair of lobes, which may be large and protrude (Fig. 666) or small, reduced, and relatively undifferentiated from the prescutum. The lobes are separated by an invagination which may be shallow or deep. The anterior margin of the scutellar groove can be relatively flat and straight in some cases, but it mostly is broadly concave (Figs 660, 671) or more laterally compressed transforming the concavity into more of a cleft (Figs 664, 675, 679). In most of Baridinae *s. str.*, there is a median longitudinal crest on the scutellar groove, referred to as the median carina by Zherikhin and Egorov (1990), Zherikhin and Gratshev (1995), and Oberprieler et al. (2007). In many taxa this crest is well-developed and large (Figs 668-670, 684), while in others it is reduced to apparently absent (Figs 655, 666, 677). Some related groups to Baridinae do not possess this crest. It is curious, though, that when considering Baridinae *s. lat.*, this feature may appear as a synapomorphy, as noted by the above authors. Of course it seems to be absent in many taxa within these groups, but it may have been reduced or lost in these taxa. *Trigonocolus curvipes* does not possess a typical carina, but rather an apparently modified one of wrinkles or folds (Fig. 709). In a few taxa there is a transverse, sclerotized bridge present at the anterior end of the scutellar groove. This bridge may be well-developed (Figs 662, 663, 669, 678), partially developed (Figs 655, 679), or absent (Figs 667, 670, 685). The posterior margin of the scutellar groove may be straight, concave, or convex. The antero-medial margin of the allocrista is always rounded in Baridinae (Fig. 661), whereas it is more angular to quadrate in related outgroups (Figs 697-716). The shape of the metascutum is variable within Baridinae. It is always rounded, varying from subcircular (Figs 655, 675, 679), transversely elongate (Figs 662, 663, 669, 678), or to longitudinally elongate (Figs 658, 664, 670, 680, 681). The postero-medial margin can be convex (Figs 655, 671, 684), relatively straight (Figs 661, 664, 665, 688), or concave (Figs 662, 666, 680). In a few taxa this margin can be strongly convex and forming an angular margin (Figs 658, 673, 679). In Ceutorhynchinae and Conoderinae, the metascutum typically is transversely elongate, and the postero-medial margin quadrate or rectangular. This feature may be similar with the few baridine taxa that also share an angular postero-medial margin; however, taking the shape of the entire metascutum into account, all of the metascutal margins in Baridinae are rounded, while those in outgroups tend to be entirely quadrate (Figs 701, 707, 715), with the exception of Orobitidinae (Fig. 716), which may be closely related to Baridinae. The metascutum may also bear small or large punctures (Fig. 660), or punctures may be absent. The degree of development of the metanotum is closely related to the size and shape of the metascutum. In some taxa where the metascutum is subcircular or transversely elongate, its posterior margin is well-defined and does not extend to the posterior margin of the metanotum, leaving the appearance of the posterior of the metanotum being well-developed (Figs 659, 669, 682, 686). When the metascutum becomes longitudinally elongate, its posterior margin usually becomes less defined and extends to the posterior margin of the metanotum, leaving the appearance of the posterior margin of the metanotum reduced to nearly absent (Figs 661, 668, 680, 683). On the metascutellum, there can be a weak ridge or crest, here termed the metascutellar line, from the posterior end of the scutellar groove to the metascutum (Figs 657, 659, 669, 689). In most outgroup taxa this ridge is absent. In all of Baridinae, the postero-lateral margins of the metanotum are developed and projecting (Figs 691, 694, 695), whereas taxa outside of the subfamily do not possess this feature and the lateral margins are straight (Figs 697-716).

**Metendosternite** (Figs 717-771): The typical form of the baridine metendosternite has a moderately short, quadrate stalk, which may be longitudinally or laterally elongate and always is wide (Figs 717-719, 727-731, 740-743). Many taxa, however, have a stalk in which the lateral margin migrates inwards towards the longitudinal flange, creating an upside-down V-shaped stalk (Figs 720-726, 736, 737, 747). In this type, the stalk is wide ventrally and narrows towards the furcal arm. The hemiductus is nearly always well-developed in Baridinae, but sometimes reduced in outgroups (Figs 755, 765, 767). The apex of the furcal arms may be simple (Figs 717-719, 738-743) or bifurcate (Figs 727, 729) in Baridinae. The anterior tendons vary in their position, being adjacent to the longitudinal flange (Fig. 727), approximately centered between the longitudinal flange and the base of the furcal arm, or closer to the furcal arm

(Fig. 740). Although a few of the outgroups show close similarities in metendosternite morphology to Baridinae, members of Ceutorhynchinae (Figs 762-764), in particular, possess many baridine-like features.

**Sclerolepidia**: Following Lyal et al. (2006), there are four basic types of sclerolepidia found in weevils, two of these types are only found in Baridinae. One type is composed of flattened, strongly appressed scales which are often trifurcate but also can be multifurcate (Figs 772, 773, 776-780). The second type is composed of elongate, projecting scales that have fimbriate apices (Figs 774, 775, 781-784). The specific function of sclerolepidia is unknown, but they are believed to be associated either with a secretory or sensory function.

**Wing-locking patches**: Dorsal microtrichial fields have been found in many insect groups and function as types of body-appendage arresting mechanisms through frictional forces acting as probabilistic fasteners (Gorb 1999; Gorb et al. 2002; Gorb and Popov 2002; Gorb and Goodwyn 2003). In Coleoptera, these fields are concentrated on the dorsal surface, particularly on the thorax and abdomen. As illustrated in other beetle groups, such as Tenebrionidae (Gorb 1998, 1999) and Carabidae (Baehr 1980), all baridines also possess interlocking microtrichial fields which function to fasten the elytra and hind wings to the body. While many tergites are modified with dorsal fields of spines (Figs 785, 786) for interaction in wing fastening with corresponding areas on the apico-ventral region of the elytra (Figs 791-793), the thorax also plays a large role in this process. In Baridinae, the lateral region of the thorax just above the posterior area of the metepisternum possesses a microtrichial field for attachment to the ventral side of the elytra. This patch is composed of spade-like cuticular microprojections and is consistently found in all baridine taxa (Figs 789, 790). The largest microtrichial field on the thorax involved in wing-fastening is located on each metascutum and is composed of similar spade-like cuticular outgrowths (Figs 785-788). These fields interact with corresponding fields on the antero-ventral side of the elytra (Figs 794, 795) and setal spines on the hind wings (Figs 796-799).

### ***Hind wings*** (Figs 800, 801, 803-845)

Following wing terminology of Zherikhin and Gratshev (1995), the baridine wing, like many other morphological features, is relatively conserved, in which mostly subtle changes are seen when comparing genera. Generally, the larger-bodied taxa retain greater sclerotization in the hind wing, and smaller taxa often show reduction in many of the veins and sclerotizations on the wing. For the most part, C, Sc, R, Cu, and A remain relatively undifferentiated among taxa. Rr is most often present and fully developed, although it may be reduced in length or even absent. The rfi is always present, but may be somewhat ambiguous in less sclerotized wings. The rc often is present, fully enclosed by the rcm, and may vary slightly in size. It may sometimes be open, though, due to discontinuities in the rcm. The sclerotized regions, particularly the rms, rsc, and msc are always present, but may also be inconspicuous in less sclerotized wings. The rm can be absent (Fig. 814, 818) or present (Figs 806, 813, 820), but differentiating the two states may be difficult when the rm is faint. 1rs is always present, and can also be faint in many taxa, but 2rs may be present or absent. R3 is usually present as a thin, sclerotized vein (Figs 815, 816, 821, 822, 831), though it may lose the majority of sclerotization along its length and therefore take the form of a long, thin, white line (Figs 800, 804, 812, 823). In a few taxa R3 is absent. The pst is always present and developed in the majority of genera, though it may become narrower or slightly reduced in length medially (Figs 810, 811, 825). The mst also usually is elongate and developed (Fig. 804, 818), but it too may be reduced in length medially (Figs 808, 819, 817, 825). $Cu_1$ never reaches the wing margin, and is extended by a light sclerotization at the apical fold of $Cu_1$. This sclerotization may become reduced in length apically. $1A_1$ and $1A_2$ usually are completely absent, though when present, they typically are only defined near the wing margin (Figs 804, 806, 815, 816, 821). In only a few genera, the $1A_1$ or $1A_2$ veins are extended dorsally towards A and fused by $a_1$-$a_2$ (Figs 813), though both veins are never found to extend dorsally in the same instance. 3A in the majority of genera is reduced (Figs 809, 819, 824), though it may be developed and nearly touching A (Figs 805, 813, 815, 821, 825, 826). 3A, however, is never fused with A in Baridinae. In outgroups (Figs 826-832, 835-845), particularly in Ceutorhynchinae, Conoderinae, and Trigonocolinae, the wing venation is quite similar, as determined by Zherikhin and Gratshev (1995), with no distinct differences from taxa placed within Baridinae *s. str.*

Since the sclerites at the base of the hind wing in Baridinae have never been demarcated, they are illustrated in Fig. 801. Terminology follows that of Kukalova-Peck and Lawrence (1993), Browne and Scholtz (1995), and Fedorenko (2002). Particularly noteworthy is that Br and BSc are fused. In this illustration, Mr is visible, but cannot be seen well in the full-wing illustrations because of its short length and small size.

### *Legs*

The pro-, meso-, and metafemora are often bare and relatively similar in size. Sometimes one or more teeth are present near the apico-ventral surface, and the ventral surface may be sulcate for reception of the tibia. The tibiae usually are not particularly modified and do not usually bear a strong tarsal groove along the apical surface (Fig. 856), but in some taxa, such as species of *Fryella*, deep tarsal grooves are present for reception of the tarsi when they are folded. The outer (proximal, Thompson 1992) and inner setose fringes often are well-developed (Figs 850, 855, 856-858, 860). Variation is seen in the presence and absence of an apical tibial uncus. When an apical uncus is present, it most often arises from the inner angle and is accompanied by an adjacent tuft of elongate setae that converge with the uncus (Figs 846, 857, 858, 860), a condition apparently present in many of the higher Curculionidae, particularly in many

Ceutorhynchinae. In this condition, the proximal setose fringe is always located terminally. In some cases a small premucro may form from the inner carina adjacent to the uncus (Fig. 850-852). The uncus, however, does not always arise from the inner angle, and can also arise from the middle (Fig. 847, 849, 858). In these cases, the proximal setose fringe also shifts with the uncus, translocating almost entirely to the outer angle and margin. A furthered condition from these arises when the uncus is present at the outer apical angle, still with a premucro at the inner angle, much like some Conoderinae (Thompson 1992), although some taxa in Baridinae and Conoderinae may also possess an uncus at the outer apical angle with the premucro at the inner angle absent. In these cases the proximal setose fringe has moved entirely to the outer margin or has been lost. The apical margin may also be bare (also in outgroups), with both premucro and uncus apparently absent or highly reduced, and only in outgroup cases the apex of the tibia may have other spines in addition to the uncus and premucro.

The number of tarsi in Baridinae is 5. Tarsomeres 1 and 2 usually are cylindrical or conical (Fig. 853), although they may be dorso-ventrally flattened and expanded laterally (Fig. 854). Tarsomere 3 typically is bilobed, though the lobes may be highly reduced and appear more cylindrical. When lobes are present they vary in size between genera. When they are enlarged and expanded laterally, tarsomeres 1 and 2 usually are expanded as well. Tarsomere 4 is always reduced in size and inconspicuous. Tarsomere 5 always is cylindrical, but varies in length. Usually it is shorter when the lobes of tarsomere 3 are expanded (and often when tarsomeres 1 and 2 are expanded) and longer when the lobes are reduced in size. The ventral setal tufts on the tarsus are as in Figs 862-864. The pretarsal ungues may be connate (Figs 865, 867, 868) or divergent/free (Figs 864, 866) and are always simple (not bearing any serrations or teeth).

***Tergites*** (Figs 802, 869-927)

A unique feature of Baridinae is that most taxa possess a strongly sclerotized tergum, in which the intersegmental membrane between the tergites is even sclerotized, forming a hardened shell. A few outgroup taxa also possess this strong sclerotization of the tergum, such as some taxa in Orobitidinae (Fig. 912) and Molytinae (Fig. 907), though most outgroups possess a more weakly sclerotized tergum which also does not form a rigid shell (Figs 902-906, 908-911). Only relatively few baridine taxa possess a weakly sclerotized abdomen, thus this feature appears to be plesiomorphic in Baridinae. As in the remainder of Curculionidae, there are 7 visible tergites in Baridinae, although the male $8^{th}$ tergite may sometimes be exposed (Morimoto et al. 2006). Each tergite is composed of 3 separate parts- the median sclerite, which is the largest, the spiracular sclerite, and the laterotergites (Fig. 802), which are small and each subdivided into many smaller sclerites. Median tergite 7 is never modified or subdivided, and its associated spiracular sclerite is always fused. Median tergite 1 is always divided in the middle, and these two separate sclerites are further subdivided into two parts (Fig. 872), a possible synapomorphy and feature that appears to be only found within Baridinae *s. str.*

Median tergites 2-6 may also be individually separated with a median fissure in many taxa. The spiracular sclerites, similar to the median sclerites, may be individually fused or separated from the median sclerites. The laterotergites are always separated from the spiracular sclerites.

As already mentioned above, on the dorsal side of the tergites, as in many weevil subfamilies, spiculate patches (patches of spines) are found (Figs 913-919). These patches are present only on the median and spiracular sclerites, and there is variation found between taxa on which tergites they are present. On the median sclerites, two forms of spiculate patches can be distinguished – lateral patches, which are composed mostly of laterally-directed spines, and median patches, which are composed mostly of posteriorly-directed spines (Figs 125, 918). It appears that tergites 1-2 only possess median patches on the median sclerites in Baridinae. Tergites 3-6 may have both median and lateral patches on the median sclerites, and tergite 7 only possesses the lateral patches. Only the lateral patches on the 7$^{th}$ median sclerite and the patches on the spiracular sclerites appear to interact with corresponding patches on the postero-ventral and latero-ventral margins of the elytra, respectively, while the median spiculate patches on the median sclerites seem to interact in securing the hind wings.

Sound production, particularly by stridulation, has been described in numerous beetle groups (Kasper and Hirschberger 2005; Serrano et al. 2003). As described by Lyal and King (1996), in many genera of Baridinae two longitudinal rows of plectra are present on the dorsal surface of the 7$^{th}$ tergite (Figs 920-927). These rows are seen to be of two types- those that are composed of closely-spaced plectra (Figs 920-925) and those that are composed of more distantly-spaced plectra (Fig. 926, 927). These two types of plectra correspond to the presence of two types of files on the apico-ventral surface of the elytra (Figs 928-932). The type of plectra that form dense rows correspond to a file type that is composed of dense longitudinal ridges (Figs 928, 930, 931). The second type of plectra, forming sparse rows, correspond to a file type that is composed of more sparse ridges (Figs 929, 932). This type of combination of plectral rows and file is the most common among weevils, present in 13 other curculionid subfamilies (Lyal and King 1996). Although other types of stridulating mechanisms are present within Curculionidae, only one type is found within Baridinae.

***Ventrites*** (Figs 933-980)

The ventrites (visible sternites) in Baridinae are relatively uniform, showing variation mainly in the shape of the posterior margin of ventrite 5. The posterior margin may be developed and rounded (Figs 935, 937, 946, 948), truncate and convex, occasionally with a small central projection (Figs 933, 941, 945, 956, 957, 969), truncated and concave (Figs 936, 951, 952, 963, 976), truncated and sinusoidal (Figs 950, 958, 978), or truncated with a small central projection (Figs 940, 971, 977, 979). Punctures covering the ventrites are normal, but punctures along the anterior margin of ventrite 5 may be present or absent (Figs 978-980). In the majority of Baridinae, the posterior margin of ventrite 1 is sinusoidal (Figs 933, 941, 967), with the lateral parts convex and the central part concave; however, in some taxa this margin may be more linear (Fig. 946, 954). The posterior margins of ventrites 2-4 are broadly concave. The ventrites in outgroups do not appear particularly contrasting to those of Baridinae (Figs 960-962, 964-966), except for those of *Cyllophorus fasciatus* (Fig. 965). The ventrites of Ceutorhynchinae, however, may be most easily distinguished, particularly due to the truncate apical margin of ventrite 5 (Fig. 963).

***Male genitalia*** (Figs 981, 982, 985-1043)

**8th sternite**: The 8th sternite in Baridinae is divided and forms paired sclerites, their medial margins rounded and distal margins often acute (Figs 982). They most often are fairly wide (medial-distal length long) and have a short length (anterior-posterior length short) (Figs 993, 995, 1008, 1009, 1013). In some taxa this pair of sclerites may be enlarged and more round (Figs 986, 989, 1001), the length becoming more equal to the width.

**9th sternite (spiculum gastrale)**: The spiculum gastrale usually is approximately ½ to ¾ the length of the aedeagus. It often is broadly curved and relatively narrow (Figs 985, 990, 998, 1005), though it may be more straight (Figs 1007, 1008, 1023) or have an angled apex (Figs 990, 1001, 1004, 1019), and may also vary in width between species (Figs 1000, 1022). The apex may be subequal in width to the remainder, but more often is flattened and expanded (Figs 990, 991, 1009, 1022).

**Aedeagus**: The median lobe may be short in length (Figs 991, 992, 994, 1011, 1013) to long (Figs 986, 989, 998, 1007, 1009, 1015), with lateral margins straight and parallel-sided (Figs 986, 987, 1008), even and sinusoidal (Figs 1001, 1020, 1022), or broadly curved (Figs 988, 994, 999, 1012, 1019). The median lobe may also be relatively wide (usually also short in length) (Figs 992, 996, 1000) or narrow (usually also elongate) (Figs 986, 998, 1023). The apex may range from acutely lobed (Figs 989, 1004, 1007), lobed with a central projection (Figs 993, 1009), broadly curved (Figs 985, 991, 999, 1021), or concave (Figs 986, 992, 996, 1000, 1020). The apex may also have a wide margin, in which the median orifice is more posterior (Figs 988, 1005, 1008, 1011), or the apical margin may be narrow, in which the median orifice is adjacent to the apex (Figs 986, 992, 1010, 1019, 1021). Pairs of setal tufts may also be present at the apex (Figs 987, 1014, 1023). The dorsal surface of the median lobe in Baridinae varies in degree of sclerotization. When the aedeagus is viewed dorsally, the median lobe may have a central large, lightly sclerotized area and is seen with thin, heavily sclerotized lateral margins (Figs 986, 993, 996, 1002, 1021). This lightly sclerotized area may decrease in width, where the lateral areas of the median lobe are wider and heavily sclerotized (Figs 987, 988, 1004, 1007, 1012). The lightly sclerotized median area may be even narrower, in which the heavily sclerotized lateral areas of the median lobe nearly touch medially (Figs 989, 1022); these heavily sclerotized lateral areas can also touch medially, leaving the entire dorsal surface of the median lobe heavily sclerotized (Figs 991, 999, 1008, 1009, 1011). Outgroup morphology is not notably different for the median lobe (Figs 1025-1043). Ceutorhynchinae (Figs 1033, 1035, 1036) and some Conoderinae (Fig. 1040), for example, often have a central large, lightly sclerotized area on the dorsal surface anterior to the median orifice, a feature common to many Baridinae. Internally there often is an elongate, thin, sclerotized flagellum (Figs 993, 1011, 1012, 1014, 1016, 1022, 1024), along with other sclerotizations (Figs 990, 999, 1000, 1028). The median struts or apodemes vary tremendously between some genera, where they may be highly reduced (Figs 990, 998, 1014, 1024), approximately subequal in length to the median lobe (Figs 987-989, 1002-1009), slightly longer than the median lobe (Figs 1016, 1017, 1019), or several times longer than the median lobe (Figs 995, 1011-1013, 1018, 1020).

**Tegmen**: The tegmen normally is complete in Baridinae and encircles the aedeagus, but it can be incomplete in outgroups (Figs 1026, 1027). The ventral tegminal apodeme or manubrium typically is simple and relatively long, or highly elongate in some cases (Figs 985, 988, 995, 1005, 1008, 1018, 1027). In some taxa it may be reduced in length to a short stub (Figs 990, 999), but rarely is it bifurcate. The dorsal parameroid lobes are always fairly elongate when the tegmen is complete, from approximately half the length of the median lobe to equal in length (Fig. 985, 994, 995).

***Female genitalia*** (Figs 983, 984, 1044-1058)

In Baridinae the 8th sternite of the female forms two general types - one in which the latero-basal margins (where the sternite divides) are rounded (Figs 1045, 1047, 1048, 1056) and the second in which the latero-basal margins are angular (Figs 1044, 1046, 1049, 1052, 1057). This basal region normally is distinctly divided (Figs 1046, 1047, 1053), although it may become more narrowly divided (Figs 1045, 1048) or fused (Figs 1050, 1055). The spiculum typically is relatively short, but may be more elongate (Figs 1045, 1048). The coxites also can be quite variable in length, often moderately short (Figs 1044, 1054, 1057) but also elongate in some taxa (Figs 1046, 1048, 1055). The stylus is fairly conserved in shape, typically elongate and cylindrical.

The spermatheca possess an elongate and curved cornu, which often does not vary much in shape but may become shorter or longer and vary in curvature. The collum also does not vary much, usually not produced (Fig. 1048) or forming a small lobe (Fig. 1052). More variable, however, is the size and length of the ramus, which may not be produced (Figs 1044), form a similar sized lobe as the collum (Figs 1052), or form an elongated extension (Figs 1046, 1049, 1051), sometimes similar in length to the cornu (Fig. 1055).

The female genitalia in closely allied outgroups, such as Ceutorhynchinae, Conoderinae, and Orobitidinae, are not markedly different from that in Baridinae, and possess similar variation in the 8th sternite and spermatheca. The basal region of the 8th sternite can be distinctly divided, with rounded or more angular latero-basal margins, and can also become more narrowly divided or fused. An extreme comparison, one in

Entiminae (Fig. 1058), is shown, in which the basal region of the 8th sternite is entire, as is the spiculum.

## Acknowledgements

Much appreciation is given to the aforementioned institutions for loan of their baridine specimens. The constant guidance and valuable advice given by my advisor Dr. Michael S. Engel, without which this research never would have seen an end. Dr. Jens Prena and Dr. Robert S. Anderson for their helpful recommendations during the beginning of this project and also throughout its development. Many thanks also are devoted to my thesis committee members at the University of Kansas, Dr. Deborah Smith and Dr. Edward Wiley, III, and the University of Kansas. Partial support was provided by National Science Foundation grants NSF EF-0341724 and DEB-0542909 (both to M.S. Engel) and NSF DEB-9978110 (to M.S. Engel) for use of the Microptics digital imaging system for production of all light photomicrographs. Much appreciation also is dedicated to M. A. Alonso-Zarazaga for his detailed review of this paper, and his insightful and helpful comments. Support for this research was also made possible through various funds from the University of Kansas entomology endowment, including from the John Deal Summer Scholarship, Panorama Small Grant Fund from the KU Biodiversity Institute, as well as travel funds from the KU Department of Ecology and Evolutionary Biology. Much appreciation also goes to the KU Microscopy and Analytical Imaging Laboratory and to the support and assistance offered by its staff.

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## Appendix I

Taxa examined. Classification follows that of Alonso-Zarazaga and Lyal (1999).

| Subfamily (Family) | Tribe | Subtribe | Taxon |
|---|---|---|---|
| **Bagoinae** | | | *Bagous transversus* LeConte, 1876 |
| **Cossoninae** | Cossonini | | *Cossonus impressifrons* Boheman, 1838 |
| **Curculioninae** | Curculionini | Curculionina | *Curculio pardalis* (Chittenden, 1908) |
| | Derelomini | | *Derelomus basalis* Blatchley & Leng, 1916 |
| **Hylesininae (Scolytidae)** | Hylastini | | *Hylurgops planirostris* Wood & Bright, 1992 |
| **Orobitidinae** | | | *Parorobitis gibbus* Korotyaev, O'Brien, & Konstantinov, 2000 |
| **Conoderinae** | Arachnopodini | | *Arachnobas gazella* Boisduval, 1835 |
| | Coryssomerini | | *Metialma signifera* Pascoe, 1871 |
| | Coryssopodini | | *Cyllophorus fasciatus* Faust, 1886 |
| | Lechriopini | | *Acoptus suturalis* LeConte, 1876 |
| | Lobotrachelini | | *Lobotrachelus troglodytes* (Desbrochers, 1891) |
| | Mecopini | | *Mecopus trilineatus* Rosenschoeld, 1838 |
| | Menemachini | | *Balanogastris kolae* (Desbrochers, 1895) |
| | Menemachini | | *Telephae oculata* (Say, 1824) |
| | Trichodocerini | | *Trichodocerus* Chevrolat, 1879 sp. |
| | Zygopini | | *Cylindrocopturus adspersus* (LeConte, 1876) |
| | Zygopini | | *Cylindrocopturus operculatus* (Say, 1824) |
| **Molytinae** | Cholini | | *Cholus rana* Schoenherr, 1825 |
| | Conotrachelini | | *Conotrachelus fissunguis* LeConte, 1876 |
| | Trigonocolini | | *Trigonocolus curvipes* Klima, 1935 |
| **Entiminae** | Cyphicerini | Cyphicerina | *Cyrtepistomus castaneus* (Roelofs, 1873) |
| **Dryophthorinae (Dryophthoridae)** | | | *Dryophthorus americanus* Bedel, 1885 |
| **Cryptorhynchinae** | Cryptorhynchini | Cryptorhynchina | *Cryptorhynchus lapathi* (Linnaeus, 1758) |
| **Ceutorhynchinae** | Ceutorhynchini | | *Ceutorhynchus obstrictus* (Marsham, 1802) |
| | Ceutorhynchini | | *Coeliodes flavicaudis* Boheman, 1844 |
| | Cnemogonini | | *Auleutes bosqi* Hustache, 1939 |
| | Hypurini | | *Hypurus bertrandi* (Perris, 1852) |
| | Mononychini | | *Mononychus vulpeculus* (Fabricius, 1801) |
| | Phytobiini | | *Phytobius griseomicans* Schwarz, 1892 |
| **Baridinae** | Ambatini | | *Ambates chaetopus* Champion, 1909 |
| | Ambatini | | *Pteracanthus smidtii* Dejean, 1835 |
| | Anopsilini | | *Anopsilus oblongus* Boheman, 1844 |
| | Baridini | Baridina | *Allomegops* Hustache, 1951 sp. |
| | Baridini | Baridina | *Baris torquata* Hustache, 1938 |
| | Baridini | Baridina | *Buschiella lecythidis* (Champion, 1909) |
| | Baridini | Baridina | *Cosmobaris americana* Casey, 1920 |
| | Baridini | Baridina | *Craptus tibialis* Casey, 1922 |
| | Baridini | Baridina | *Cryptosternum nevermanni* Heller, 1936 |

| Subfamily (Family) | Tribe | Subtribe | Taxon |
|---|---|---|---|
| | Baridini | Baridina | *Cymatobaris impressifrons* Casey, 1922 |
| | Baridini | Baridina | *Dalcesia* Casey, 1922 sp. |
| | Baridini | Baridina | *Deipyle induta* Champion, 1909 |
| | Baridini | Baridina | *Desmoglyptus arizonicus* Casey, 1920 |
| | Baridini | Baridina | *Dissopygus metallescens* (Boheman, 1836) |
| | Baridini | Baridina | *Elasmobaris signifer* Reitter, 1895 |
| | Baridini | Baridina | *Lepidobaris acnisti* Champion, 1909 |
| | Baridini | Baridina | *Macrobaris* Champion, 1909 sp. |
| | Baridini | Baridina | *Megalobaris viridana* (Boheman, 1836) |
| | Baridini | Baridina | *Nanobaris* Champion, 1909 sp. |
| | Baridini | Baridina | *Odontobaris* Champion, 1909 sp. |
| | Baridini | Baridina | *Opertes* Casey, 1922 sp. |
| | Baridini | Baridina | *Orthoris crotchii* LeConte, 1876 |
| | Baridini | Baridina | *Plesiobaris albilata* (LeConte, 1876) |
| | Baridini | Baridina | *Pseudobaris angustula* LeConte, 1876 |
| | Baridini | Baridina | *Pycnobaris pruinosa* Casey, 1892 |
| | Baridini | Baridina | *Rhoptobaris canescens* LeConte, 1876 |
| | Baridini | Baridina | *Rhytidoglymma aenescens* Faust, 1896 |
| | Baridini | Baridina | *Solenosternus dividuus* (Champion, 1909) |
| | Baridini | Baridina | *Sphenobaris quadridens* Champion, 1909 |
| | Baridini | Baridina | *Stereobaris interpunctata* Casey, 1922 |
| | Baridini | Baridina | *Thanius* Casey, 1922 sp. |
| | Baridini | Baridina | *Trepobaris inornata* Champion, 1909 |
| | Baridini | Baridina | *Trichobaris texana* LeConte, 1876 |
| | Baridini | Baridina | *Ulobaris loricata* Reitter, 1895 |
| | Baridini | Baridina | *Zathanius* Casey, 1922 sp. |
| | Baridini | Coelonertina | *Coelonertus nigrirostris* Solari & Solari, 1906 |
| | Baridini | Coelonertina | *Coluthus cribrarius* Champion, 1908 |
| | Baridini | Coleomerina | *Coleomerus boliviensis* Hustache, 1949 |
| | Baridini | Diorymerina | *Diorymerus lancifer* Guérin-Méneville, 1839 |
| | Baridini | Diorymerina | *Hiotus inflatus* Casey, 1922 |
| | Baridini | Diorymerina | *Prodinus* Casey, 1922 sp. |
| | Baridini | Diorymerina | *Testalthea* Casey, 1922 sp. |
| | Baridini | Eurhinina | *Barycerus collaris* Gyllenhal, 1836 |
| | Baridini | Eurhinina | *Eurhinus festivus* (Fabricius, 1792) |
| | Baridini | Eurhinina | *Eurhinus aeneus* Schoenherr, 1844 |
| | Madarini | Barymerina | *Barymerus binarius* Hustache, 1938 |
| | Madarini | Eutoxina | *Eutoxus* Schoenherr, 1844 sp. |
| | Madarini | Leptoschoinina | *Acythopeus* Pascoe, 1874 sp. |
| | Madarini | Leptoschoinina | *Athesapeuta vinculata* Faust, 1894 |
| | Madarini | Leptoschoinina | *Eumycterus albosquamulatus* Boheman, 1838 |
| | Madarini | Leptoschoinina | *Loboderes citriventris* Hustache, 1938 |
| | Madarini | Leptoschoinina | *Megabaris quadriguttata* (Klug, 1829) |
| | Madarini | Leptoschoinina | *Microstrates cocois* Bondar, 1941 |
| | Madarini | Leptoschoinina | *Platyonyx ornatus* Schoenherr, 1826 |

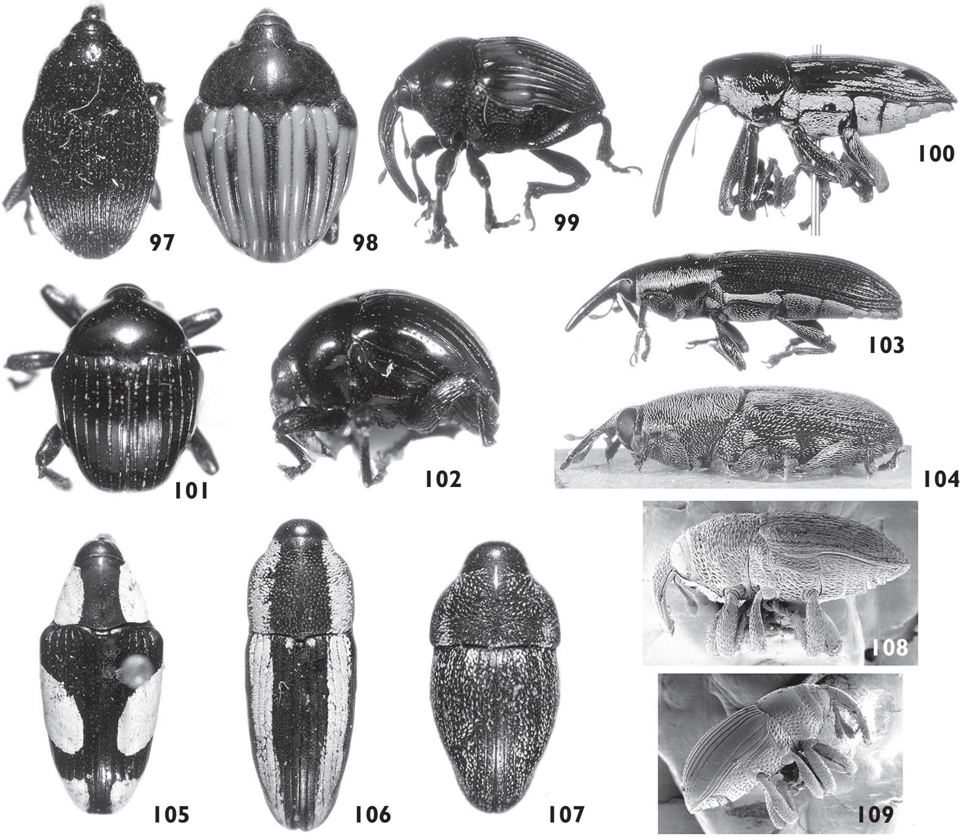
| Subfamily (Family) | Tribe | Subtribe | Taxon |
|---|---|---|---|
| | Madarini | Leptoschoinina | *Zena virgata* Hustache, 1938 |
| | Madarini | Madarina | *Conoproctus quadripustulatus* Fabricius, 1801 |
| | Madarini | Madarina | *Glyptobaris lecontei* Champion, 1909 |
| | Madarini | Madarina | *Linomadarus vorticosus* Casey, 1922 |
| | Madarini | Madarina | *Madarellus ebenus* (Fabricius, 1801) |
| | Madarini | Madarina | *Madarus bistrigellus* Boheman, 1844 |
| | Madarini | Madarina | *Microrhinus mutilus* (Boheman, 1844) |
| | Madarini | Madarina | *Onychobaris densa* LeConte, 1876 |
| | Madarini | Madarina | *Orchidophilus aterrimus* (Waterhouse, 1874) |
| | Madarini | Madarina | *Solaria curtula* Champion, 1908 |
| | Madarini | Madarina | *Stictobaris cribrata* (LeConte, 1876) |
| | Madarini | Madarina | *Neomadarus* Hustache, 1938 sp. |
| | Madarini | Tonesiina | *Antesis sparsa* (Klug, 1829) |
| | Madarini | Tonesiina | *Myctides imberbis* Lea, 1906 |
| | Madarini | Tonesiina | *Parisoschoenus* Faust, 1896 sp. |
| | Madarini | Tonesiina | *Pycnotheantis* Casey, 1922 sp. |
| | Madarini | Tonesiina | *Tonesia* Casey, 1922 sp. |
| | Madopterini | Madopterina | *Centrinopsis* Roelofs, 1875 sp. |
| | Madopterini | Madopterina | *Lipancylus brevirostris* (Casey, 1922) |
| | Madopterini | Madopterina | *Madopterus talpa* Schoenherr, 1833 |
| | Madopterini | Madopterina | *Opseobaris alba* Bondar, 1942 |
| | Madopterini | Madopterina | *Pacomes distortus* Casey, 1922 |
| | Madopterini | Madopterina | *Pacomes subglaber* Casey, 1922 |
| | Madopterini | Madopterina | *Parallelosomus amplitarsis* (Casey, 1922) |
| | Madopterini | Madopterina | *Trachymeropsis palmipes* Champion, 1907 |
| | Madopterini | Thaliabaridina | *Thaliabaris inermis* Marshall, 1952 |
| | Madopterini | Torcina | *Anatorcus densus* Casey, 1922 |
| | Madopterini | Torcina | *Microtorcus tubulatus* Casey, 1922 |
| | Madopterini | Torcina | *Pseudotorcus rufipes* Hustache, 1949 |
| | Madopterini | Torcina | *Sibariops concinnus* (LeConte, 1876) |
| | Madopterini | Torcina | *Sibariops concurrens* (Casey, 1892) |
| | Madopterini | Torcina | *Sibariopsida docilis* Casey, 1922 |
| | Madopterini | Torcina | *Torcobius* Casey, 1922 sp. |
| | Madopterini | Torcina | *Torcus nigrinus* Hustache, 1939 |
| | Madopterini | Torcina | *Torcus variabilis* Hustache, 1939 |
| | Madopterini | Zygobaridina | *Acentrinops brevicollis* Casey, 1920 |
| | Madopterini | Zygobaridina | *Amercedes subulirostris* Casey, 1893 |
| | Madopterini | Zygobaridina | *Amercedes orthorrhinus* Champion, 1909 |
| | Madopterini | Zygobaridina | *Anavallius ruficornis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Andiblis seriata* Casey, 1922 |
| | Madopterini | Zygobaridina | *Aniops sculpturatus* Casey, 1922 |
| | Madopterini | Zygobaridina | *Aniops* Casey, 1922 sp. |
| | Madopterini | Zygobaridina | *Anotesiops obidosensis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Barilepis grisea* (LeConte, 1876) |
| | Madopterini | Zygobaridina | *Barilepton filiforme* LeConte, 1876 |

| Subfamily (Family) | Tribe | Subtribe | Taxon |
|---|---|---|---|
| | Madopterini | Zygobaridina | *Barilepton quadricolle* LeConte, 1876 |
| | Madopterini | Zygobaridina | *Barinus bivittatus* (LeConte, 1878) |
| | Madopterini | Zygobaridina | *Barinus cribricollis* (LeConte, 1876) |
| | Madopterini | Zygobaridina | *Bondariella mimica* Hustache & Bondar, 1942 |
| | Madopterini | Zygobaridina | *Buchananius striatus* (LeConte, 1876) |
| | Madopterini | Zygobaridina | *Buchananius sulcatus* (LeConte, 1876) |
| | Madopterini | Zygobaridina | *Calandrinus grandicollis* LeConte, 1876) |
| | Madopterini | Zygobaridina | *Calorida binocularis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Camelodes leachii* (Kirby, 1819) |
| | Madopterini | Zygobaridina | *Camerones semiopacus* Casey, 1922 |
| | Madopterini | Zygobaridina | *Catapastinus caseyi* Champion, 1909 |
| | Madopterini | Zygobaridina | *Catapastus conspersus* Casey, 1892 |
| | Madopterini | Zygobaridina | *Catapastus squamirostris* Casey, 1920 |
| | Madopterini | Zygobaridina | *Catapastus albonotatus* Linell, 1897 |
| | Madopterini | Zygobaridina | *Catapastus diffusus* Casey, 1892 |
| | Madopterini | Zygobaridina | *Catapastus seriatus* Casey, 1920 |
| | Madopterini | Zygobaridina | *Catapastus signatipennis* Linell, 1897 |
| | Madopterini | Zygobaridina | *Catapastus simplex* Casey, 1920 |
| | Madopterini | Zygobaridina | *Centrinites strigicollis* Casey, 1892 |
| | Madopterini | Zygobaridina | *Centrinogyna hispidula* Casey, 1920 |
| | Madopterini | Zygobaridina | *Centrinogyna strigata* Casey, 1892 |
| | Madopterini | Zygobaridina | *Centrinopus alternatus* Casey, 1892 |
| | Madopterini | Zygobaridina | *Centrinopus helvinus* Casey, 1892 |
| | Madopterini | Zygobaridina | *Centrinus curvirostris* Boheman, 1844 |
| | Madopterini | Zygobaridina | *Chepagra rotundicollis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Clandius cephalotes* Casey, 1922 |
| | Madopterini | Zygobaridina | *Crostidia tenuipes* Casey, 1922 |
| | Madopterini | Zygobaridina | *Crostis subexplanata* Casey, 1922 |
| | Madopterini | Zygobaridina | *Crotanius trivittatus* Champion, 1908 |
| | Madopterini | Zygobaridina | *Cylindridia prolixa* (LeConte, 1876) |
| | Madopterini | Zygobaridina | *Cylindrocerus comma* Boheman, 1844 |
| | Madopterini | Zygobaridina | *Dactylocrepis flabellitarsis* Boheman, 1844 |
| | Madopterini | Zygobaridina | *Dealia carbonaria* Hustache, 1938 |
| | Madopterini | Zygobaridina | *Deipyrus hirsutulus* Champion, 1908 |
| | Madopterini | Zygobaridina | *Demoda vittata* Casey, 1922 |
| | Madopterini | Zygobaridina | *Dericinus habilis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Dialomia gradata* Casey, 1922 |
| | Madopterini | Zygobaridina | *Diastethus eurhinoides* Champion, 1907 |
| | Madopterini | Zygobaridina | *Dimesus rubricatus* (Hustache, 1939) |
| | Madopterini | Zygobaridina | *Diorymeropsis disjuncta* Champion, 1908 |
| | Madopterini | Zygobaridina | *Diorymeropsis xanthoxyli* (Linell, 1897) |
| | Madopterini | Zygobaridina | *Dirabius calvus* Casey, 1920 |
| | Madopterini | Zygobaridina | *Dirabius rectirostris* (LeConte, 1876) |
| | Madopterini | Zygobaridina | *Eisonyx crassipes* LeConte, 1880 |
| | Madopterini | Zygobaridina | *Eisonyx opacus* Casey, 1893 |

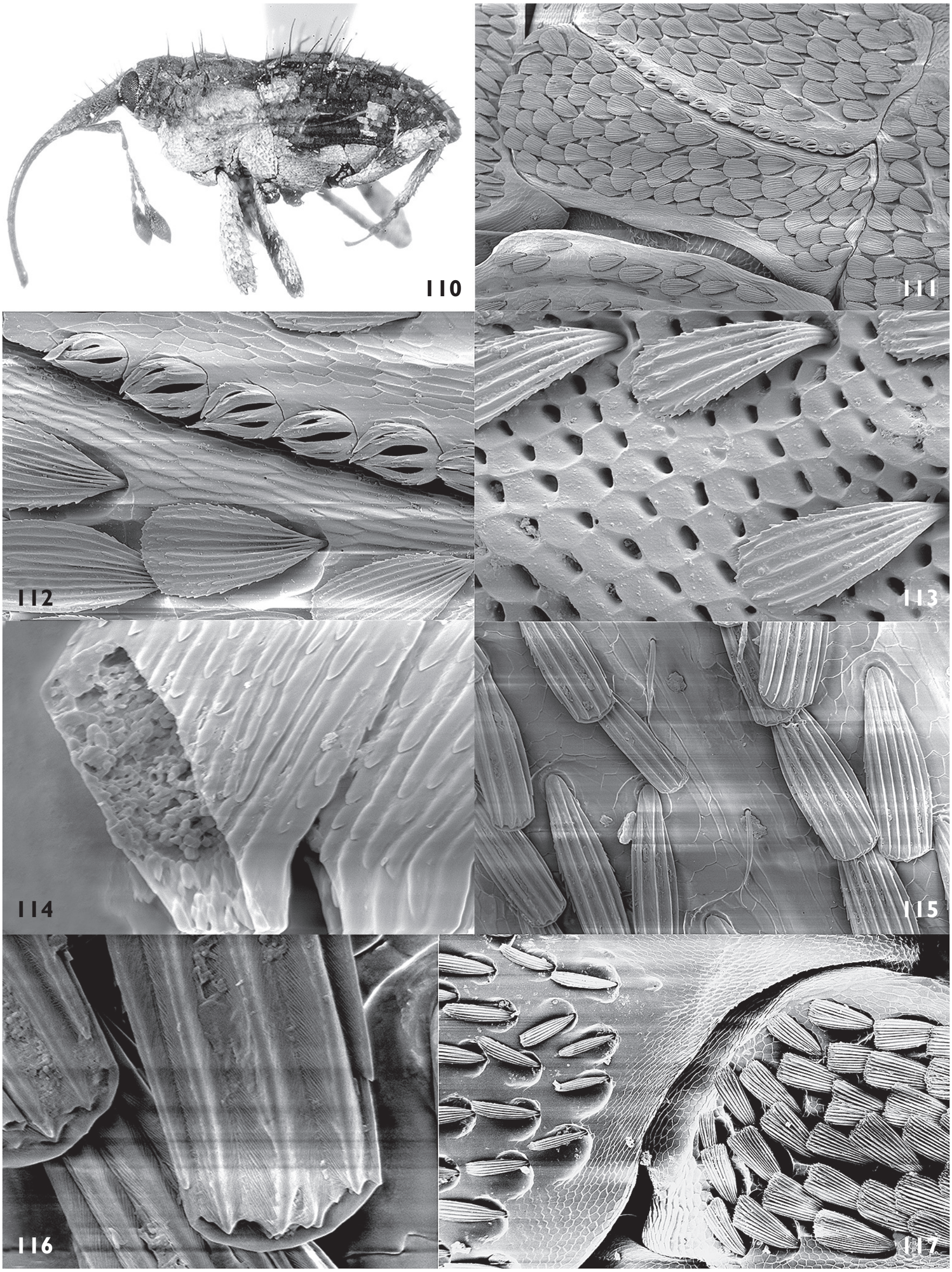
| Subfamily (Family) | Tribe | Subtribe | Taxon |
|---|---|---|---|
| | Madopterini | Zygobaridina | *Ethelda squamosa* Casey, 1922 |
| | Madopterini | Zygobaridina | *Eucalus vitticollis* (Blanchard, 1851) |
| | Madopterini | Zygobaridina | *Eudialomia longula* Casey, 1922 |
| | Madopterini | Zygobaridina | *Eugeraeus* Champion, 1908 sp. |
| | Madopterini | Zygobaridina | *Eusomenes curtirostris* Casey, 1922 |
| | Madopterini | Zygobaridina | *Fishonia brevinasus* Casey, 1922 |
| | Madopterini | Zygobaridina | *Forandia duplex* Casey, 1922 |
| | Madopterini | Zygobaridina | *Forandiopsis carinulata* Casey, 1922 |
| | Madopterini | Zygobaridina | *Fryella quadrituberculata* Hustache, 1929 |
| | Madopterini | Zygobaridina | *Garnia* Casey, 1922 sp. |
| | Madopterini | Zygobaridina | *Geraeopsis duplocincta* Champion, 1908 |
| | Madopterini | Zygobaridina | *Geraeus lineellus* Casey, 1892 |
| | Madopterini | Zygobaridina | *Geraeus penicillus* (Herbst, 1797) |
| | Madopterini | Zygobaridina | *Haplostethops ellipsoideus* Casey, 1920 |
| | Madopterini | Zygobaridina | *Idiostethus subcalvus* (LeConte, 1878) |
| | Madopterini | Zygobaridina | *Idiostethus tubulatus* (Say, 1831) |
| | Madopterini | Zygobaridina | *Iops bicolor* Hustache, 1939 |
| | Madopterini | Zygobaridina | *Iopsidaspis truncatula* Casey, 1922 |
| | Madopterini | Zygobaridina | *Ladustaspis crocopelma* Boheman, 1844 |
| | Madopterini | Zygobaridina | *Lamprobaris cucullata* Champion, 1908 |
| | Madopterini | Zygobaridina | *Lasiobaris geminata* Champion, 1908 |
| | Madopterini | Zygobaridina | *Laurentius bruchi* (Hustache, 1949) |
| | Madopterini | Zygobaridina | *Leptogarnia polita* Casey, 1922 |
| | Madopterini | Zygobaridina | *Leptoladustes densus* Casey, 1922 |
| | Madopterini | Zygobaridina | *Leptoschoinus fucatus* (Klug, 1829) |
| | Madopterini | Zygobaridina | *Limnobaris bicincta* Champion, 1908 |
| | Madopterini | Zygobaridina | *Limnobaris calandriformis* Champion, 1908 |
| | Madopterini | Zygobaridina | *Linogarnia suturalis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Linogeraeus urbanus* (Boheman, 1859) |
| | Madopterini | Zygobaridina | *Linogeraeus viduatus* (Hustache, 1949) |
| | Madopterini | Zygobaridina | *Lorena simulans* Casey, 1922 |
| | Madopterini | Zygobaridina | *Macrorevena atromicans* Casey, 1922 |
| | Madopterini | Zygobaridina | *Megavallius auritarsis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Melampius basalis* (Hustache, 1950) |
| | Madopterini | Zygobaridina | *Microbaridia delicatula* Casey, 1922 |
| | Madopterini | Zygobaridina | *Microcholus puncticollis* LeConte, 1876 |
| | Madopterini | Zygobaridina | *Microcholus striatus* LeConte, 1876 |
| | Madopterini | Zygobaridina | *Microforandia uniformis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Microstegotes* Casey, 1922 sp. |
| | Madopterini | Zygobaridina | *Microzalestes basalis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Montella rufipes* Bondar, 1948 |
| | Madopterini | Zygobaridina | *Nedestes sarpedon* Casey, 1922 |
| | Madopterini | Zygobaridina | *Neplaxa illustris* Casey, 1922 |
| | Madopterini | Zygobaridina | *Nestrada compacta* Casey, 1922 |
| | Madopterini | Zygobaridina | *Nicentridia angusticollis* Casey, 1922 |

| Subfamily (Family) | Tribe | Subtribe | Taxon |
|---|---|---|---|
| | Madopterini | Zygobaridina | *Nicentrus decipiens* Casey, 1892 |
| | Madopterini | Zygobaridina | *Nicentrus grossulus* Casey, 1893 |
| | Madopterini | Zygobaridina | *Odontocorynus scutellumalbum* (Say, 1831) |
| | Madopterini | Zygobaridina | *Odontocorynus creperus* Boheman, 1844 |
| | Madopterini | Zygobaridina | *Oligolochus bracatus* (Casey, 1892) |
| | Madopterini | Zygobaridina | *Oligolochus ornatus* (Casey, 1920) |
| | Madopterini | Zygobaridina | *Oomorphidius laevicollis* (LeConte, 1876) |
| | Madopterini | Zygobaridina | *Orissus meigeni* Pascoe, 1889 |
| | Madopterini | Zygobaridina | *Orissus christophori* Hustache, 1938 |
| | Madopterini | Zygobaridina | *Ortycus cristosus* Casey, 1922 |
| | Madopterini | Zygobaridina | *Ortycus setifer* (Boheman, 1844) |
| | Madopterini | Zygobaridina | *Ovanius picipennis* Hustache, 1938 |
| | Madopterini | Zygobaridina | *Ovanius minutus* Hustache, 1949 |
| | Madopterini | Zygobaridina | *Pachybaris porosa* LeConte, 1876 |
| | Madopterini | Zygobaridina | *Pachygeraeus laevirostris* Casey, 1920 |
| | Madopterini | Zygobaridina | *Palmelampius heinrichi* O'Brien, 2000 |
| | Madopterini | Zygobaridina | *Palmocentrinus butia* Bondar, 1949 |
| | Madopterini | Zygobaridina | *Palocopsis tecta* Casey, 1922 |
| | Madopterini | Zygobaridina | *Parafishonia setulosa* Casey, 1922 |
| | Madopterini | Zygobaridina | *Parageraeus tumidirostris* Casey, 1920 |
| | Madopterini | Zygobaridina | *Parasaldius* Caesy, 1922 sp. |
| | Madopterini | Zygobaridina | *Parasomenes curvirostris* Hustache, 1939 |
| | Madopterini | Zygobaridina | *Peclavia hispidicollis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Peclaviopsis planipectus* Casey, 1922 |
| | Madopterini | Zygobaridina | *Phacelobarus singularis* Gyllenhal, 1844 |
| | Madopterini | Zygobaridina | *Plocamus echidna* (LeConte, 1876) |
| | Madopterini | Zygobaridina | *Plocamus clavisetis* Champion, 1908 |
| | Madopterini | Zygobaridina | *Pseudocentrinus ochraceus* (Boheman, 1844) |
| | Madopterini | Zygobaridina | *Pseudogeraeus macropterus* Champion, 1908 |
| | Madopterini | Zygobaridina | *Pseudorancea armata* Boheman, 1844 |
| | Madopterini | Zygobaridina | *Pseudorthoris devexus* Champion, 1908 |
| | Madopterini | Zygobaridina | *Pseudosaldius conjunctus* Casey, 1922 |
| | Madopterini | Zygobaridina | *Psiona densa* Casey, 1922 |
| | Madopterini | Zygobaridina | *Pycnogeraeus modestus* Casey, 1920 |
| | Madopterini | Zygobaridina | *Pycnogeraeus striatirostris* Casey, 1920 |
| | Madopterini | Zygobaridina | *Pycnonicentrus gilvivestis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Rancea parviclava* Casey, 1922 |
| | Madopterini | Zygobaridina | *Ranceoma uniformis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Remertus marginatus* Casey, 1922 |
| | Madopterini | Zygobaridina | *Revena rubiginosa* Boheman, 1836 |
| | Madopterini | Zygobaridina | *Reveniopsis* Casey, 1922 sp. |
| | Madopterini | Zygobaridina | *Roalius rufipes* Casey, 1922 |
| | Madopterini | Zygobaridina | *Saldiopsis armata* Casey, 1922 |
| | Madopterini | Zygobaridina | *Saldius inaequalis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Scirpicola chilensis* (Blanchard, 1851) |

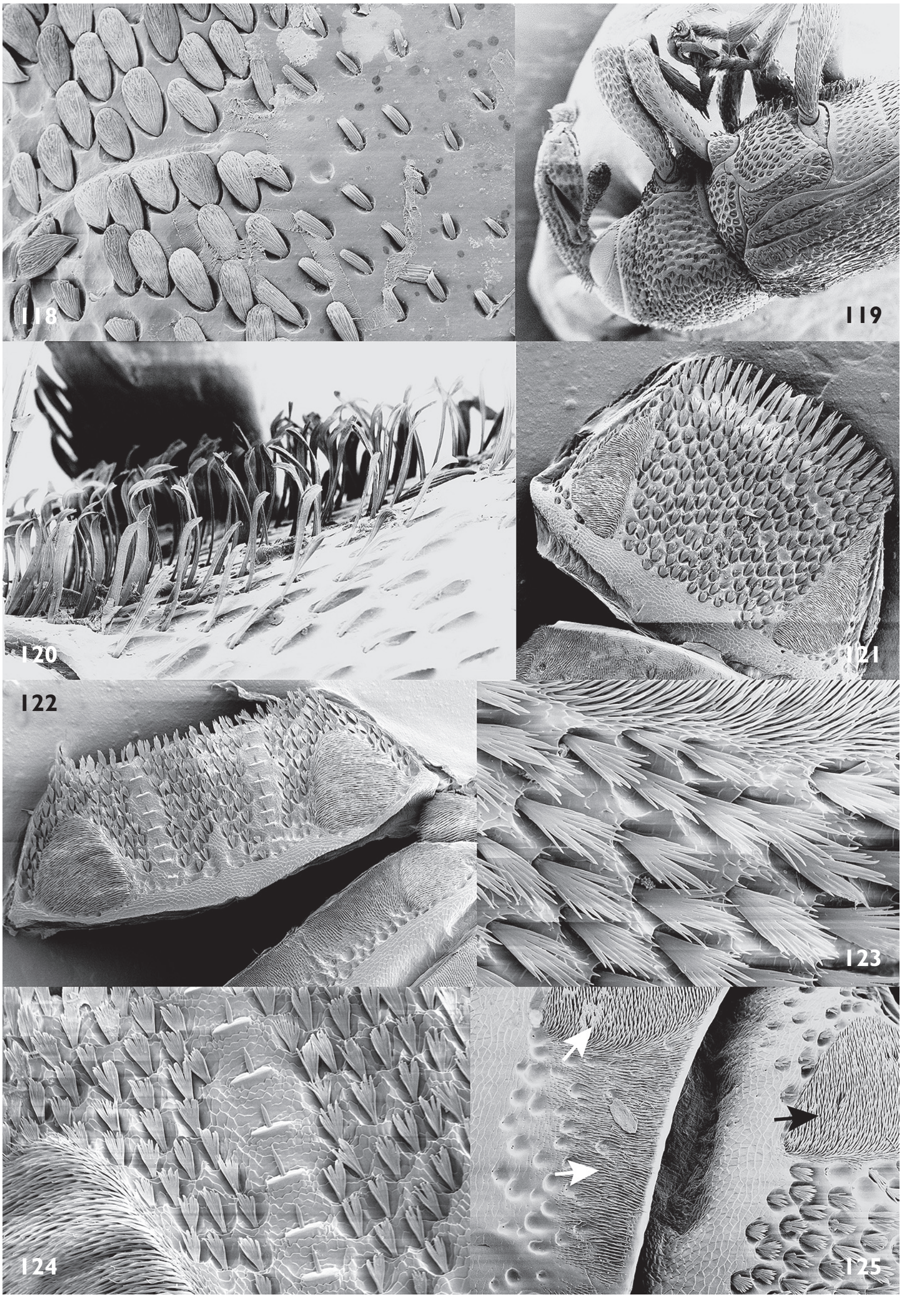
| Subfamily (Family) | Tribe | Subtribe | Taxon |
|---|---|---|---|
| | Madopterini | Zygobaridina | *Selasella cuneipennis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Sodesia sparsa* Casey, 1922 |
| | Madopterini | Zygobaridina | *Somenes spinifer* Casey, 1922 |
| | Madopterini | Zygobaridina | *Spolatia gradata* Casey, 1922 |
| | Madopterini | Zygobaridina | *Starcus rugulosus* Casey, 1922 |
| | Madopterini | Zygobaridina | *Stethobaris commixta* Blatchley & Leng, 1916 |
| | Madopterini | Zygobaridina | *Stethobaris laevimargo* (Champion, 1916) |
| | Madopterini | Zygobaridina | *Stethobaroides nudiventris* Champion, 1907 |
| | Madopterini | Zygobaridina | *Sunilius platyrhinus* Casey, 1922 |
| | Madopterini | Zygobaridina | *Tenemotes abdominalis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Tenemotes parviclava* Casey, 1922 |
| | Madopterini | Zygobaridina | *Ternova bipartita* Casey, 1922 |
| | Madopterini | Zygobaridina | *Thestonia sparsa* Casey, 1922 |
| | Madopterini | Zygobaridina | *Trichodirabius longulus* Casey, 1920 |
| | Madopterini | Zygobaridina | *Valdenus laevis* Casey, 1922 |
| | Madopterini | Zygobaridina | *Valliopsis squamipes* Casey, 1922 |
| | Madopterini | Zygobaridina | *Vallius sulcatus* Hustache, 1938 |
| | Madopterini | Zygobaridina | *Xystus ater* (Boheman, 1844) |
| | Madopterini | Zygobaridina | *Xystus arnoldi* (Kirby, 1819) |
| | Madopterini | Zygobaridina | *Zalestes perpolitus* Casey, 1922 |
| | Madopterini | Zygobaridina | *Zygobarella xanthoxyli* Casey, 1920 |
| | Madopterini | Zygobaridina | *Zygobarella tristicula* Casey, 1920 |
| | Madopterini | Zygobaridina | *Zygobarinus coelestinus* Blatchley & Leng, 1916 |
| | Madopterini | Zygobaridina | *Zygobaris* LeConte, 1876 sp. 2 |
| | Madopterini | Zygobaridina | *Zygobaris nitens* LeConte, 1876 |
| | Madopterini | Zygobaridina | *Zygobaris* LeConte, 1876 sp. 1 |
| | Madopterini | Zygobaridina | *Zygozalestes oblongus* Casey, 1922 |
| | Nertinini | | *Lichnus longulus* Hustache, 1938 |
| | Nertinini | | *Nertinus suturalis* (Boheman, 1844) |
| | Nertinini | | *Strongylotes squamans* Boheman, 1844 |
| | Optatini | | *Lydamis cinnamomeus* Champion, 1907 |
| | Optatini | | *Optatus palmaris* Champion, 1907 |
| | Optatini | | *Pardisomus biplagiatus* (Desbrochers, 1906) |
| | Optatini | | *Pistus galeatus* (Boheman, 1844) |
| | Optatini | | *Telemus* Pascoe, 1889 sp. |
| | Pantotelini | Cyrionychina | *Cyrionyx camelus* Champion, 1907 |
| | Pantotelini | Pantotelin | *Pantoteles tenuirostris* Boheman, 1845 |
| | Peridinetini | | *Peridinetus cretaceus* Pascoe, 1880 |
| | Peridinetini | | *Peridinetus irroratus* Schoenherr, 1837 |
| | *Incertae sedis* | | *Moreobaris deplanata* (Roelofs, 1875) |



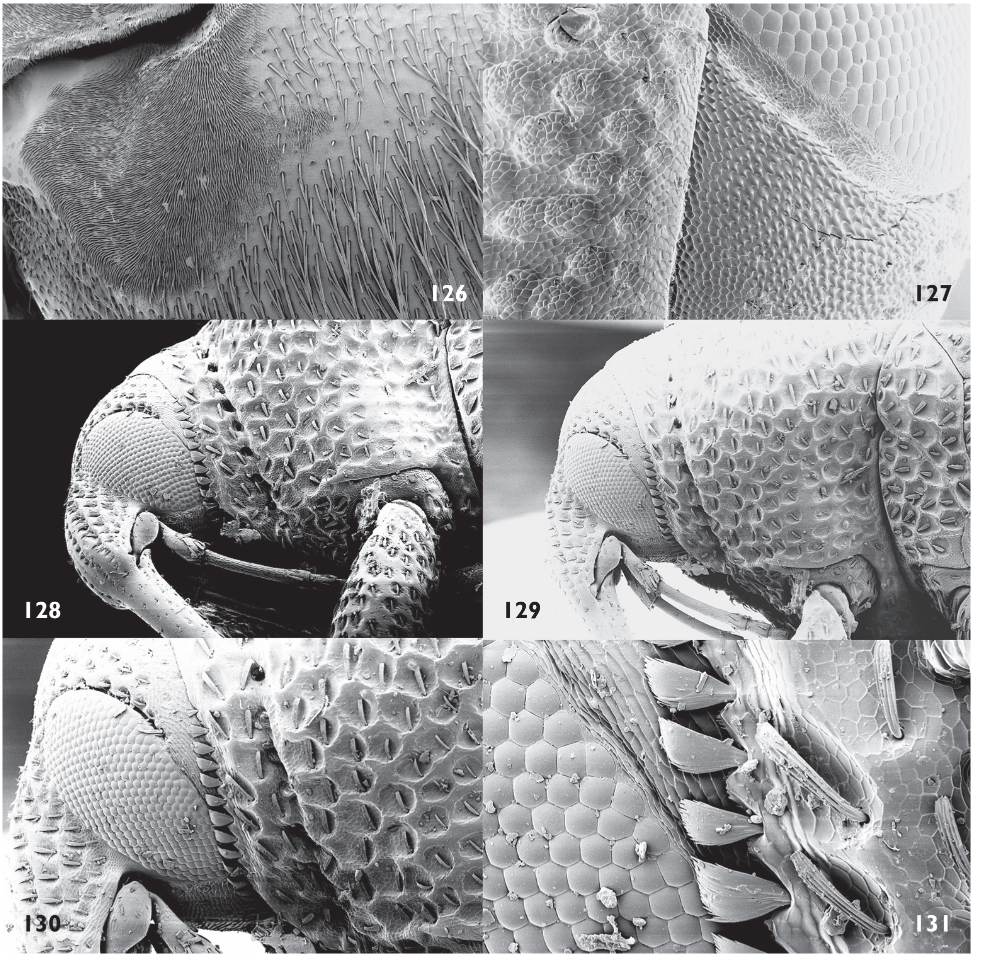

**Figures 97-109**. Adult morphology. 97, *Dialomia gradata* (dorsal view); 98, *Orissus christophori* (dorsal view); 99, *Orissus meigenii* (lateral view); 100, *Nertinus suturalis* (lateral view); 101, *Prodinus* sp. (dorsal view); 102, *Prodinus* sp. (lateral view); 103, *Parallelosomus amplitarsis* (lateral view); 104, *Torcus nigrinus* (lateral view); 105, *Peridinetus cretaceus* (dorsal view); 106, *Barinus bivittatus* (dorsal view); 107, *Microcholus puncticollis* (dorsal view); 108, *Catapastus squamirostris* (SEM); 109, *Stethobaris laevimargo* (SEM).



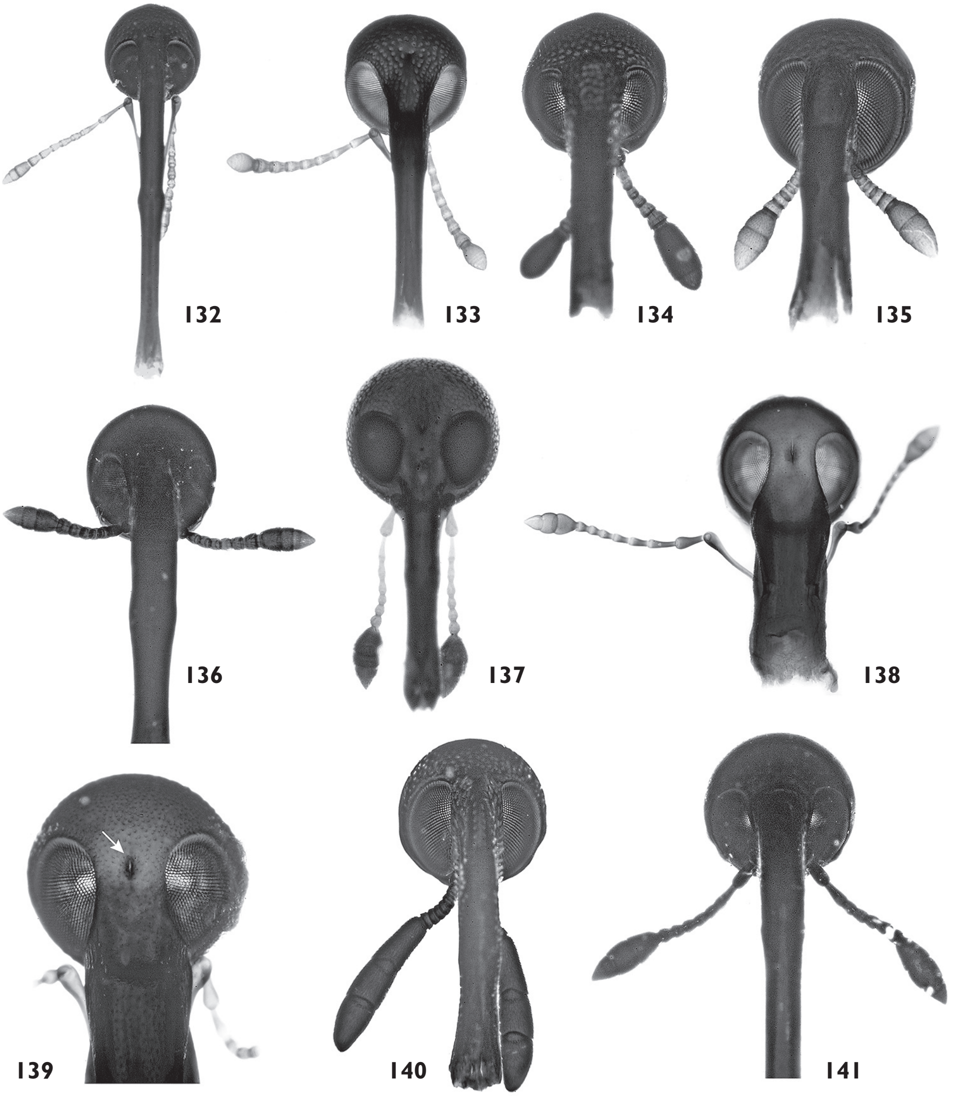

**Figures 110-117**. Scale morphology. 110, *Plocamus echidna* (lateral view). 111-117, SEM's. 111, *Pseudorthoris devexus*, scales along the metepisternum and surrounding sclerites; 112, do., sclerolepidia; 113, *Coleomerus boliviensis*, side of pronotum; 114, *Baris torquata*, enlargement of broken scale on elytra; 115-116, *Geraeus lineellus*, detail of scales on elytra; 117, *Anthinobaris* sp., scales along side of pronotum on left side of photograph and along mesepisternum on right side.



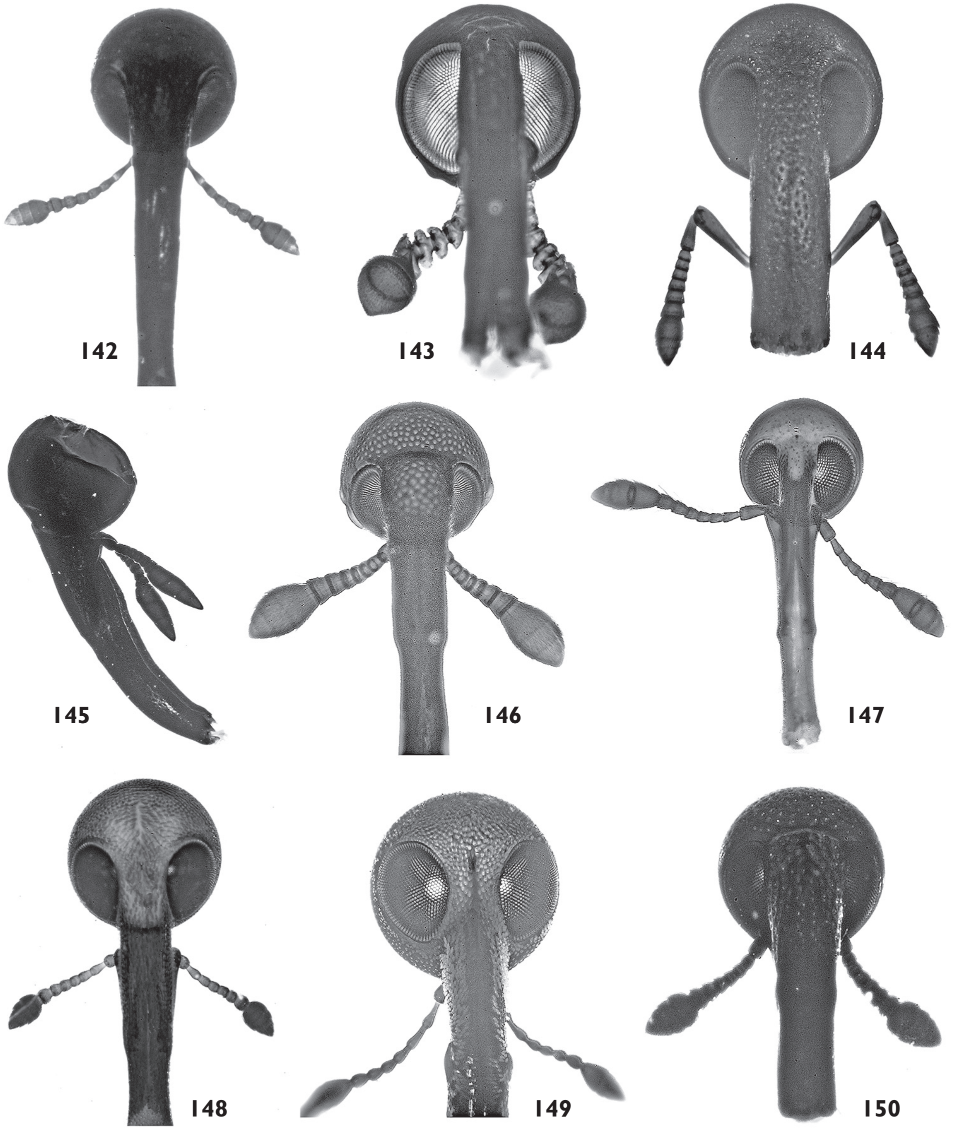

**Figures 118-125**. Scale morphology, SEM's. 118, *Spilobaris* sp., metasternum; 119-120, *Lophobaris* sp., lateral view showing erect male sex scales on first ventrite; 121, *Limnobaris jucunda*, male 7th tergite, dorsal view; 122, *Pachybaris porosa*, male 7th tergite, dorsal view; 123, *Taiwanobaris* sp.,scales on male 7th tergite, dorsal view; 124, *Pachybaris porosa*, enlargement of 7th tergite; 125, *Acythopeus* sp., enlargement of female 6th and 7th tergites, showing the two forms of spiculate patches on the median sclerites.



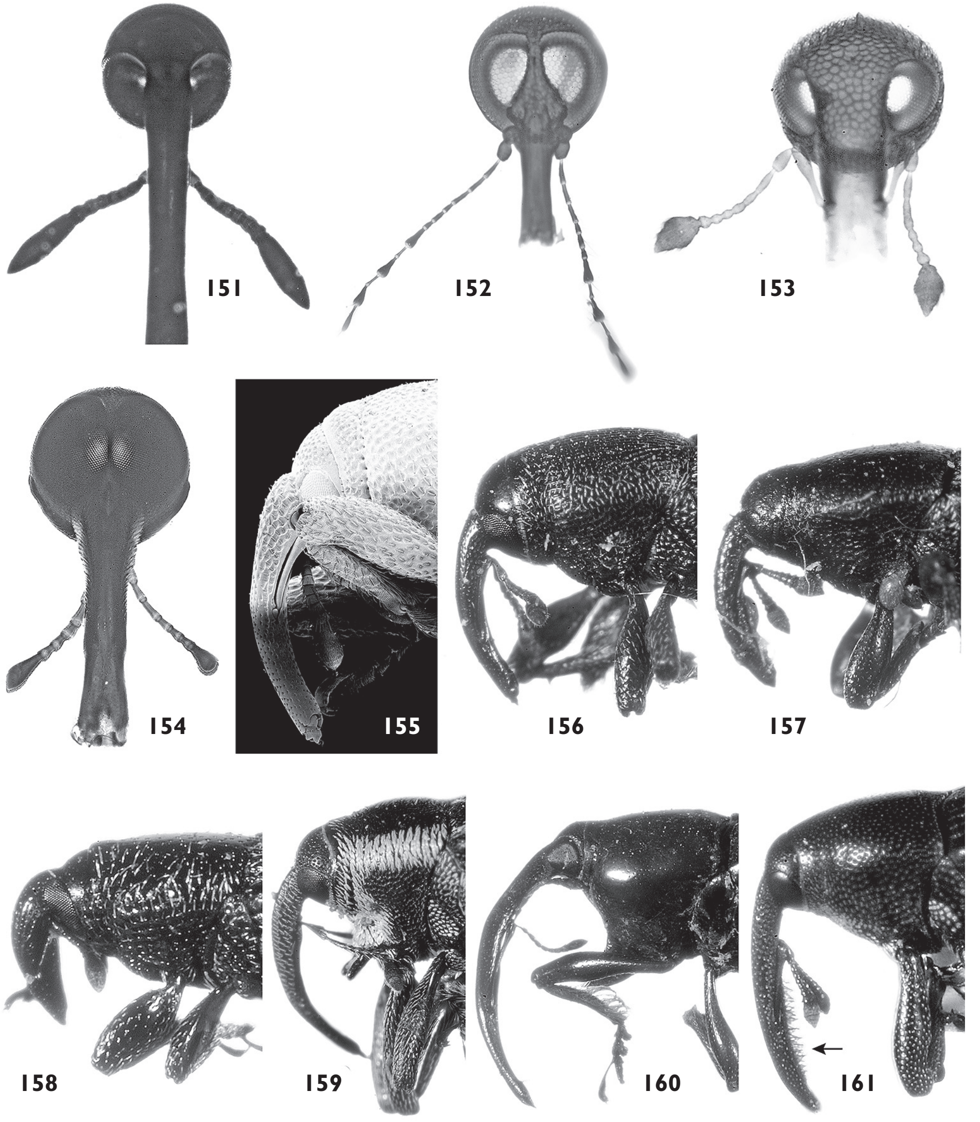

**Figures 126-131**. 126, *Lixus concavus*, scale morphology on male 7$^{th}$ tergite. 127-131, head morphology, SEM's. 127, *Taiwanobaris* sp., dorso-lateral head sculpturing near margin of eye; 128-131, *Anthinobaris* sp. 128, latero-ventral view; 129, lateral view; 130, enlargement of lateral view showing wide ocular vibrissae; 131, detail of ocular vibrissae along lateral margin of pronotum.



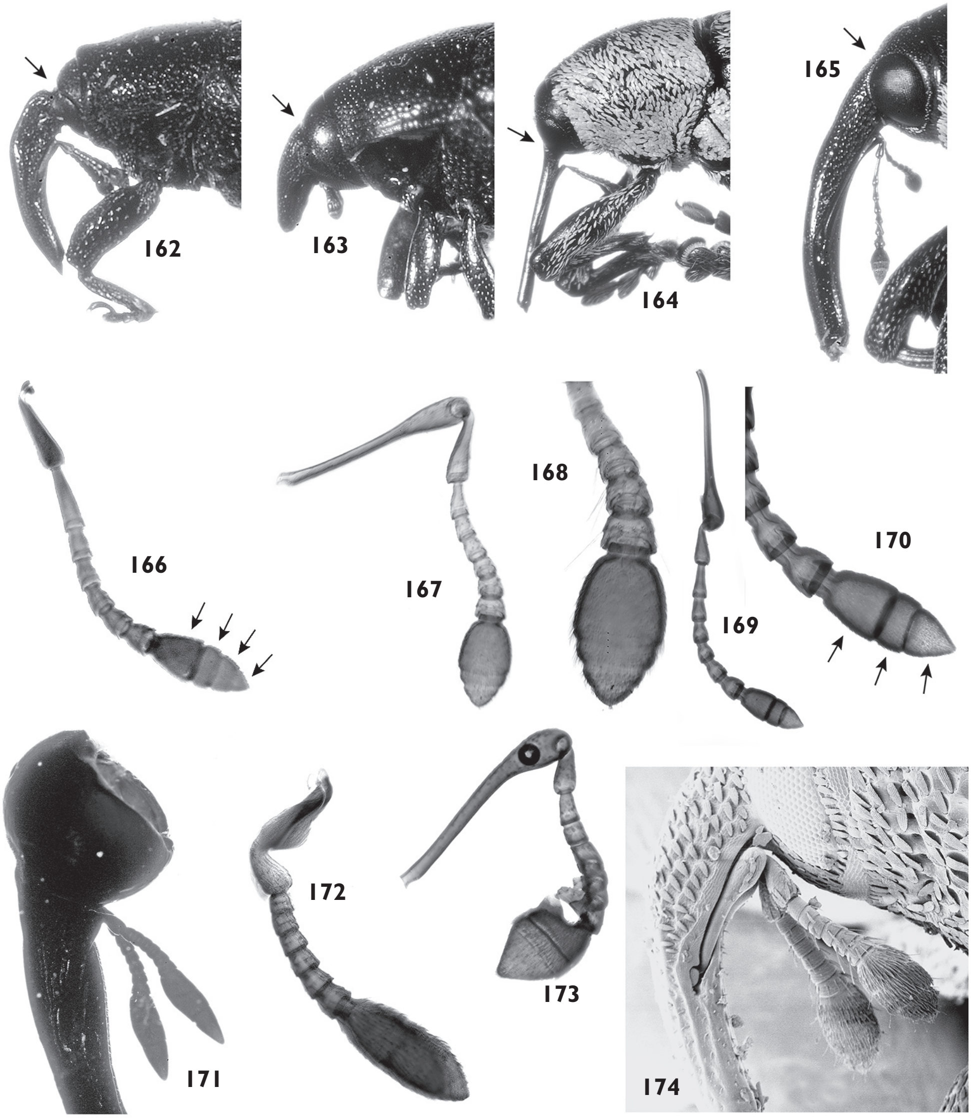

**Figures 132-141**. Head and rostrum, anterior view. 132, *Centrinus curvirostris*; 133, *Tenemotes abdominalis*; 134-135, *Acythophanes* sp.; 136, *Orissus christophori*; 137, *Pantoteles tenuirostris*; 138, *Peridinetus cretaceus*; 139, *Peridinetus irroratus*, showing central fovea; 140, *Leptoschoinus fucatus*; 141, *Garnia* sp.



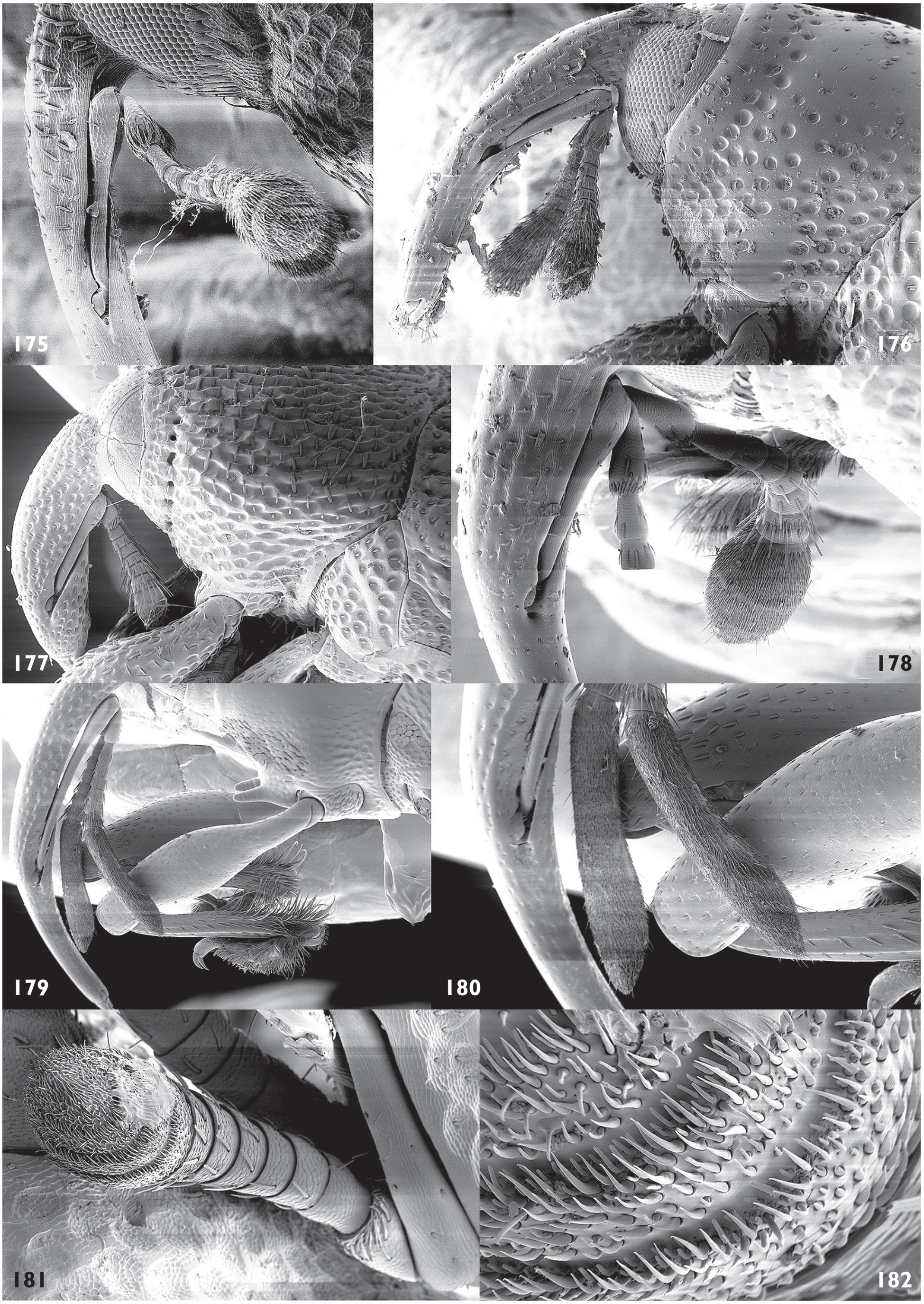

**Figures 142-150**. Head and rostrum, anterior view. 142, *Xystus arnoldi*; 143, *Odontocorynus creperus*; 144, *Eurhinus aeneus*; 145, *Diorymerus lancifer* (lateral view); 146, *Spilobaris* sp.; 147, *Lamprobaris cucullata*; 148, *Telemus* sp.; 149, *Pteracanthus smidtii*; 150, *Stereobaris interpunctata*.



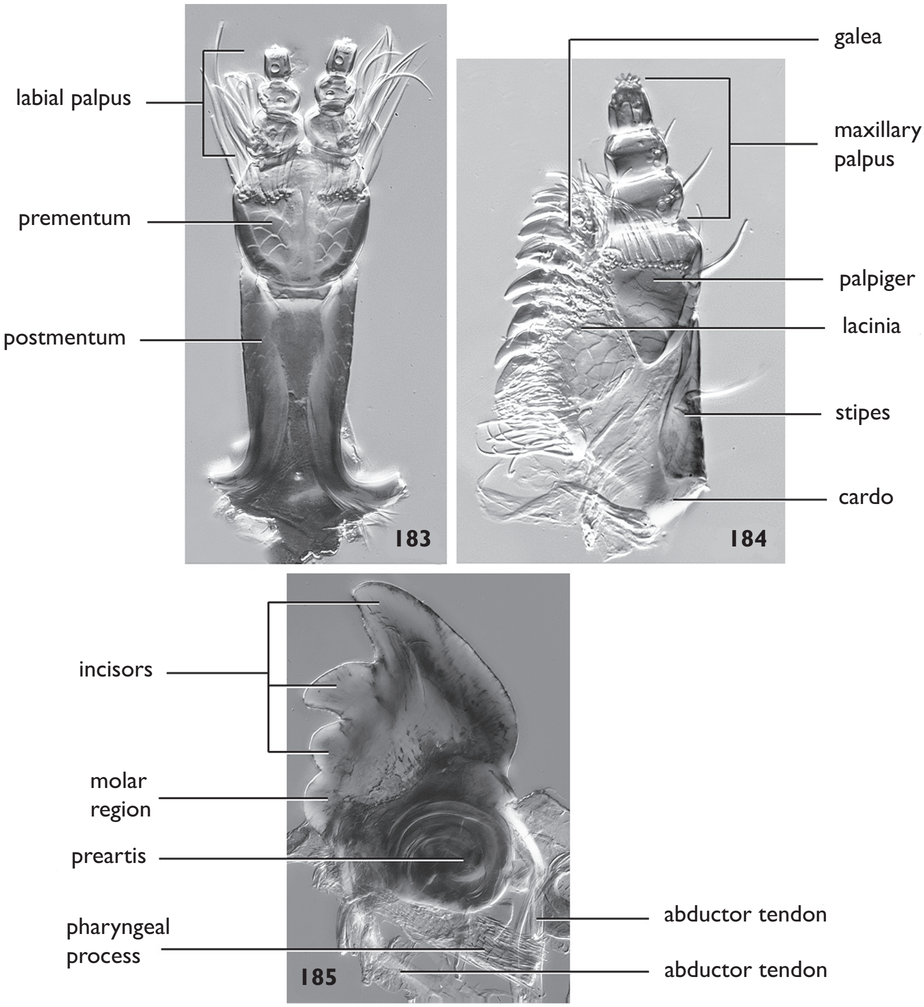

**Figures 151-161**. Head and rostrum. 151-154, anterior view. 151, *Conoproctus quadripustulatus*; 152, *Trichodocerus* sp.; 153, *Hypurus bertrandi*; 154, *Cyllophorus fasciatus*. 155-161, lateral view. 155, *Acythophanes* sp.; 156, *Centrinogyna strigata*; 157, *Dealia carbonaria*; 158, *Fishonia brevinasus*; 159, *Crotanius trivittatus*; 160, *Dactylocrepis flabellitarsis*; 161, *Myctides imberbis*, showing setae along apico-ventral margin of rostrum.



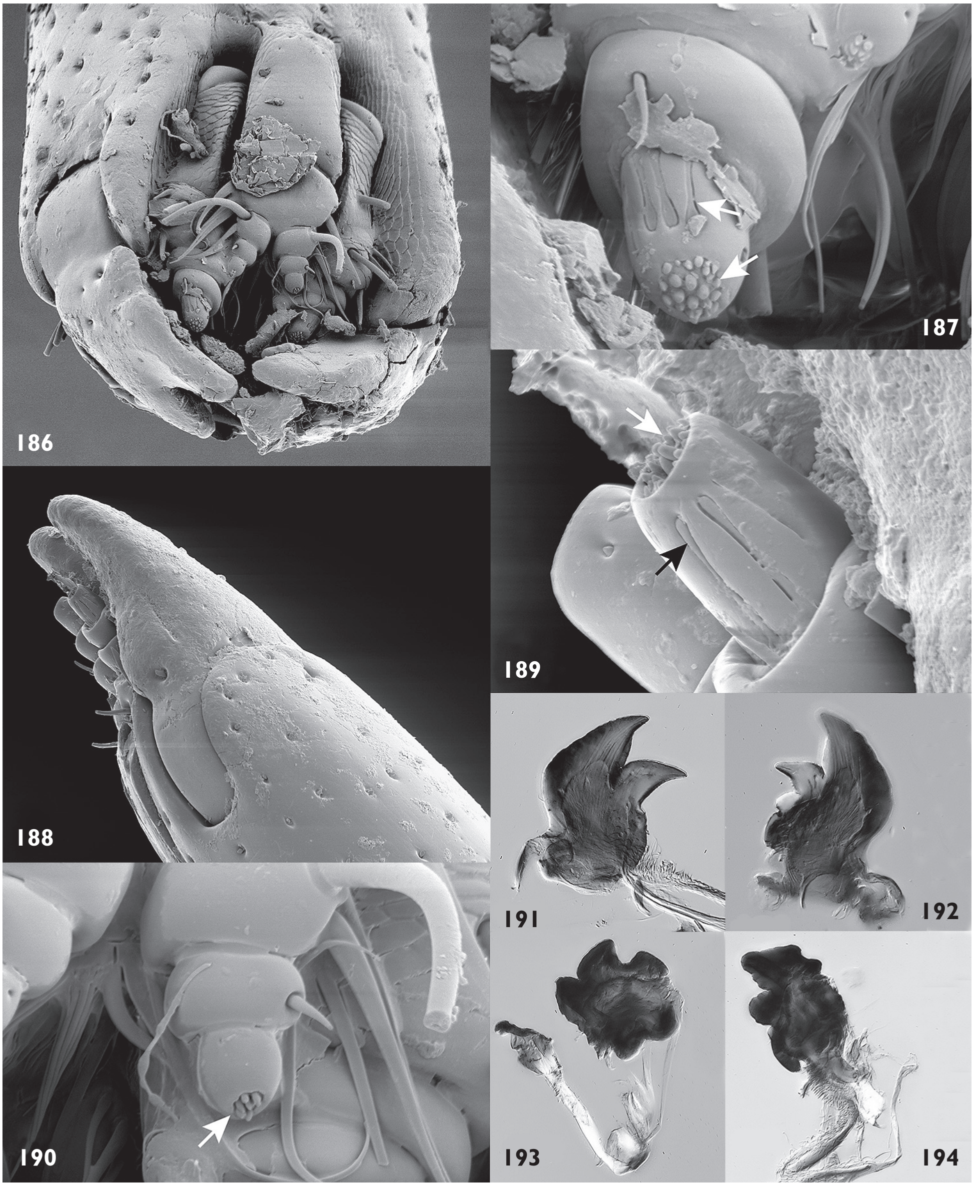

**Figures 162-174**. 162-165, head and rostrum, lateral view. 162, *Zygozalestes oblongus*, showing sulcus between rostrum and frons; 163, *Microrhinus mutilus*, showing weak sulcus at rostrum-frons junction; 164, *Strongylotes squamans*, showing weak sulcus at rostrum-frons junction; 165, *Pardisomus biplagiatus*, showing a smooth rostrum-frons junction. 166-174, antennae. 166, *Anavallius ruficornis*, club showing annulation on 3rd article; 167-168, *Oligolochus bracatus*; 169-170, *Camelodes leachii*, club without annulation on 3rd article; 171, *Diorymerus lancifer*; 172, *Orthoris crotchii*; 173, *Odontocorynus creperus*; 174, *Catapastus squamirostris* (SEM).



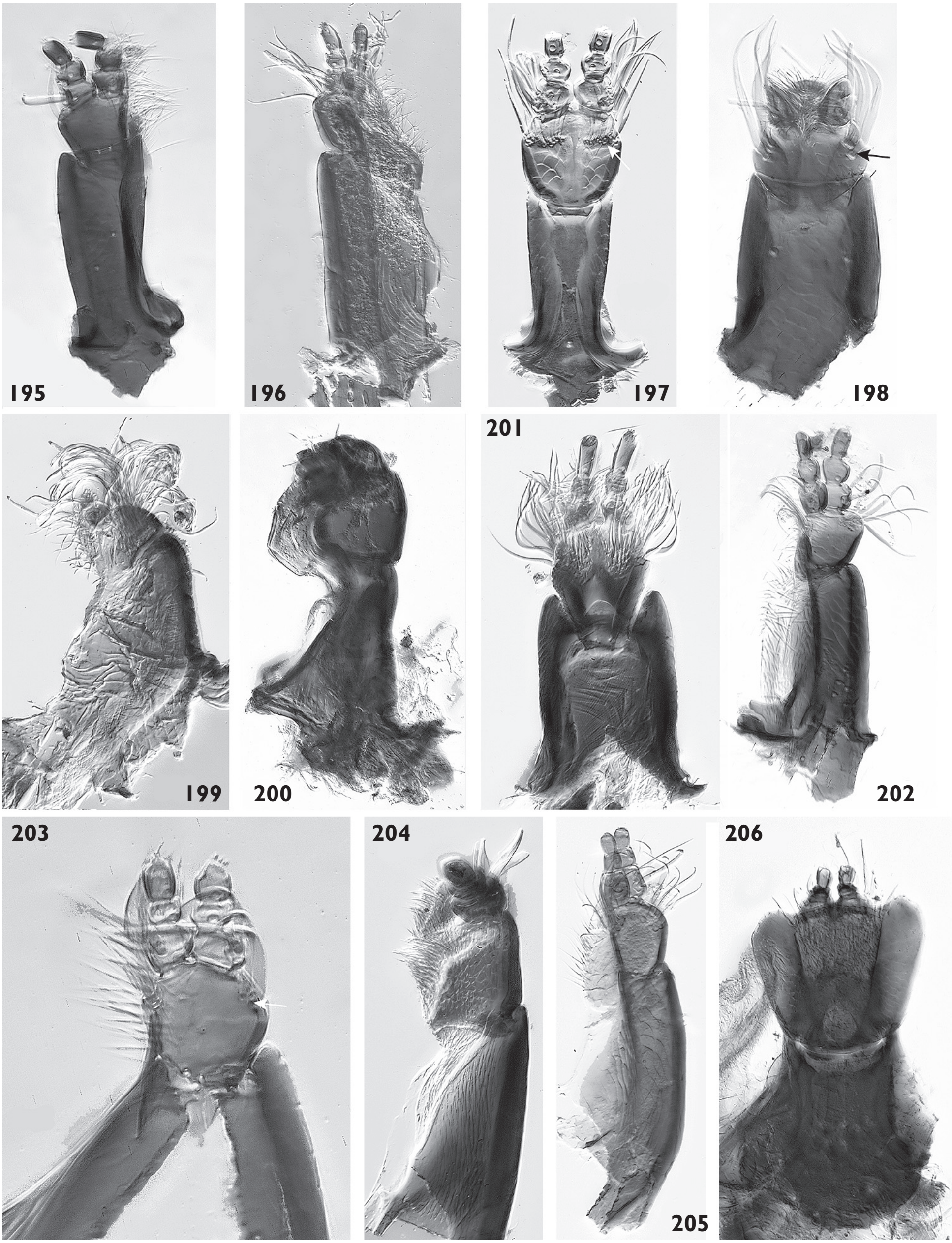

**Figures 175-182**. Antennae, SEMs. 175, *Idiostethus subcalvus*; 176, *Stethobaris laevimargo*; 177, *Pertorcus* sp.; 178, *Madarus bistrigellus*; 179-180, *Cylindrocerus comma*, showing elongate club; 181-182, *Taiwanobaris* sp., showing annulation on 3rd club article.



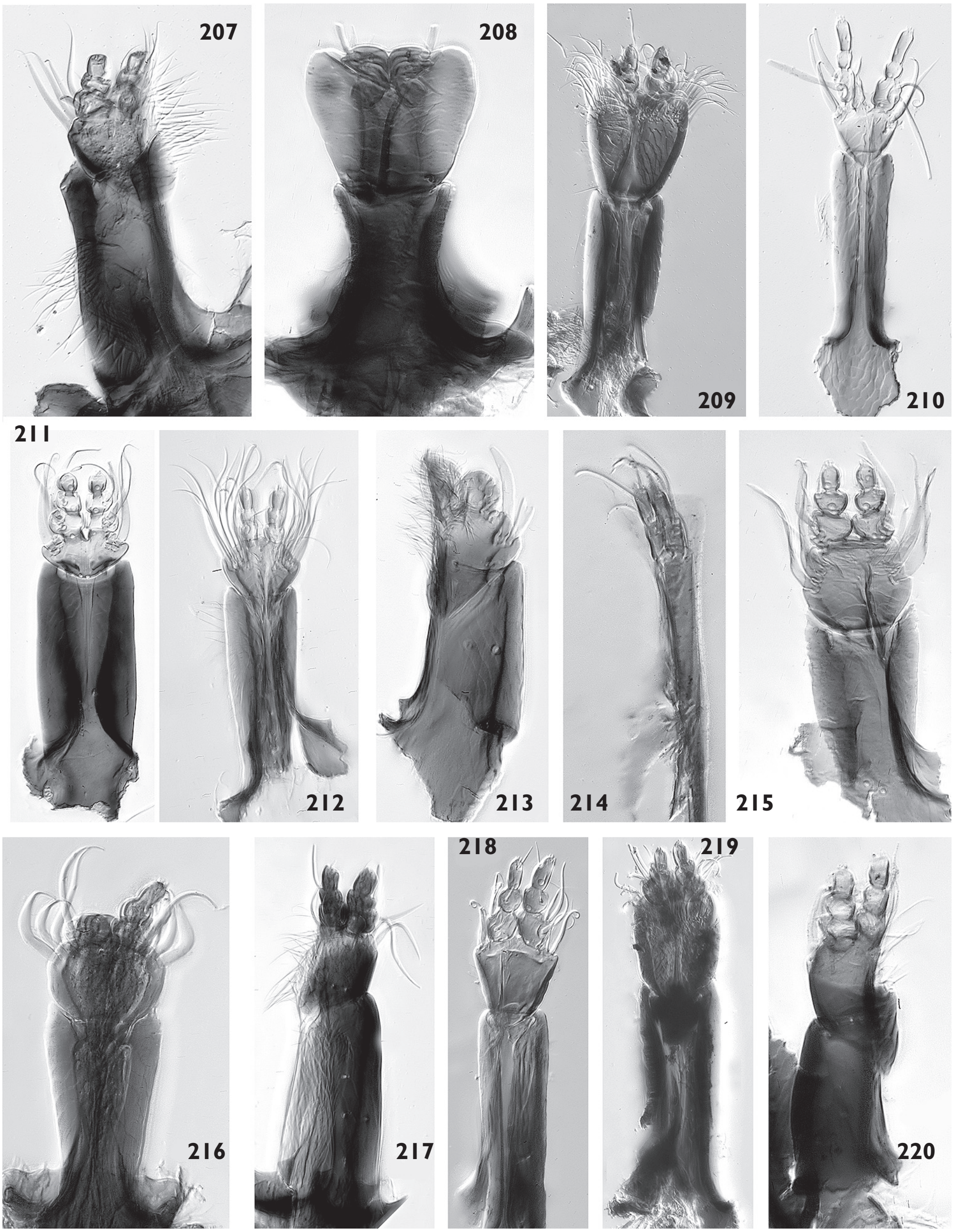

**Figures 183-185**. Mouthparts, *Anthinobaris* sp. 183, labium; 184, maxilla; 185, mandible (right).



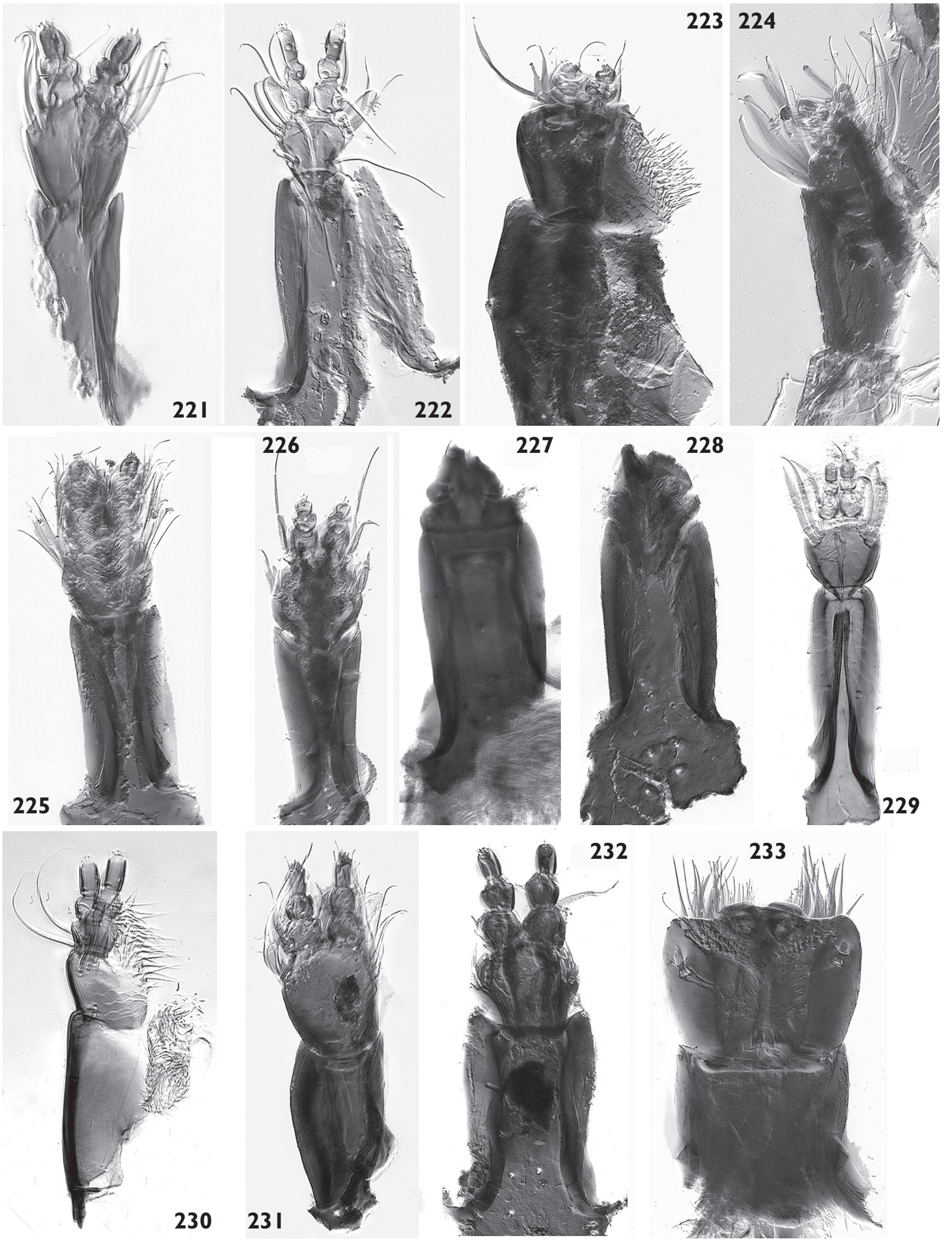

**Figures 186-194**. Mouthparts. 186-187, *Demoda vittata*. 186, ventral aspect of apex of rostrum, showing labium, maxilla, and mandibles; 187, enlargement of apical maxillary palpal lobes, showing lateral and apical sensilla; 188-189, *Cylindrocerus comma*. 188, lateral aspect of apex of rostrum; 189, enlargement of 3rd maxillary palpal lobe, showing lateral and apical sensilla; 190, *Demoda vittata*, labial palpus, showing apical sensilla; 191-192, *Ovanius picipennis*, left and right mandibles, respectively; 193-194, *Zygobarella xanthoxyli*, left and right mandibles, respectively.



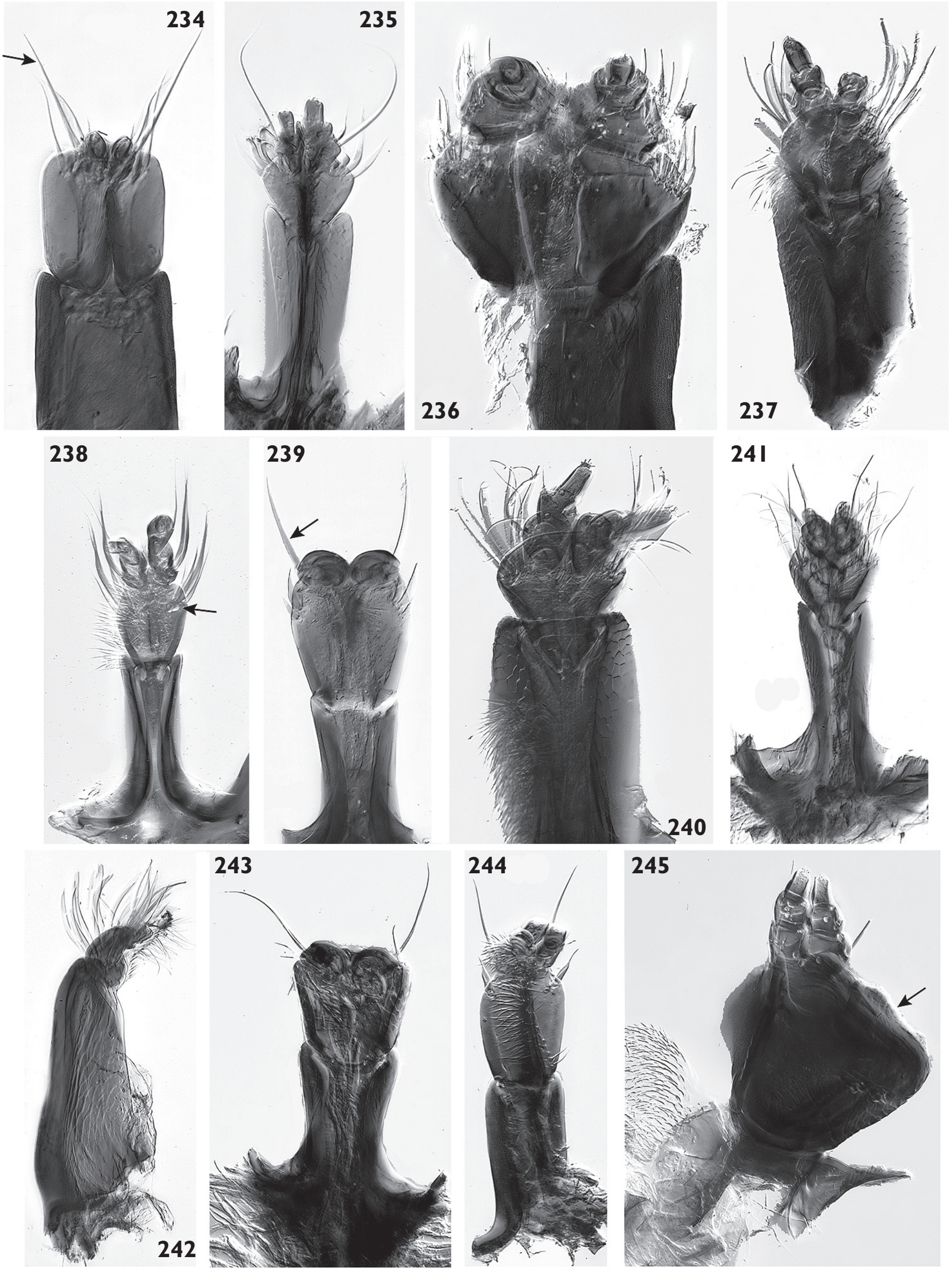

**Figures 195-206**. Mouthparts – labia, ventral view. 195, *Zygobaris nitens*; 196, *Centrinus curvirostris*, ventro-lateral view; 197, *Anthinobaris* sp.; 198, *Ovanius picipennis*; 199, *Nertinus suturalis*, lateral view; 200, *Peridinetus irroratus*; 201, *Loboderes citriventris*; 202, *Antesis sparsa*; 203, *Acentrinops brevicollis*; 204, *Garnia* sp., lateral view; 205, *Pachygeraeus laevirostris*, ventro-lateral view; 206, *Eisonyx crassipes*.



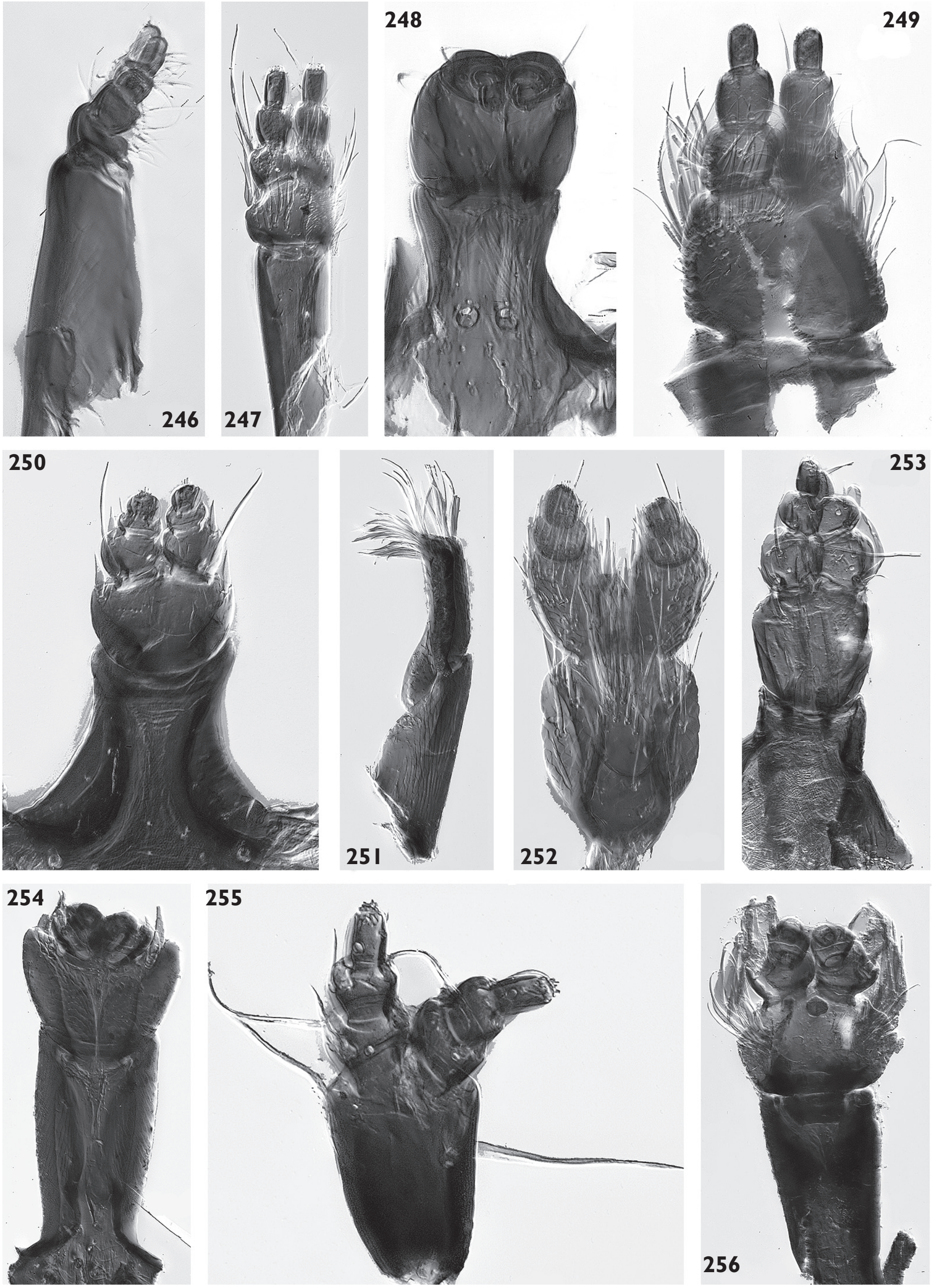

**Figures 207-220**. Mouthparts – labia, ventral view. 207, *Dirabius calvus*; 208, *Eisonyx opacus*; 209, *Xystus arnoldi*; 210, *Geraeus penicillus*; 211, *Microcholus puncticollis*; 212, *Linogeraeus viduatus*; 213, *Ovanius minutus*, dorso-lateral view; 214, *Plocamus echidna*, dorso-ventral view; 215, *Oligolochus bracatus*; 216, *Oligolochus ornatus*; 217, *Odontocorynus scutellumalbum*; 218, *Odontocorynus creperus*; 219, *Camelodes leachii*; 220, *Sibariops concinnus*.



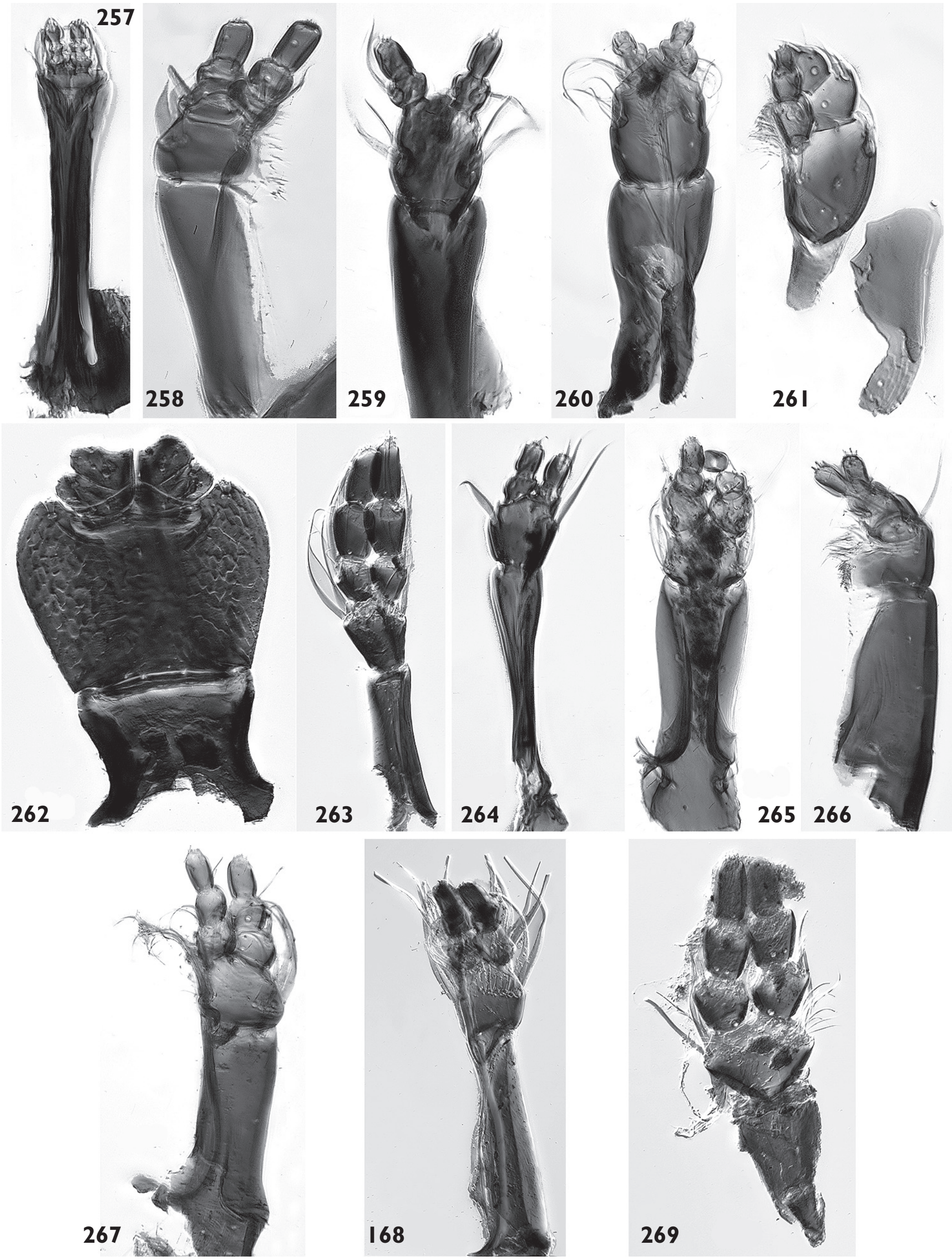

**Figures 221-233**. Mouthparts – labia, ventral view. 221, *Sibariops concurrens*; 222, *Torcus nigrinus*; 223, *Madopterus talpa*, lateral view; 224, *Parallelosomus amplitarsis*, lateral view; 225, *Orchidophilus aterrimus*; 226, *Embates chaetopus*; 227, *Eurhinus festivus*; 228, *Eurhinus aeneus*; 229, *Coleomerus boliviensis*; 230, *Coelonertus nigrirostris*, lateral view; 231, *Baris torquata*; 232, *Lydamis cinnamomeus*; 233, *Busckiella lecythidis*.



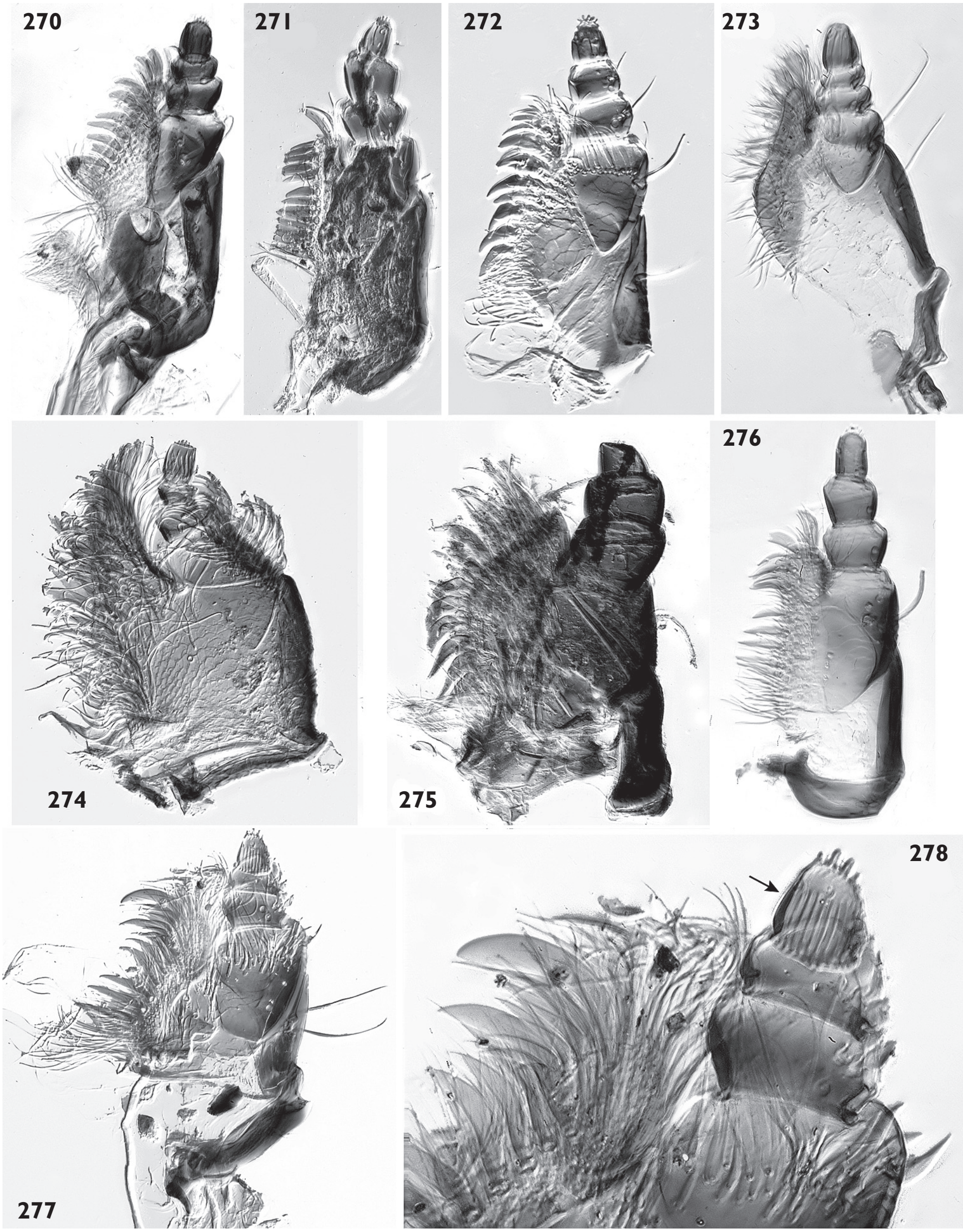

**Figures 234-245**. Mouthparts – labia, ventral view. 234, *Rhoptobaris canescens*, showing large setae along antero-lateral margins of prementum; 235, *Parisoschoenus* sp.; 236, *Pardisomus biplagiatus*; 237, *Pycnotheantis* sp.; 238, *Telemus* sp., showing large setae along antero-lateral margins of prementum; 239, *Pteracanthus smidtii*, showing large setae along antero-lateral margins of prementum; 240, *Megabaris quadriguttata*; 241, *Conoproctus quadripustulatus*; 242, *Eugeraeus* sp., lateral view; 243, *Lepidobaris acnisti*; 244, *Phacelobarus singularis*; 245, *Cyrtepistomus castaneus*, ventro-lateral view, showing enlarged prementum.



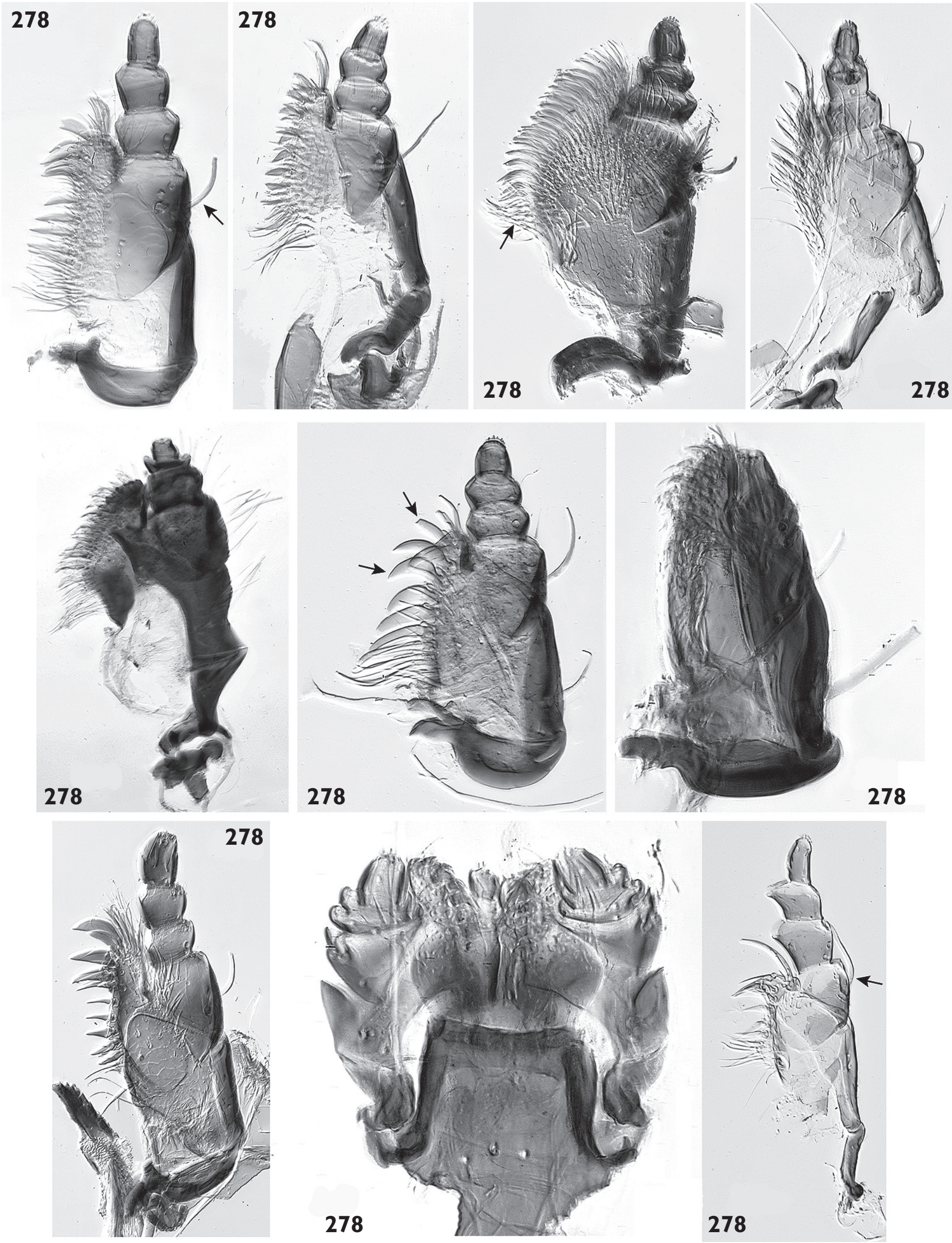

**Figures 246-256**. Mouthparts – labia, ventral view. 246, *Derelomus basalis*, lateral view; 247, *Cryptorhynchus lapathi*; 248, *Bagous transversus*; 249, *Cholus rana*; 250, *Cossonus impressifrons*; 251, *Curculio pardalis*, lateral view; 252, *Hylurgops planirostris*; 253, *Barycerus collaris*; 254, *Testalthea* sp.; 255, *Rhytidoglymma aenescens*; 256, *Megalobaris viridana*.



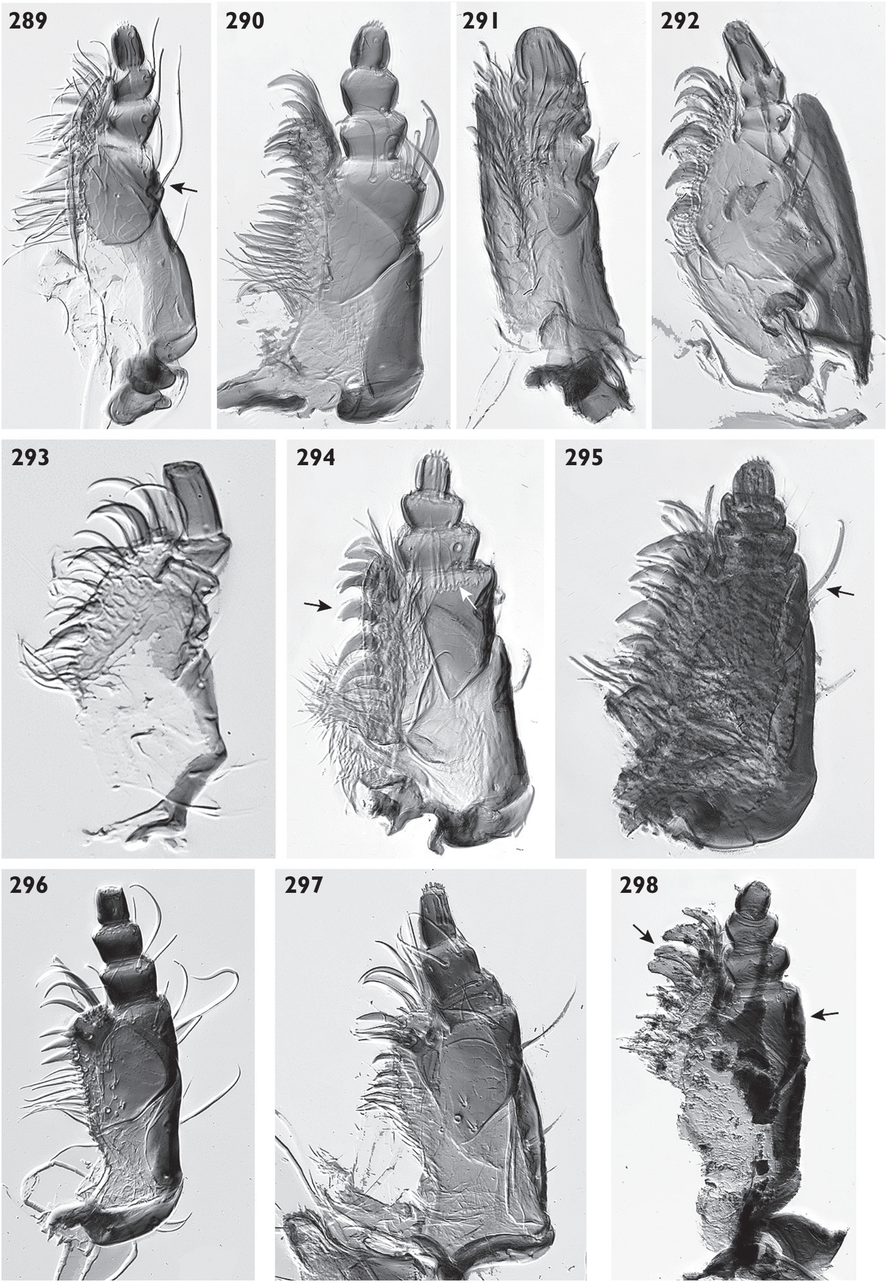

**Figures 257-269**. Mouthparts – labia, ventral view. 257, *Barymerus binarius*; 258, *Trichodocerus* sp.; 259, *Coeliodes flavicaudis*; 260, *Mononycus vulpeculus*; 261, *Hypurus bertrandi*; 262, *Trigonocolus curvipes*; 263, *Mecopus trilineatus*; 264, *Cylindrocopturus adspersus*; 265, *Telephae oculata*; 266, *Balanogastris kolae*, lateral view; 267, *Metialma signifera*; 268, *Cyllophorus fasciatus*; 269, *Arachnobas gazella*.



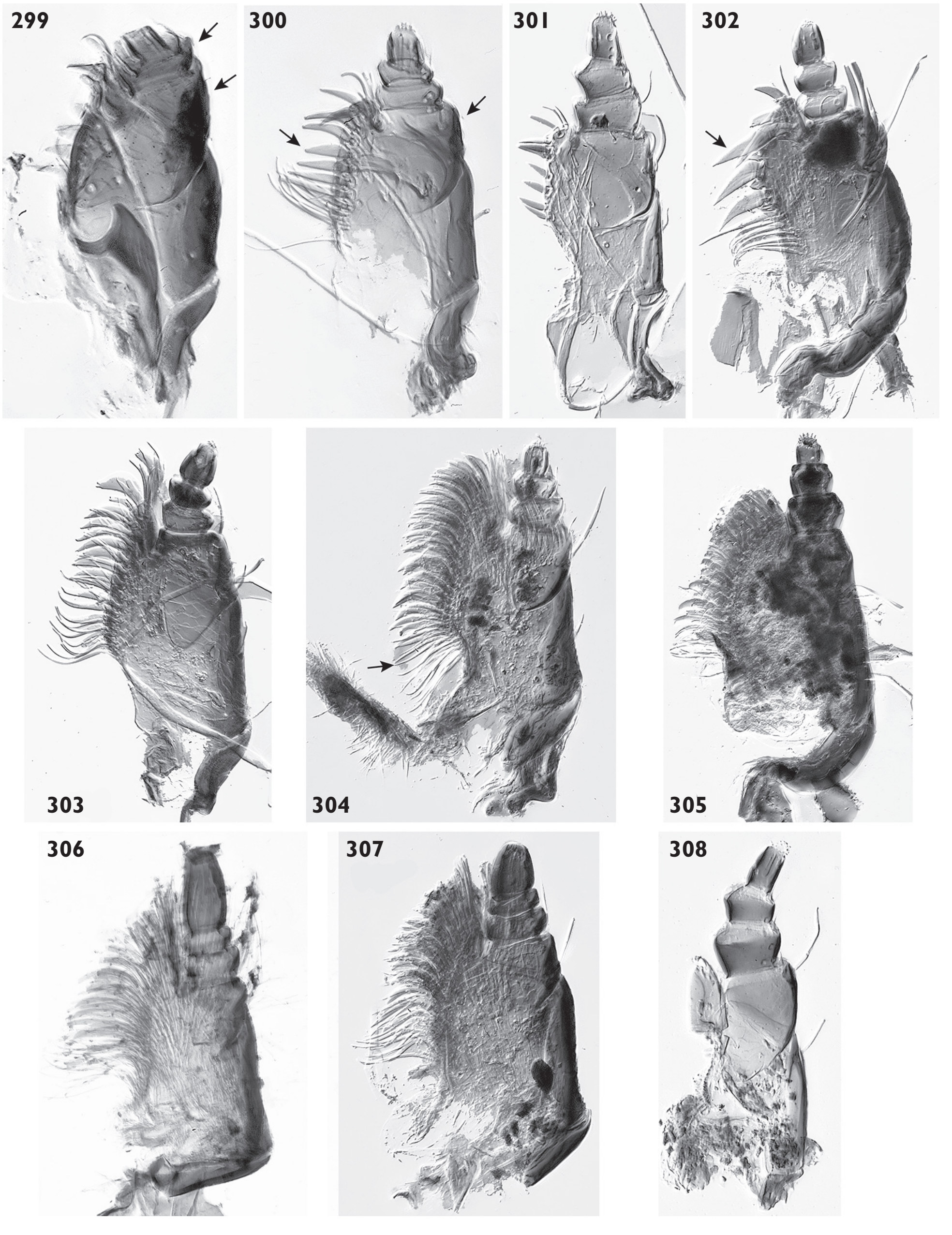

**Figures 270-278**. Mouthparts - maxilla. 270, *Zygobaris nitens*; 271, *Centrinus curvirostris*; 272, *Anthinobaris* sp.; 273, *Ovanius picipennis*; 274, *Nertinus suturalis*; 275, *Peridinetus irroratus*; 276, *Antesis sparsa*; 277, *Loboderes citriventris*; 278, *Loboderes citriventris*, showing lateral sensilla on 3rd palpal segment.



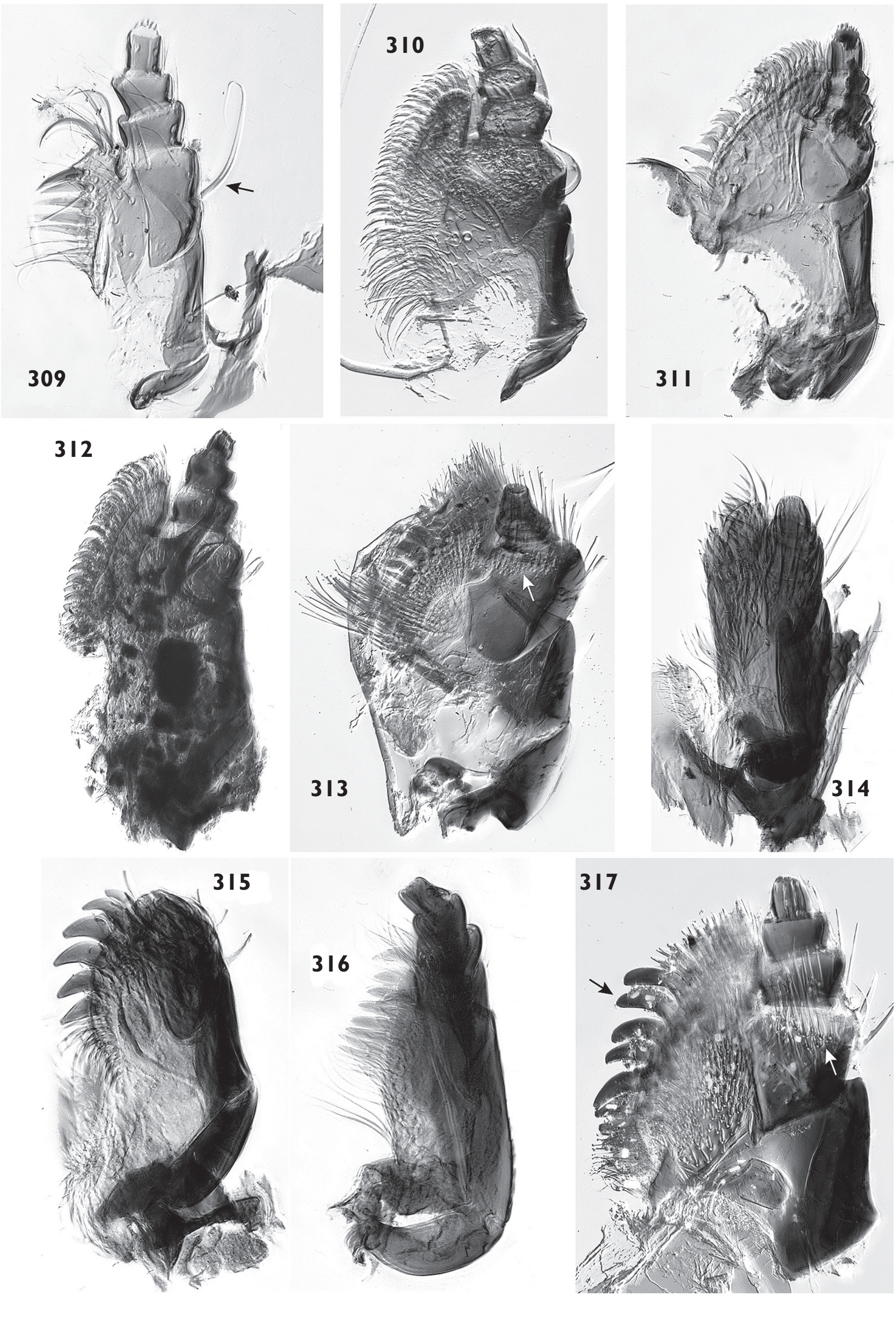

**Figures 279-288**. Mouthparts - maxilla. 279, *Antesis sparsa*, showing large setae at antero-lateral margin of palpiger; 280, *Acentrinops brevicollis*; 281, *Garnia* sp., showing thin, elongate setae on posterior margin of lacinia; 282, *Pachygeraeus laevirostris*; 283, *Eisonyx crassipes*; 284, *Dirabius calvus*, showing teeth-like setae along margin of galea and lacinia; 285, *Eisonyx opacus*; 286, *Xystus arnoldi*; 287, *Buchananius sulcatus* (maxilla-labium complex); 288, *Geraeus penicillus*, showing large setae at antero-lateral margin of palpiger.



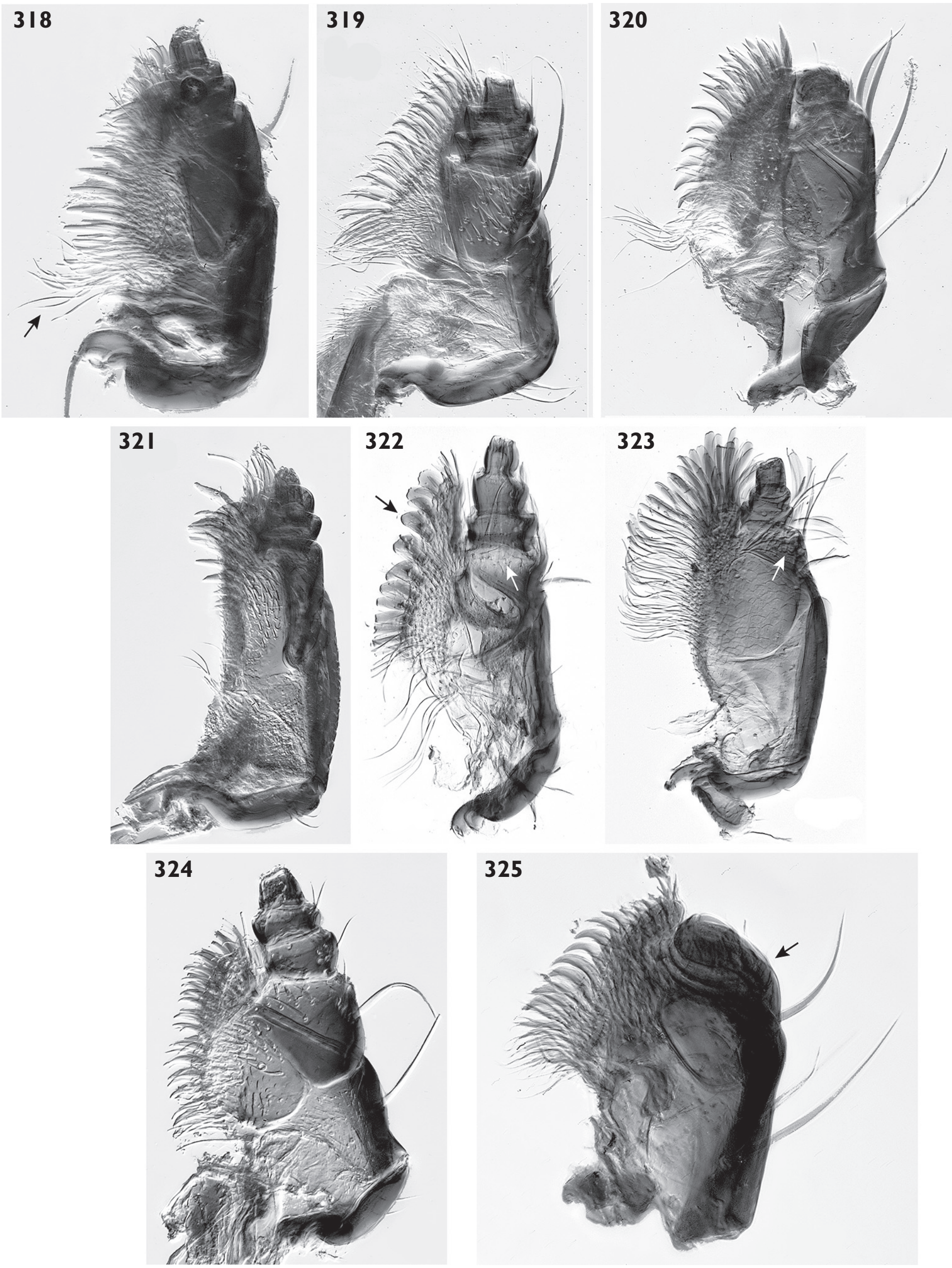

**Figures 289-298**. Mouthparts - maxilla. 289, *Microcholus puncticollis*, showing large setae at antero-lateral margin of palpiger; 290, *Linogeraeus viduatus*; 291, *Ovanius minutus*; 292, *Plocamus echidna*; 293, *Plocamus clavisetis*; 294, *Oligolochus bracatus*, showing teeth-like setae along margin of galea and lacinia and transverse row of setae along anterior margin of palpiger; 295, *Oligolochus ornatus*, showing large setae at antero-lateral margin of palpiger; 296, *Odontocorynus scutellumalbum*; 297, *Odontocorynus creperus*; 298, *Camelodes leachii*, indicating absence of large setae at antero-lateral margin of palpiger.



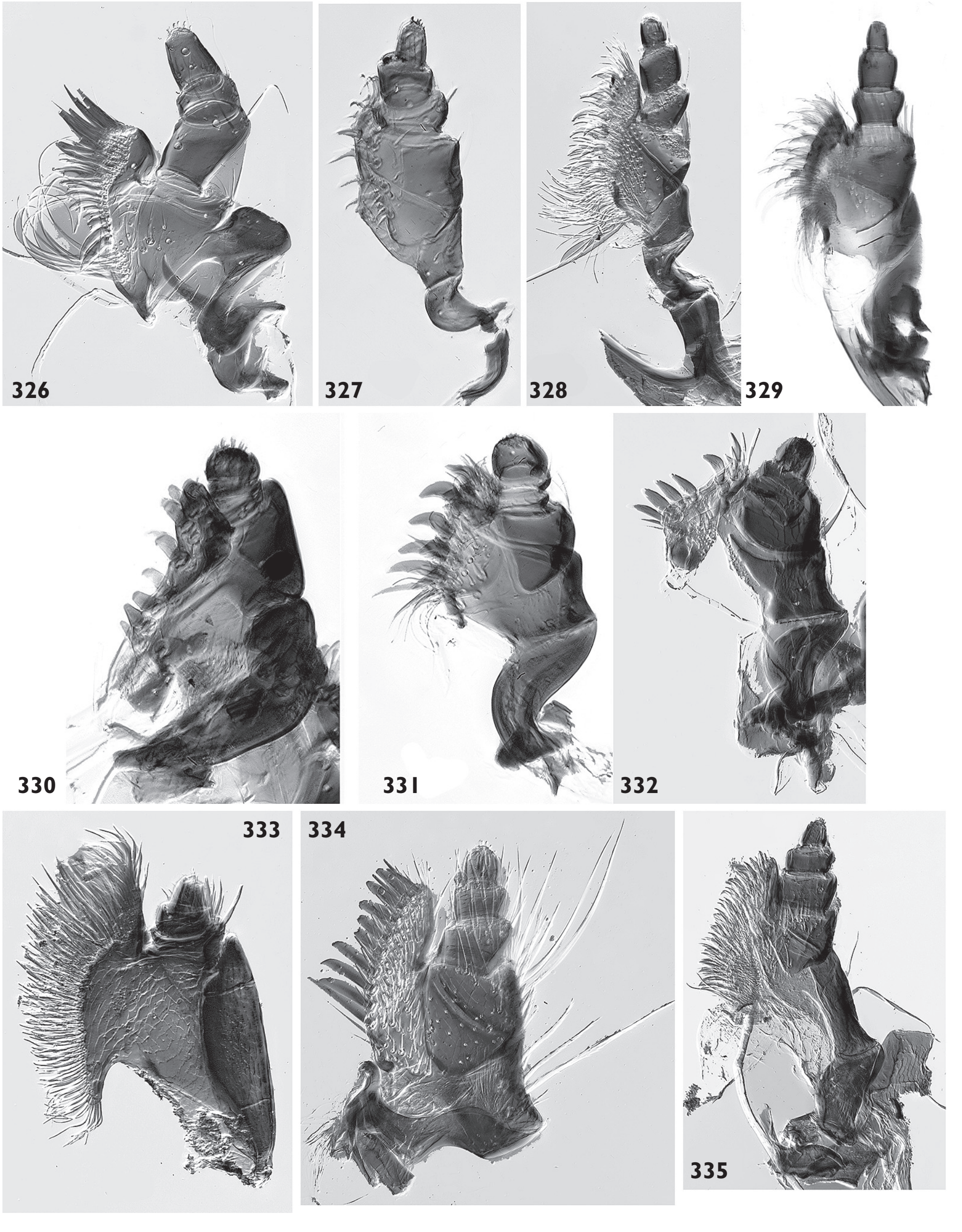

**Figures 299-308**. Mouthparts - maxilla. 299, *Sibariops concinnus*, indicating absence of large setae at antero-lateral margin of palpiger and first palpal segment; 300, *Sibariops concurrens*, showing triangular setae along margin of lacinia and indicating absence of large setae at antero-lateral margin of palpiger; 301, *Torcus nigrinus*; 302, *Madopterus talpa*, showing triangular setae along margin of lacinia; 303, *Parallelosomus amplitarsis*; 304, *Orchidophilus aterrimus*, showing thin, elongate setae on posterior margin of lacinia; 305, *Embates chaetopus*; 306, *Eurhinus festivus*; 307, *Eurhinus aeneus*; 308, *Coleomerus boliviensis*.



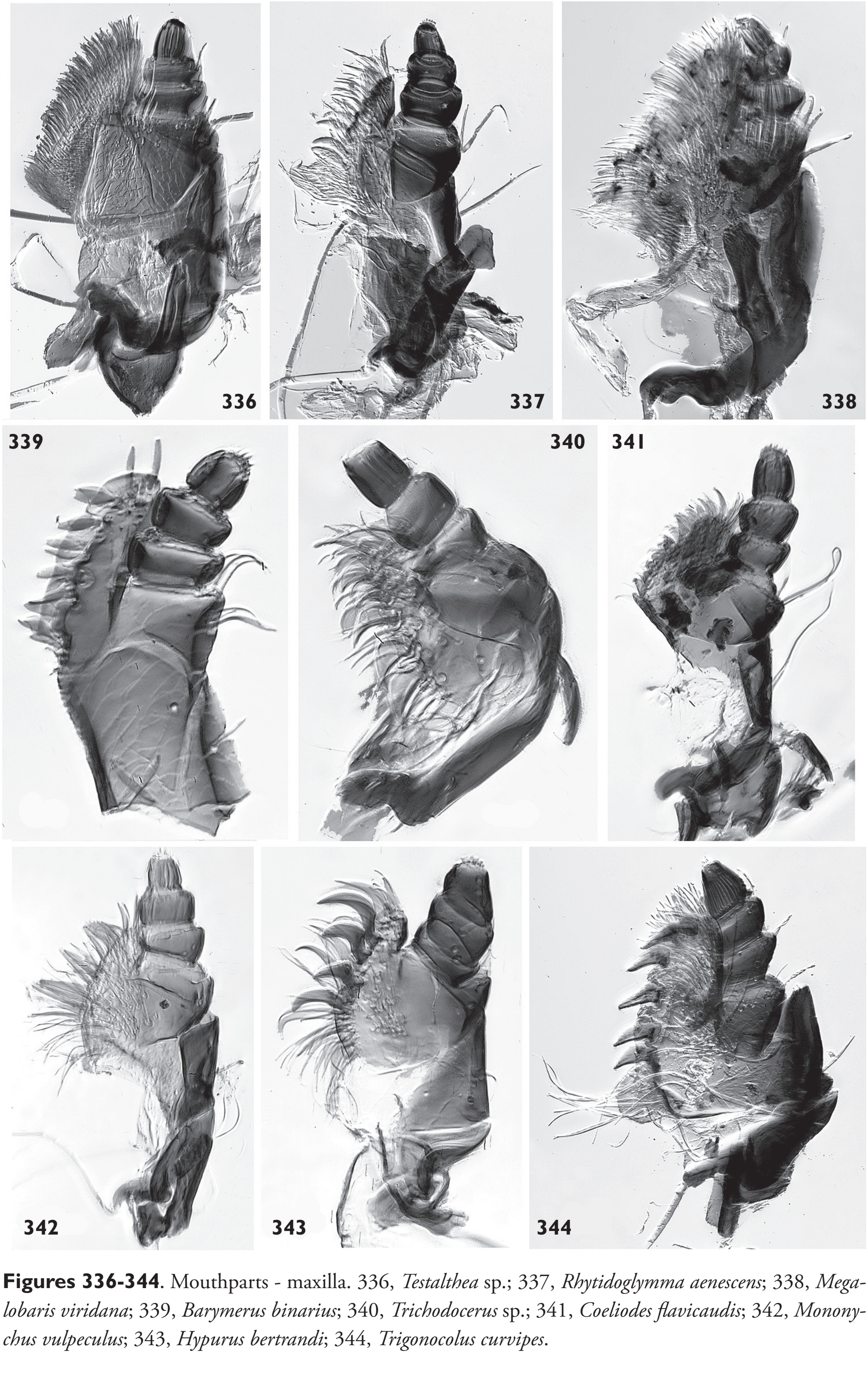

**Figures 309-317**. Mouthparts - maxilla. 309, *Coelonertus nigrirostris*, showing large setae at antero-lateral margin of palpiger; 310, *Baris torquata*; 311, *Cyrionyx camelus*; 312, *Lydamis cinnamomeus*; 313, *Busckiella lecythidis,* showing transverse row of setae along anterior margin of palpiger; 314, *Rhoptobaris canescens*; 315, *Plesiobaris albilata*; 316, *Parisoschoenus* sp.; 317, *Pardisomus biplagiatus*, showing crescent-shaped setae along margin of galea and lacinia and dense scattering of setae along anterior margin of palpiger.



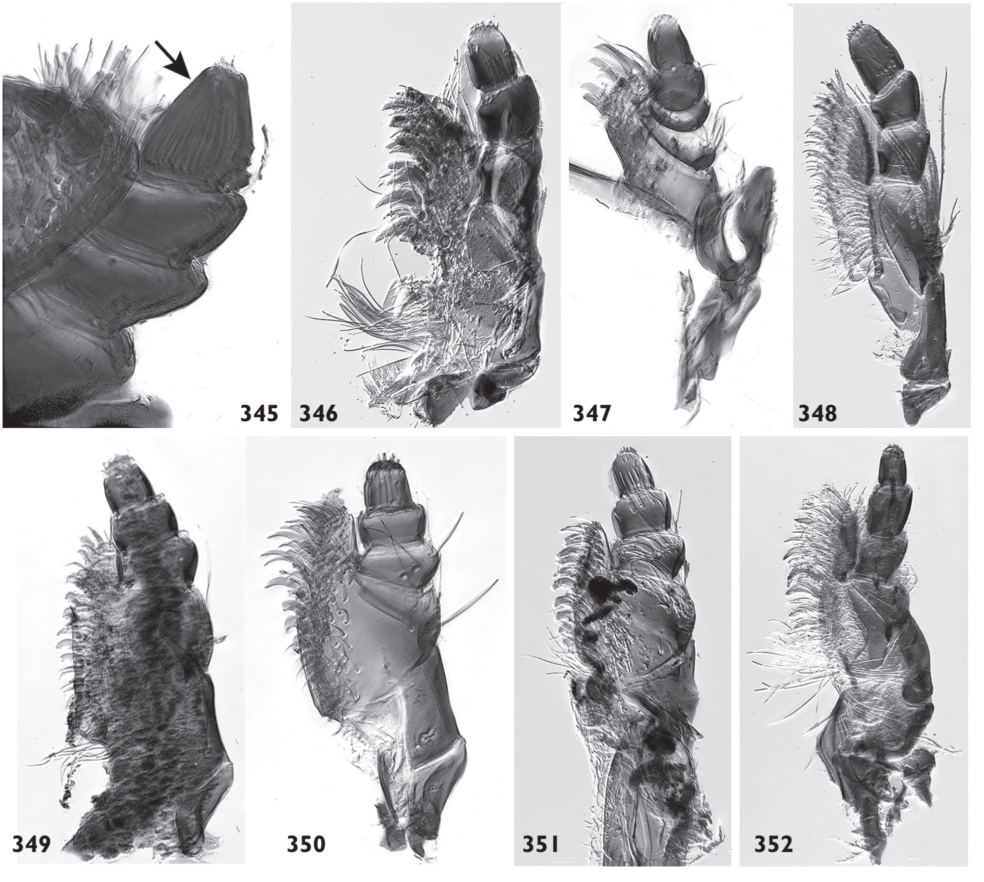

**Figures 318-325**. Mouthparts - maxilla. 318, *Pycnotheantis* sp., showing thin, elongate setae on posterior margin of lacinia; 319, *Telemus* sp.; 320, *Pteracanthus smidtii*; 321, *Megabaris quadriguttata*; 322, *Conoproctus quadripustulatus*, showing crescent-shaped setae along margin of galea and lacinia and transverse row of setae along anterior margin of palpiger; 323, *Eugeraeus* sp., showing dense scattering of setae along anterior margin of palpiger; 324, *Lepidobaris acnisti*; 325, *Phacelobarus singularis*, showing a comparatively more compact palpus.



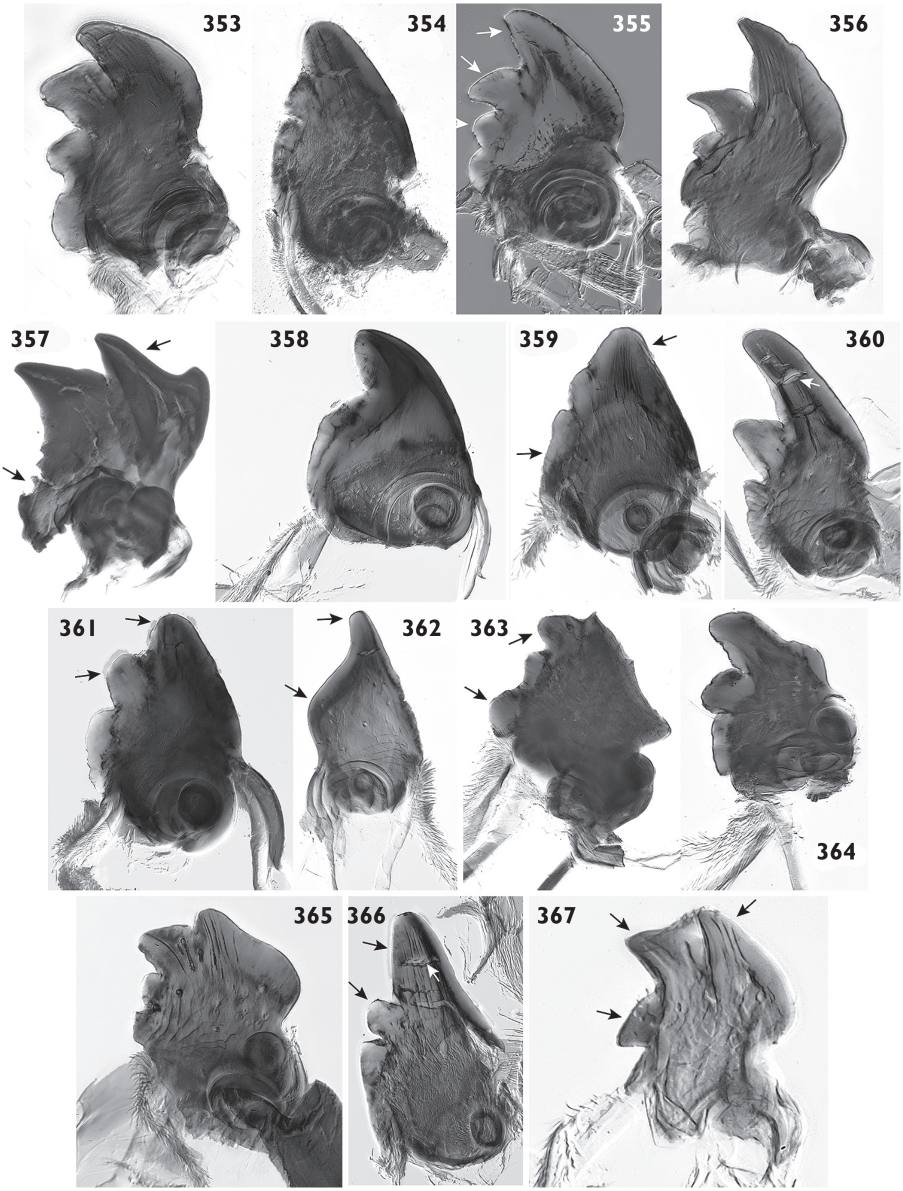

**Figures 326-335**. Mouthparts - maxilla. 326, *Cyrtepistomus castaneus*; 327, *Derelomus basalis*; 328, *Cryptorhynchus lapathi*; 329, *Cholus rana*; 330, *Dryophthorus americanus*; 331, *Bagous transversus*; 332, *Cossonus impressifrons*; 333, *Curculio pardalis*; 334, *Hylurgops planirostris*; 335, *Barycerus collaris*.



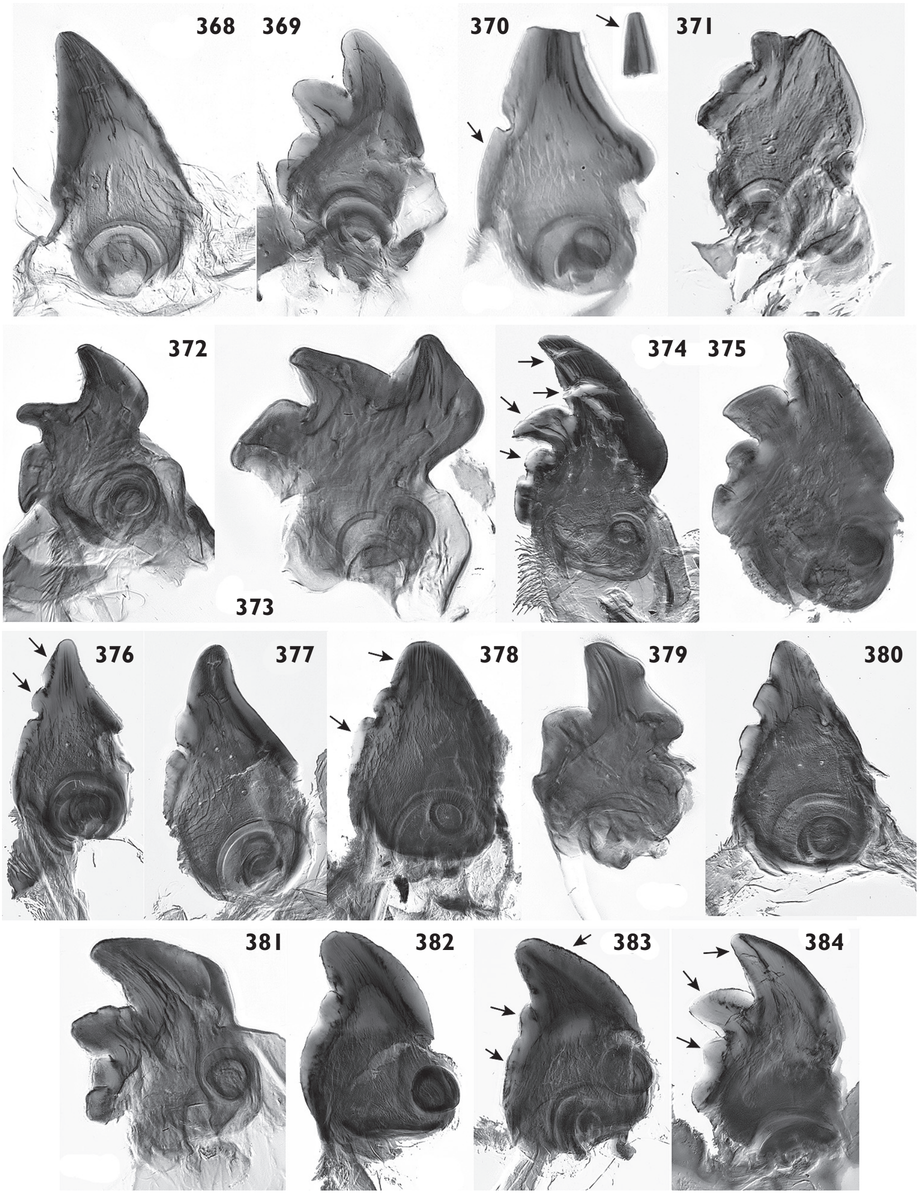

**Figures 336-344**. Mouthparts - maxilla. 336, *Testalthea* sp.; 337, *Rhytidoglymma aenescens*; 338, *Megalobaris viridana*; 339, *Barymerus binarius*; 340, *Trichodocerus* sp.; 341, *Coeliodes flavicaudis*; 342, *Mononychus vulpeculus*; 343, *Hypurus bertrandi*; 344, *Trigonocolus curvipes*.



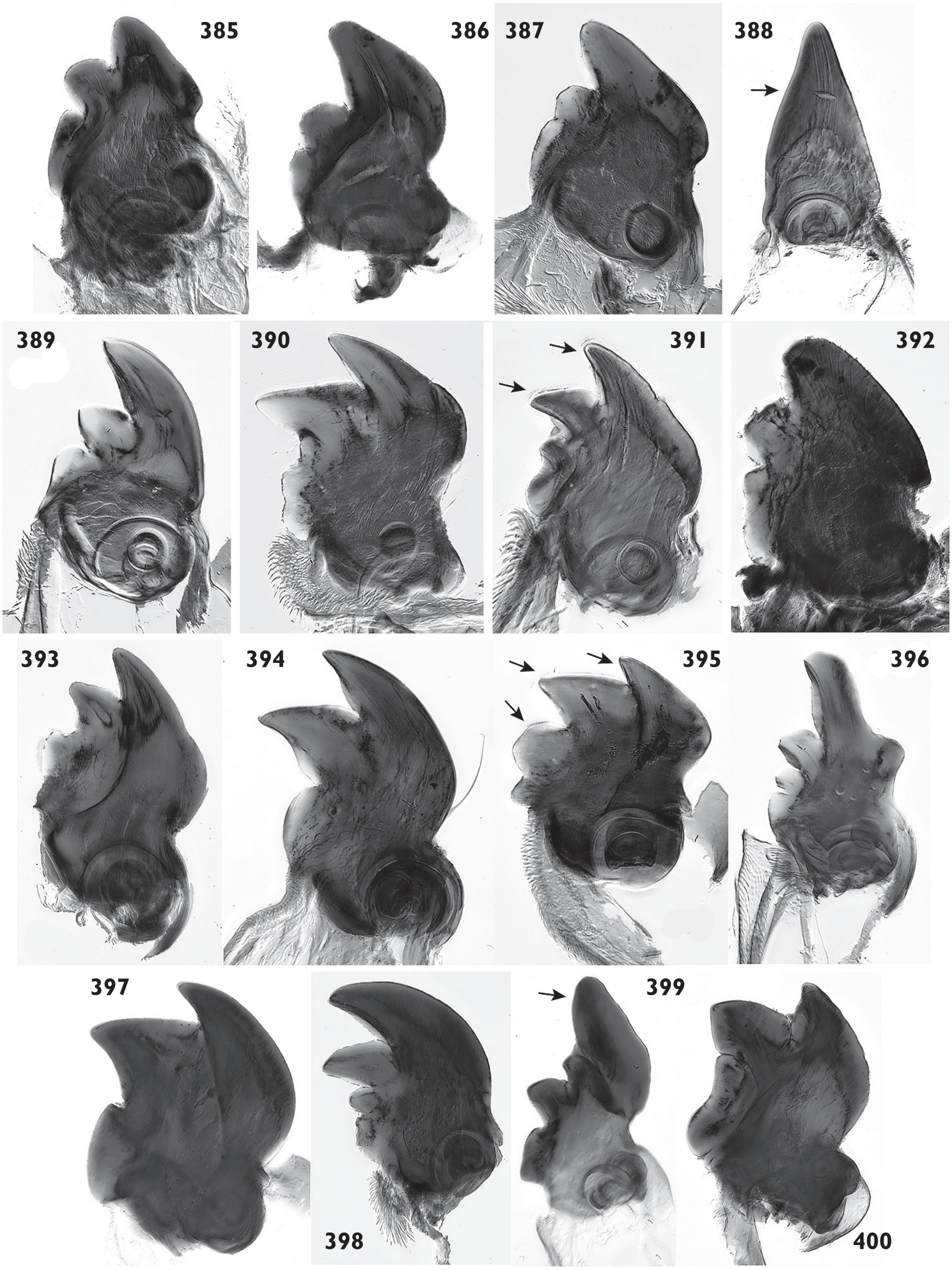

**Figures 345-352**. Mouthparts - maxilla. 345, *Trigonocolus curvipes*, showing lateral sensilla on 3rd palpal segment; 346, *Mecopus trilineatus*; 347, *Cyllophorus fasciatus*; 348, *Cylindrocopturus adspersus*; 349, *Telephae oculata*; 350, *Balanogastris kolae*; 351, *Metialma signifera*; 352, *Arachnobas gazella*.



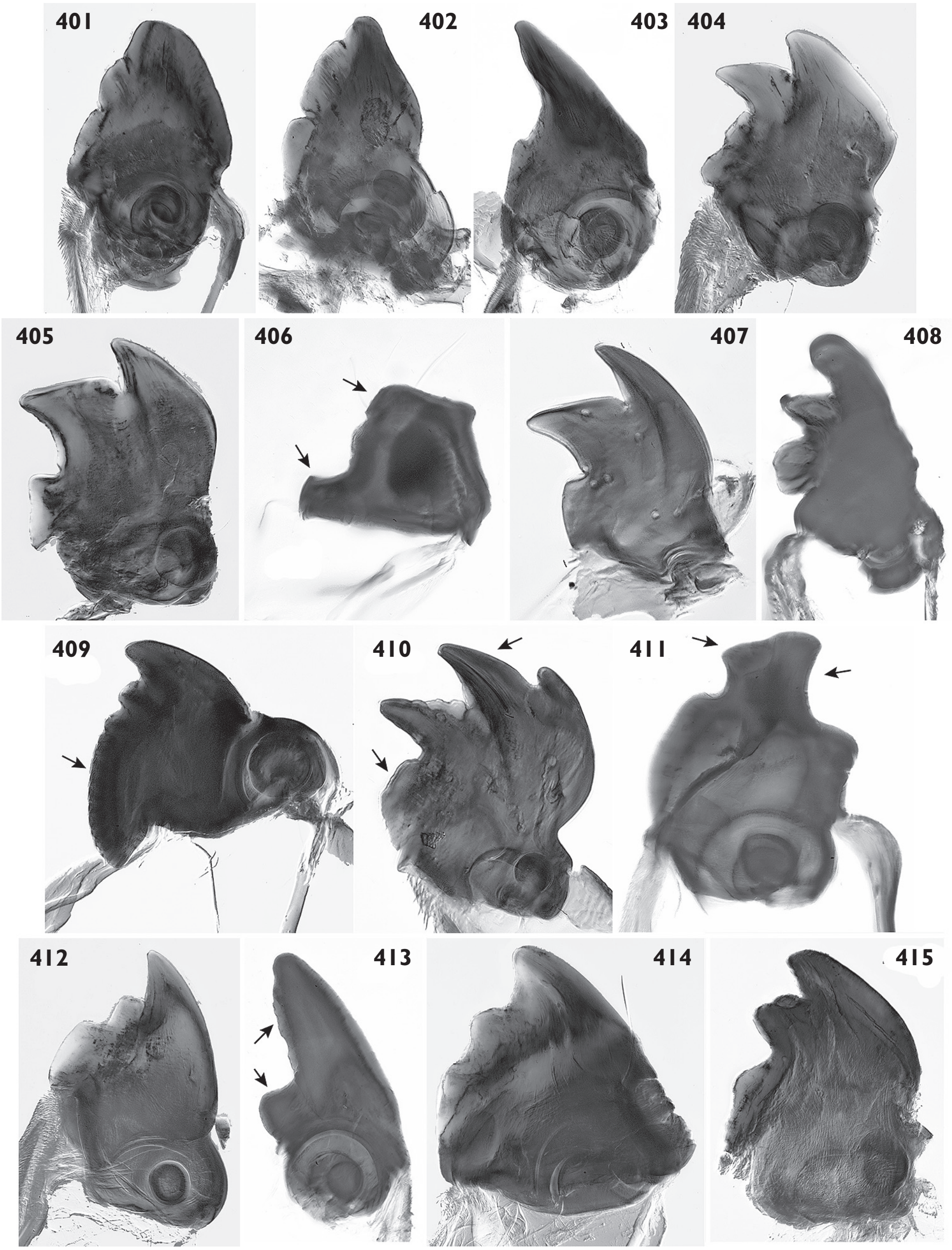

**Figures 353-367**. Mouthparts - mandibles. 353, *Zygobaris nitens*; 354, *Centrinus curvirostris*; 355, *Anthinobaris* sp., showing three incisors on mandible; 356, *Ovanius picipennis*; 357, *Peridinetus irroratus*, showing angled incisors and molar region on an angled mandible; 358, *Loboderes citriventris*; 359, *Antesis sparsa*, showing incisor and molar region on a linear mandible; 360, *Acentrinops brevicollis*, showing lateral laceration on incisor; 361, *Garnia* sp., showing mandible bearing two incisors; 362, *Pachygeraeus laevirostris*, showing mandible with one incisor and a molar region; 363, *Eisonyx crassipes*, showing angled incisors and molar region on an angled mandible; 364, *Dirabius calvus*; 365, *Eisonyx opacus*; 366, *Xystus arnoldi*, showing incisor and molar region on a linear mandible and lateral laceration on incisor; 367, *Buchananius sulcatus*, showing three incisors on mandible.



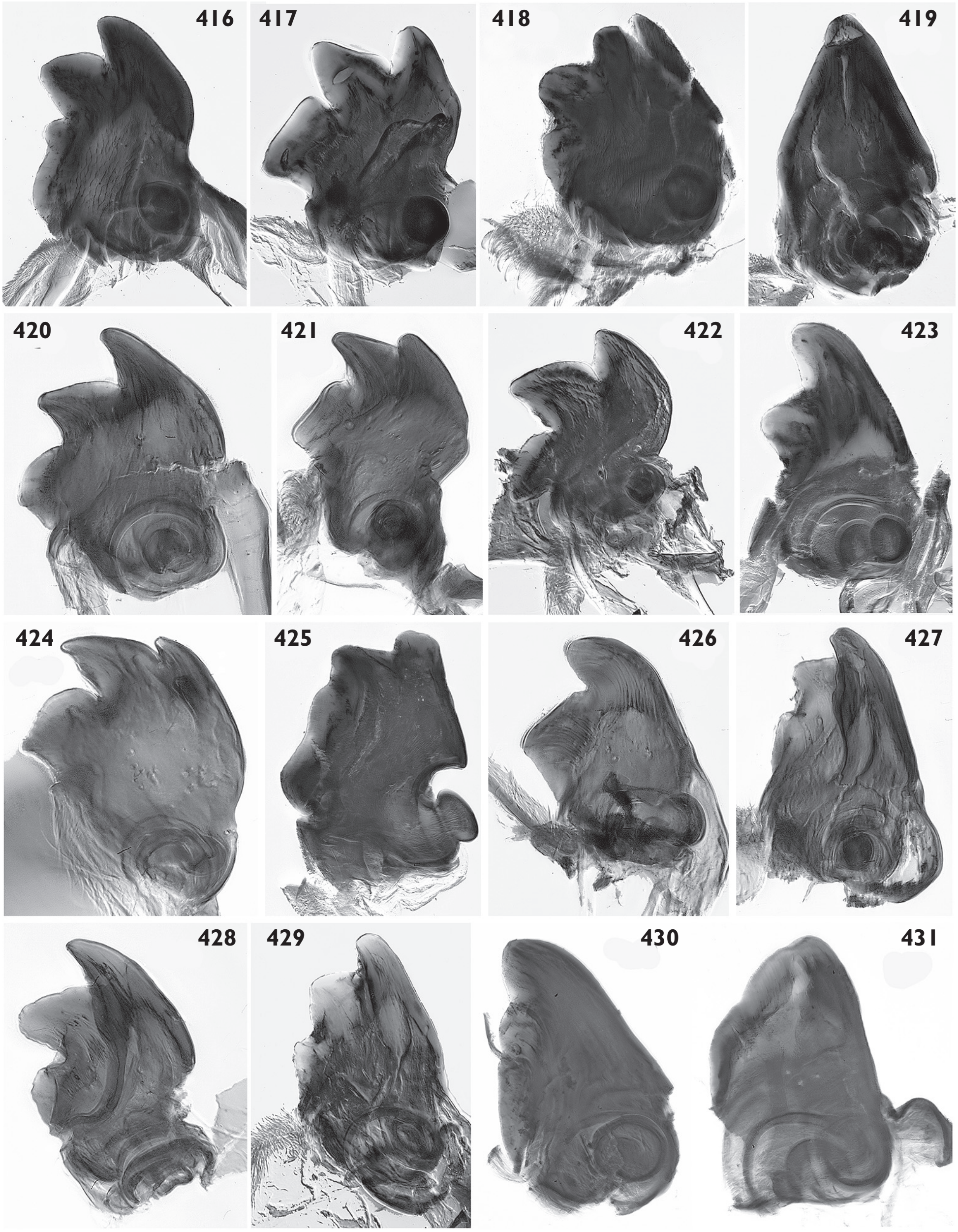

**Figures 368-384**. Mouthparts - mandibles. 368, *Geraeus penicillus*; 369, *Microcholus puncticollis*; 370, *Linogeraeus viduatus*, showing incisor and molar region on a linear mandible and naturally detached apical half of incisor; 371, *Ovanius minutus*; 372, *Plocamus echidna*; 373, *Plocamus calvisetis*; 374, *Oligolochus bracatus*, showing deep lacerations and three incisors on an angled mandible; 375, *Oligolochus ornatus*; 376, *Odontocorynus scutellumalbum*, showing two incisors and molar region on a linear mandible; 377, *Odontocorynus creperus*; 378, *Camelodes leachii*, showing two incisors and molar region on a linear mandible; 379, *Sibariops concinnus*; 380, *Torcus nigrinus*; 381, *Sibariops concurrens*; 382, *Madopterus talpa*; 383, *Parallelosomus amplitarsis*, showing two incisors on an angled mandible; 384, *Orchidophilus aterrimus*, showing three incisors on an angled mandible.




**Figures 385-400**. Mouthparts - mandibles. 385, *Embates chaetopus*; 386, *Eurhinus festivus*; 387, *Eurhinus aeneus*; 388, *Coleomerus boliviensis*, showing fused incisor and molar region on a linear mandible; 389, *Coelonertus nigrirostris*; 390, *Baris torquata*; 391, *Cyrionyx camelus*, showing three incisors on an angled mandible, in which the first two incisors are approximately equal in size; 392, *Lydamis cinnamomeus*; 393, *Busckiella lecythidis*; 394, *Rhoptobaris canescens*; 395, *Plesiobaris albilata*, showing three incisors on an angled mandible, in which the second incisor is largest; 396, *Parisoschoenus* sp.; 397, *Pardisomus biplagiatus*; 398, *Pycnotheantis* sp.; 399, *Telemus* sp., showing incisor cusp; 400, *Pteracanthus smidtii*.

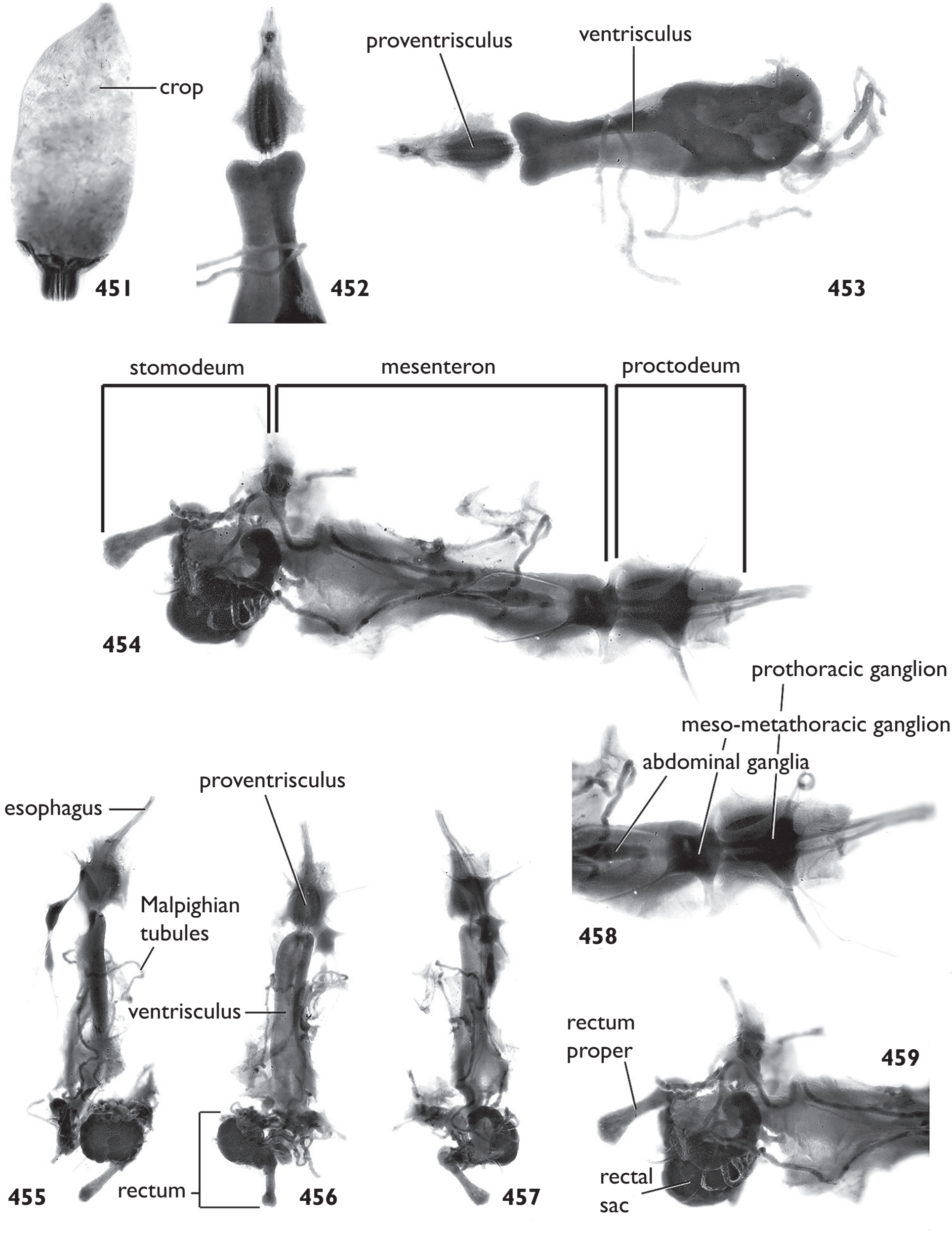



**Figures 401-415**. Mouthparts - mandibles. 401, *Megabaris quadriguttata*; 402, *Conoproctus quadripustulatus*; 403, *Eugeraeus* sp.; 404, *Lepidobaris acnisti*; 405, *Phacelobarus singularis*; 406, *Cyrtepistomus castaneus*, showing difference in incisor shape to that of Baridinae *s. str.*; 407, *Derelomus basalis*; 408, *Cryptorhynchus lapathi*; 409, *Dryophthorus americanus*, showing elongate molar region; 410, *Bagous transversus*, showing incisors and molar region; 411, *Cholus rana*, showing difference in incisor shape to that of Baridinae *s. str.*; 412, *Cossonus impressifrons*; 413, *Curculio pardalis*, showing difference in incisor shape and molar region to those of Baridinae *s. str.*; 414, *Hylurgops planirostris*; 415, *Barycerus collaris*.

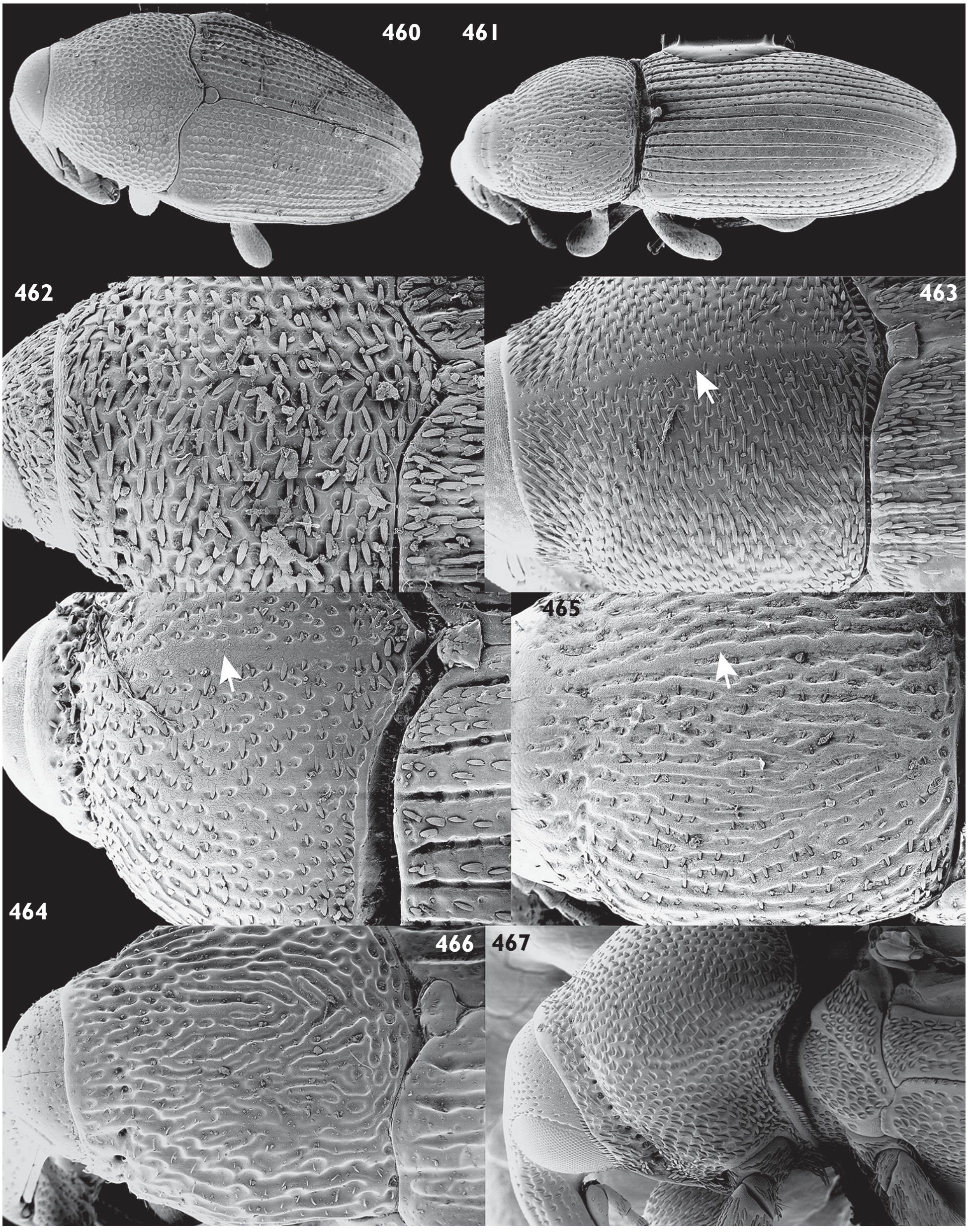



**Figures 416-431**. Mouthparts - mandibles. 416, *Testalthea* sp.; 417, *Rhytidoglymma aenescens*; 418, *Megalobaris viridana*; 419, *Barymerus binarius*; 420, *Trichodocerus* sp.; 421, *Coeliodes flavicaudis*; 422, *Mononychus vulpeculus*; 423, *Mecopus trilineatus*; 424, *Hypurus bertrandi*; 425, *Trigonocolus curvipes*; 426, *Cylindrocopturus adspersus*; 427, *Telephae oculata*; 428, *Balanogastris kolae*; 429, *Metialma signifera*; 430, *Cyllophorus fasciatus*; 431, *Arachnobas gazella*.

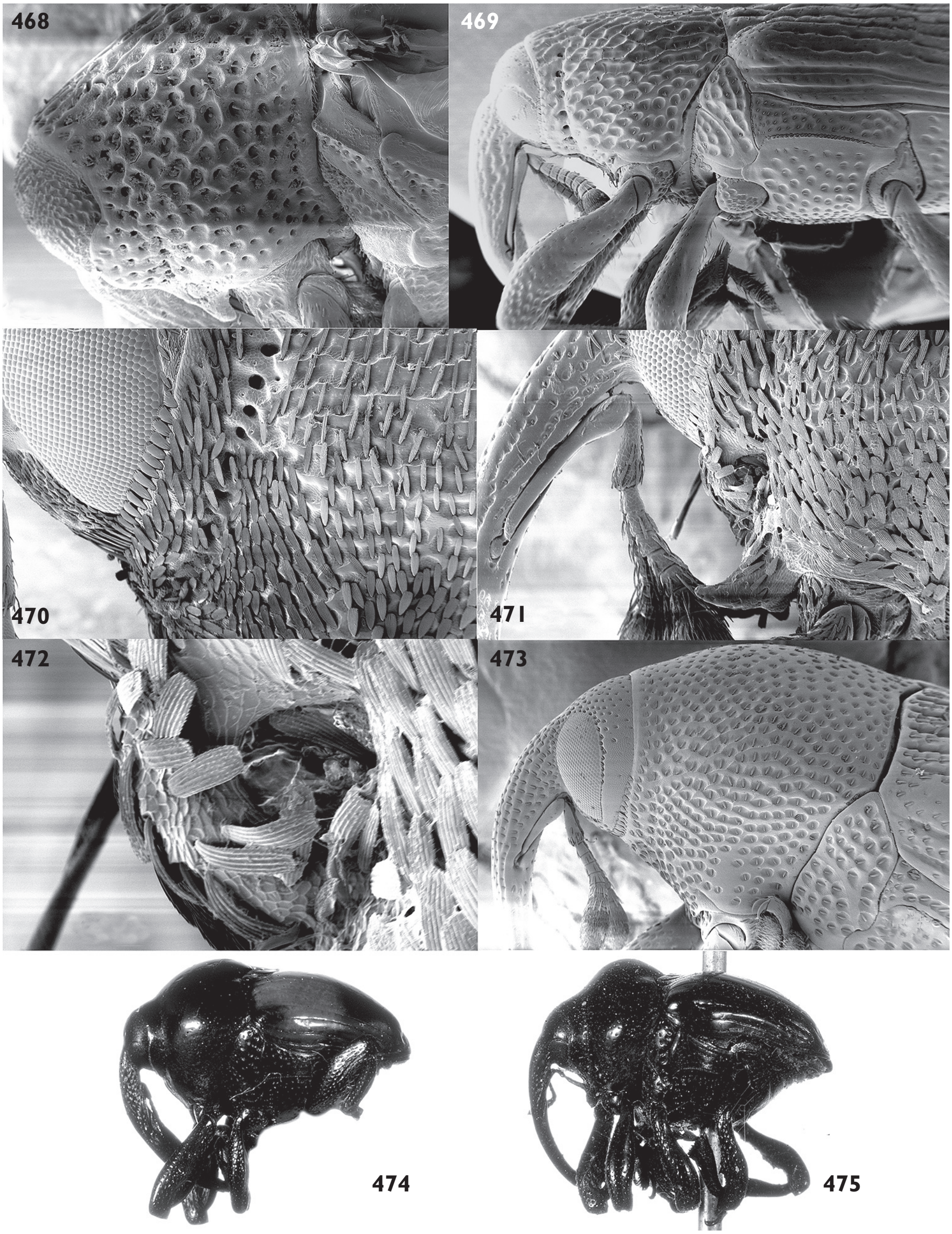

**Figures 432-450**. 432-434, tendons of mouthparts. 432, tendons on maxilla; 433-434, tendons on mandible. 435-450, proventriculus, lateral view. 435, *Optatus palmaris*; 436, *Peridinetus irroratus*; 437, *Garnia* sp.; 438, *Eisonyx crassipes*; 439, *Xystus arnoldi*; 440, *Camelodes leachii*; 441, *Diorymerus lancifer*; 442, *Centrinopus alternatus*; 443, *Anavallius ruficornis*; 444, *Telemus* sp.; 445, *Conoproctus quadripustulatus*. 446-447, *Cyrtepistomus castaneus*. 446, lateral view; 447, anterior view; 448, *Bagous transversus*; 449, *Cholus rana*; 450, *Hylurgops planirostris*.



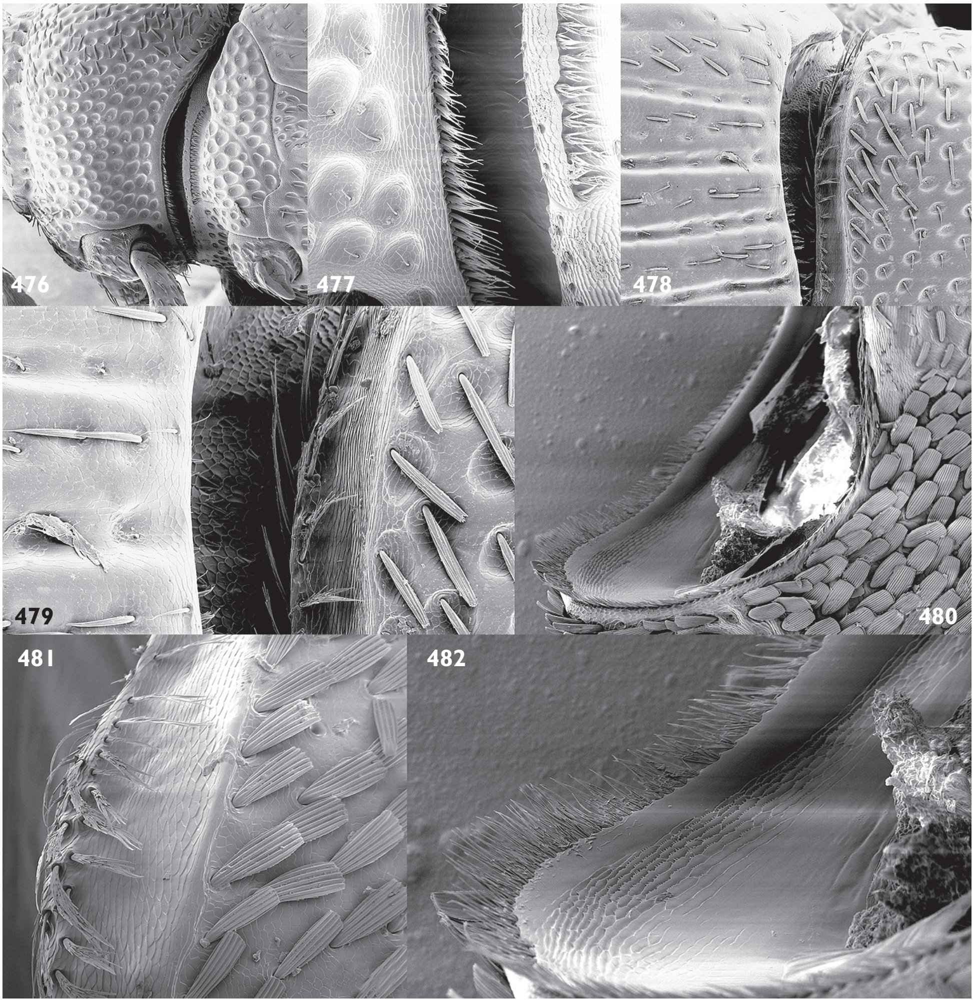

**Figures 451-459**. Internal organs. 451, *Trigonocolus curvipes* (proventriculus). 452-453, *Pycnogeraeus striatirostris*. 452, proventriculus; 453, mesenteron and proctodeum. 454-459, *Acythopeus* sp. 454, divisions of gut (ventral view); 455, lateral view (left side); 456, dorsal view; 457, lateral view (right side); 458, ganglia; 459, stomodeum.



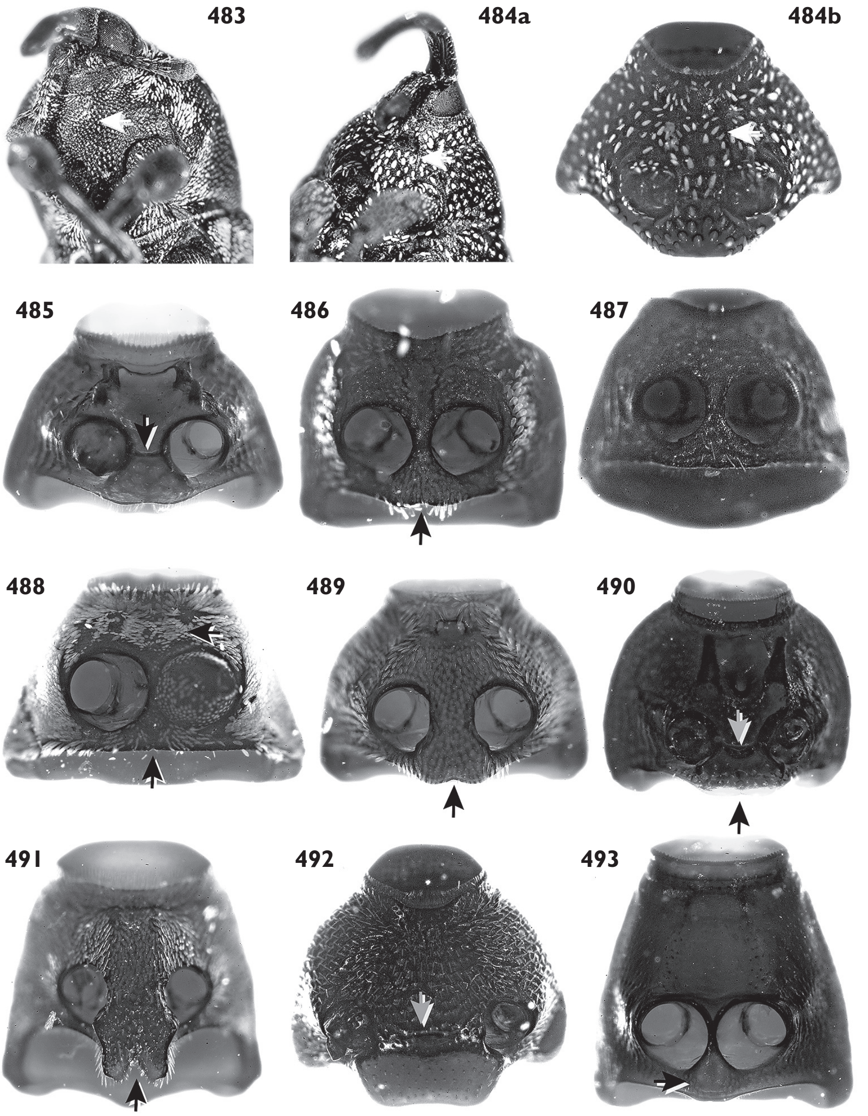

**Figures 460-467**. SEM images of pronotum. 460, *Taiwanobaris* sp.; 461, *Centrinogyna strigata*; 462, *Catapastus squamirostris*; 463, *Trichodirabius longulus*, showing mid-dorsal longitudinal smooth line; 464, *Pycnogeraeus modestus*, showing mid-dorsal longitudinal smooth line; 465, *Centrinogyna strigata*, showing mid-dorsal longitudinal smooth line; 466, *Pertorcus* sp.; 467, *Odontocorynus creperus*.



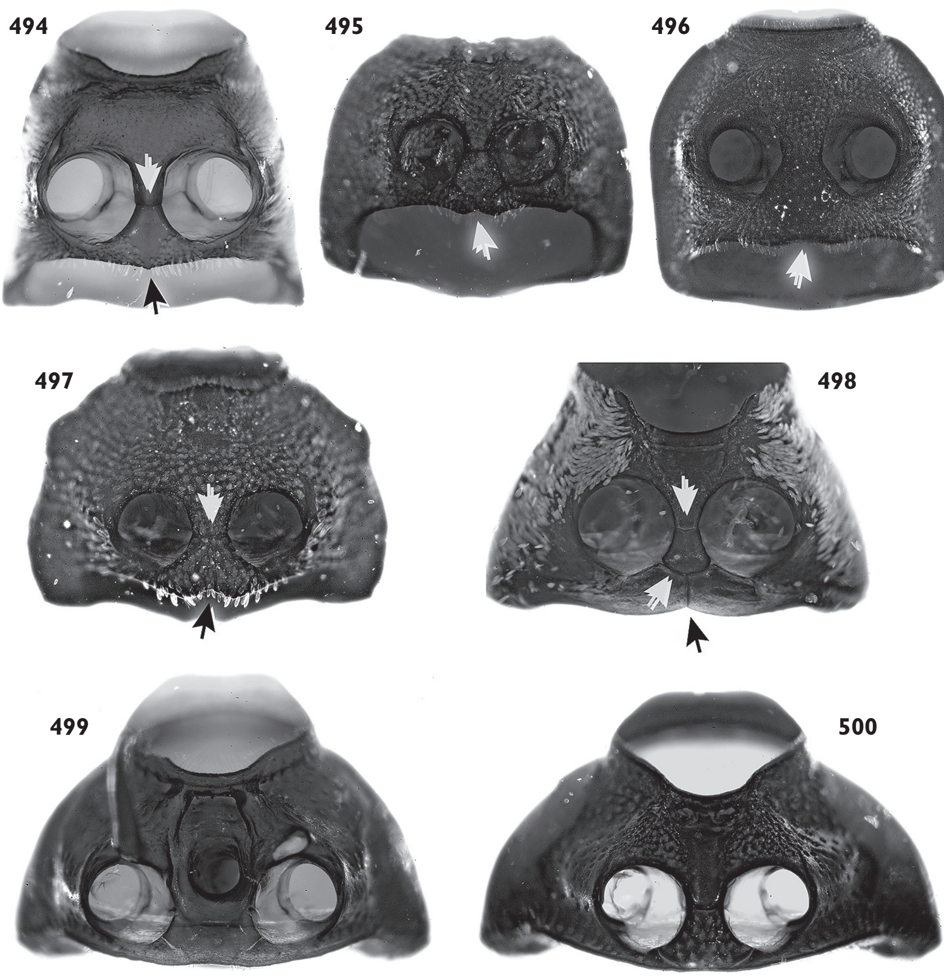

**Figures 468-475**. SEM images of pronotum. 468, *Conotrachelus fissunguis* (Molytinae), lateral view showing sculpturing; 469, *Pertorcus* sp., lateral view; 470, *Pseudocentrinus ochraceus*, lateral view of puncture collar; 471, *Centrinopus helvinus*, lateral view of puncture collar; 472, enlargement of puncture collar of 471; 473, *Pachybaris porosa*, lateral view; 474, *Microstegotes sp.*, lateral view; 475, *Vallius sulcatus*, lateral view showing extreme convexity of pronotum.



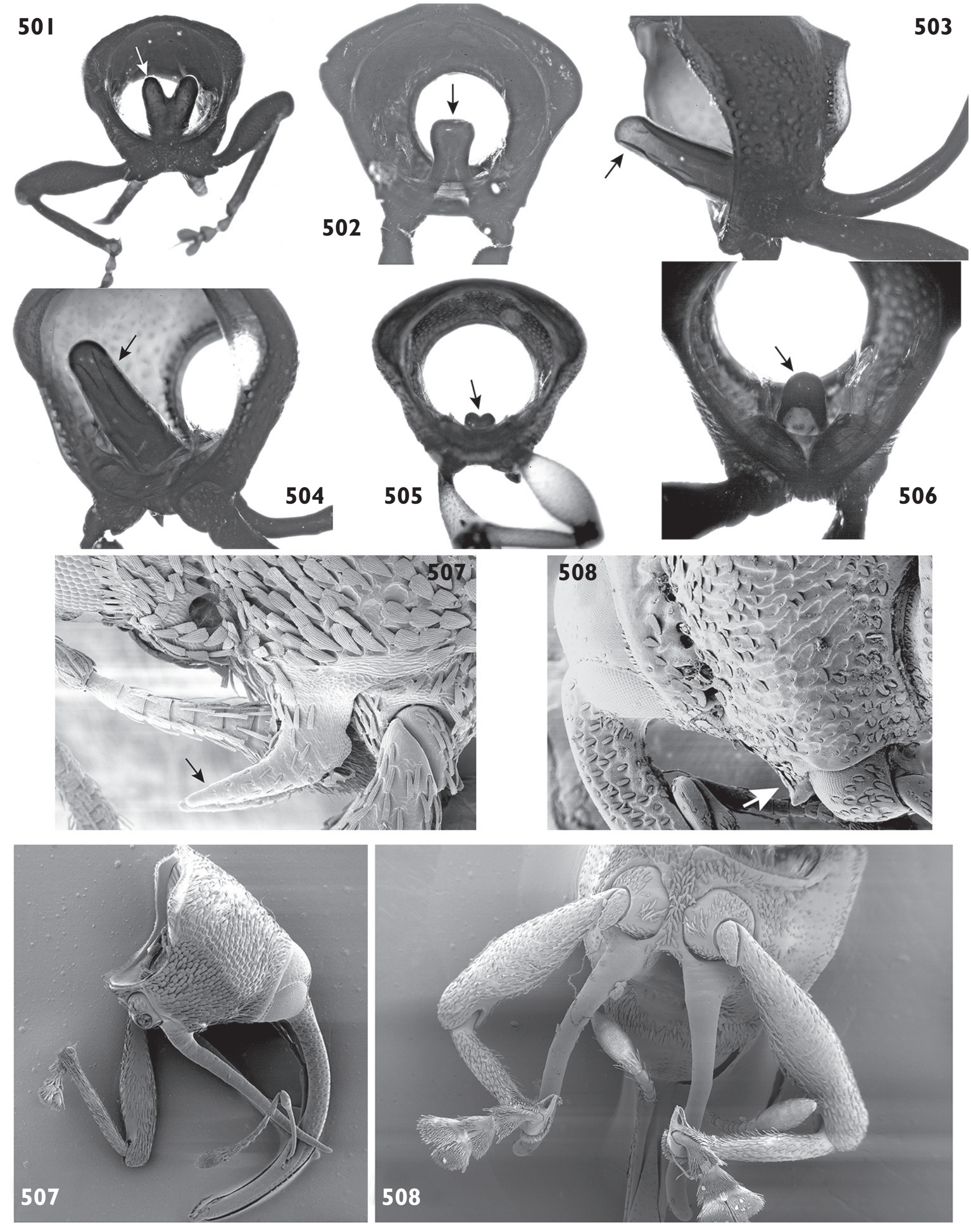

**Figures 476-482**. SEM images of pronotum. 476-479, *Idiostethus tubulatus*. 476, lateral view; 477, scales along latero-posterior margin; 478, scales along posterior margin; 479, enlargement of 478. 480-482, *Geraeus lineellus*. 480, scales along posterior margins; 481, scales along lateral margin; 482, enlargement of 480.



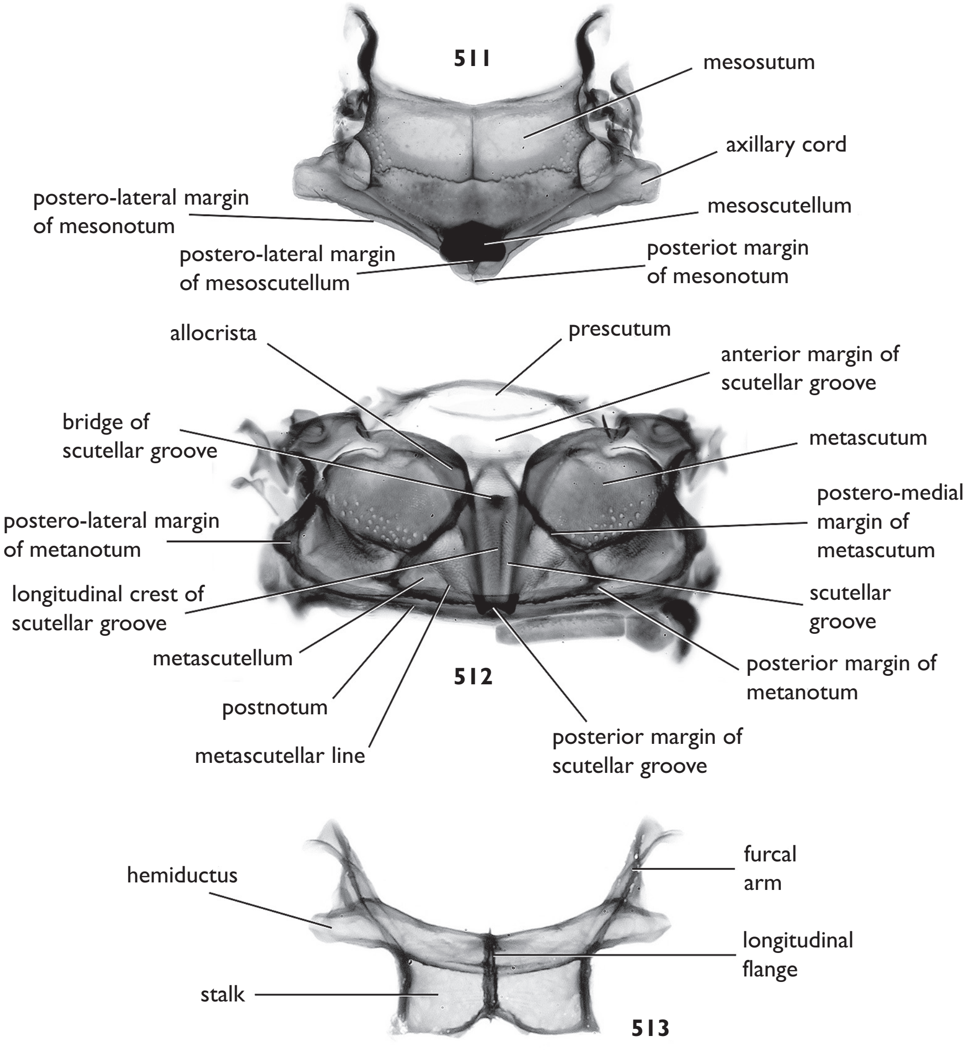

**Figures 483-493**. Prosternum and prosternal process. 483, *Parallelosomus amplitarsis*, showing smooth prosternum; 484a-b, *Zygobaris nitens*, showing shallow depression and lateral carina at anterior area of basisternum; 485, *Parasaldius* sp., showing sternacostal suture between basisternum and sternellum; 486, *Barinus bivittatus*, showing slight concavity in posterior margin of sternellum; 487, *Eisonyx opacus*; 488, *Embates chaetopus*, showing central cleft in posterior margin of intercoxal prosternal process (formed by lateral sides of hypomeron); 489, *Geraeus penicillus*, showing slight concavity in posterior margin of sternellum; 490, *Limnobaris calandriformis*, showing sternacostal suture between basisternum and sternellum and central cleft in posterior margin of sternellum; 491, *Loboderes citriventris*, showing deep central cleft of the sternellum which forms a bilobed process of the intercoxal prosternal process; 492, *Linomadarus vorticosus*, showing sternacostal suture between basisternum and sternellum; 493, *Madopterus talpa*, showing lateral suture between sternellum and lateral sides of prothorax (hypomeron).



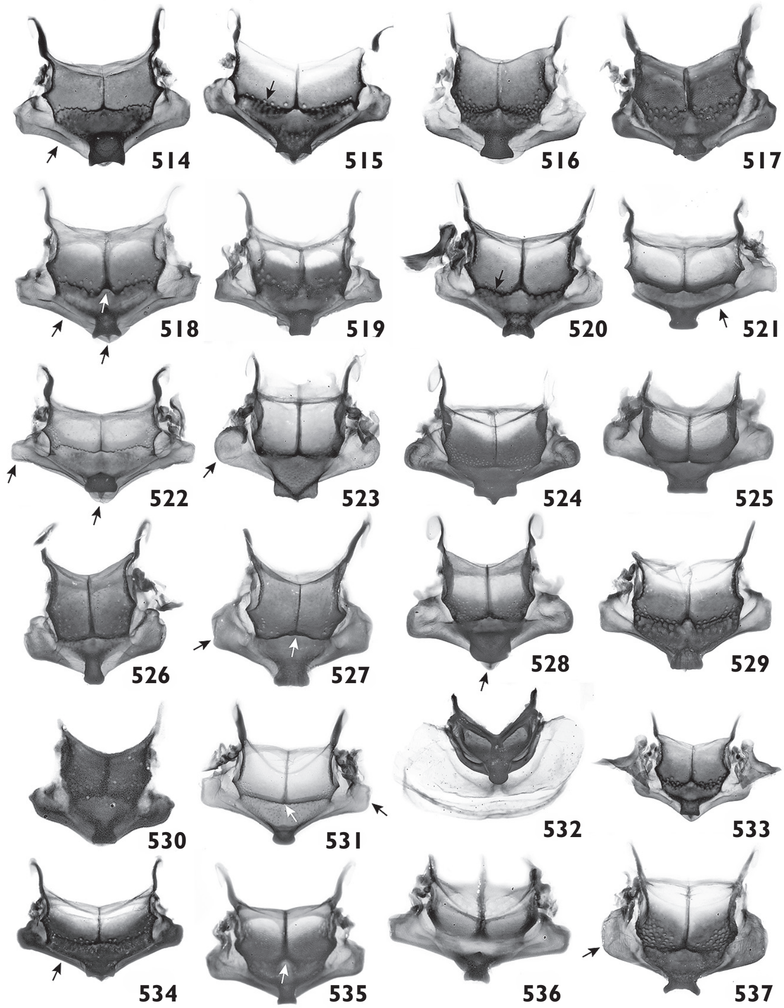

**Figures 494-500**. Prosternum and prosternal process. 494, *Nertinus suturalis*, showing sternacostal suture and slight projection of posterior margin of sternellum; 495, *Nicentrus grossulus*, showing central cleft in posterior margin of intercoxal prosternal process (formed by lateral sides of hypomeron); 496, *Parallelosomus amplitarsis*, showing slight concavity in posterior margin of sternellum; 497, *Odontocorynus scutellumalbum*, showing sternacostal suture and slight concavity in posterior margin of sternellum; 498, *Peridinetus cretaceus*, showing sternacostal suture, suture between posterior margin of sternellum and hypomeron, and mesal junction where the two sides of hypomeron meet; 499, *Xystus ater*; 500, *Xystus arnoldi*.



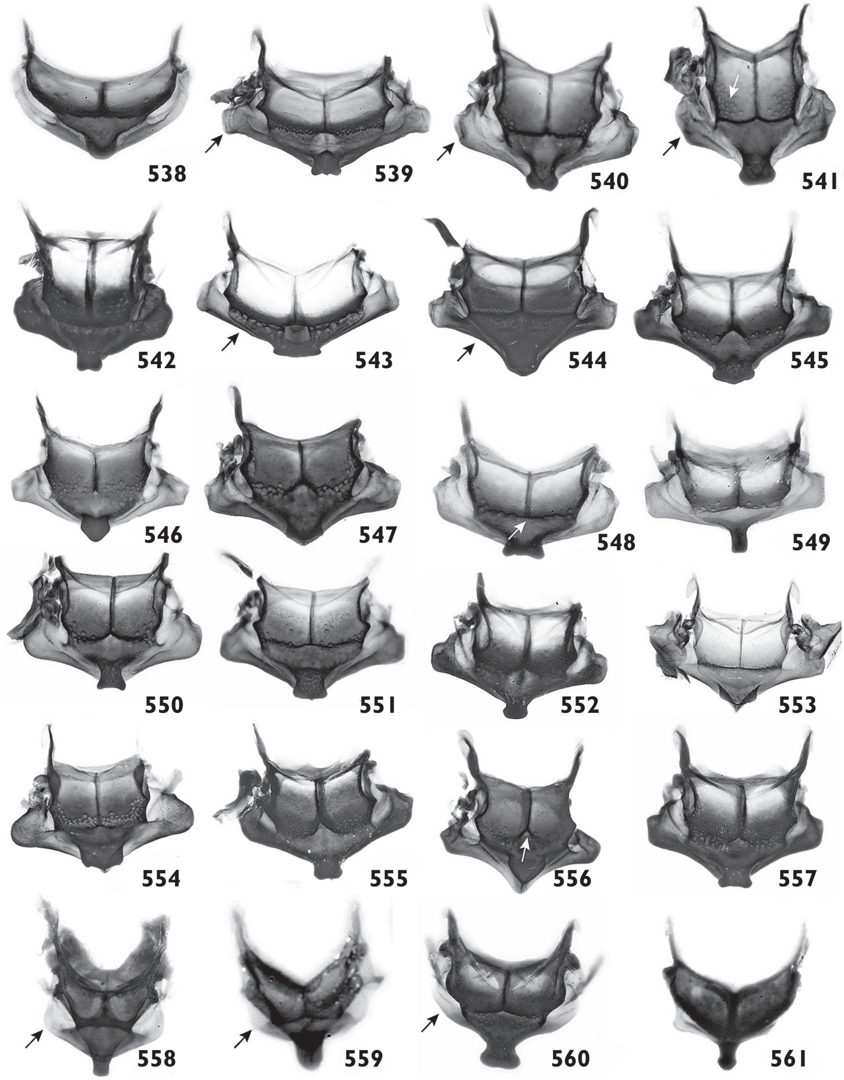

**Figures 501-510**. Prosternal horns. 501-506, horn sheath. 501, *Demoda vittata*, bifurcate sheath; 502, *Orissus christophori*, monofurcate sheath; 503-504, *Orissus meigenii*, monofurcate sheath. 503, lateral view; 504, posterior view; 505, *Pseudotorcus rufipes*, bifurcate sheath; 506, *Anavallius ruficornis*, monofurcate sheath. 507-510, horn SEMs. 507, *Centrinopus alternatus*, lateral aspect; 508, *Pycnogeraeus modestus*, lateral aspect; 509, *Geraeus lineellus*, lateral aspect; 510, *Demoda vittata*, ventral view.



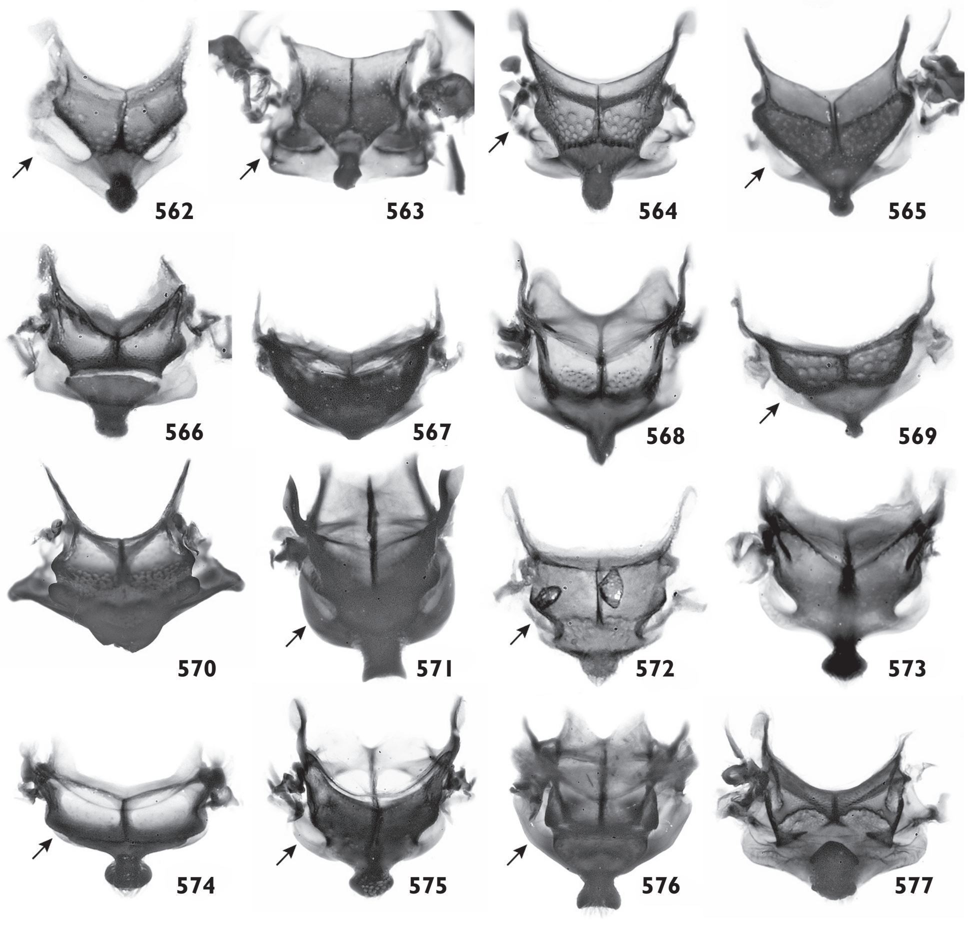

**Figures 511-513**. Thoracic structures. 511, *Orissus meigenii*, mesonotum; 512, *Leptoschoinus fucatus*, metanotum; 513, *Stereobaris interpunctata*, metendosternite.




**Figures 514-537**. Mesonotum, dorsal view. 514, *Centrinus curvirostris*, showing concave postero-lateral margin; 515, *Tenemotes abdominalis*, showing punctures of the mesoscutum restricted to the postero-lateral margin; 516, *Demoda vittata*; 517, *Acythophanes* sp.; 518, *Pycnogeraeus modestus*, showing cleft at posterior margin of mesoscutum at longitudinal mesothoracic suture, a concave postero-lateral margin, and acute posterior margin; 519, *Stethobaroides nudiventris*; 520, *Pycnogeraeus ochraceus*, showing punctures of the mesoscutum restricted to the postero-lateral margin; 521, *Orissus christophori*, showing linear postero-lateral margin; 522, *Orissus meigenii*, showing subacute posterior margin and truncate shape of axillary cord; 523, *Pantoteles tenuirostris*, showing rounded axillary cord; 524, *Optatus palmaris*; 525, *Peridinetus cretaceus*; 526, *Strongylotes squamans*; 527, *Nertinus suturalis*, showing broad, lobe-like axillary cord and smooth posterior margin of mesoscutum at longitudinal mesothoracic suture; 528, *Peridinetus irroratus,*, showing acute posterior margin; 529, *Leptoschoinus fucatus*; 530, *Barilepton filiforme*; 531, *Garnia* sp., showing truncate shape of axillary cord and smooth posterior margin of mesoscutum at longitudinal mesothoracic suture; 532, *Eisonyx crassipes*; 533, *Dirabius calvus*; 534, *Xystus arnoldi*, showing linear postero-lateral margin; 535, *Parasomenes curvirostris*, showing cleft at posterior margin of mesoscutum at longitudinal mesothoracic suture; 536, *Plocamus echidna*; 537, *Odontocorynus creperus*, showing broad, lobe-like axillary cord.

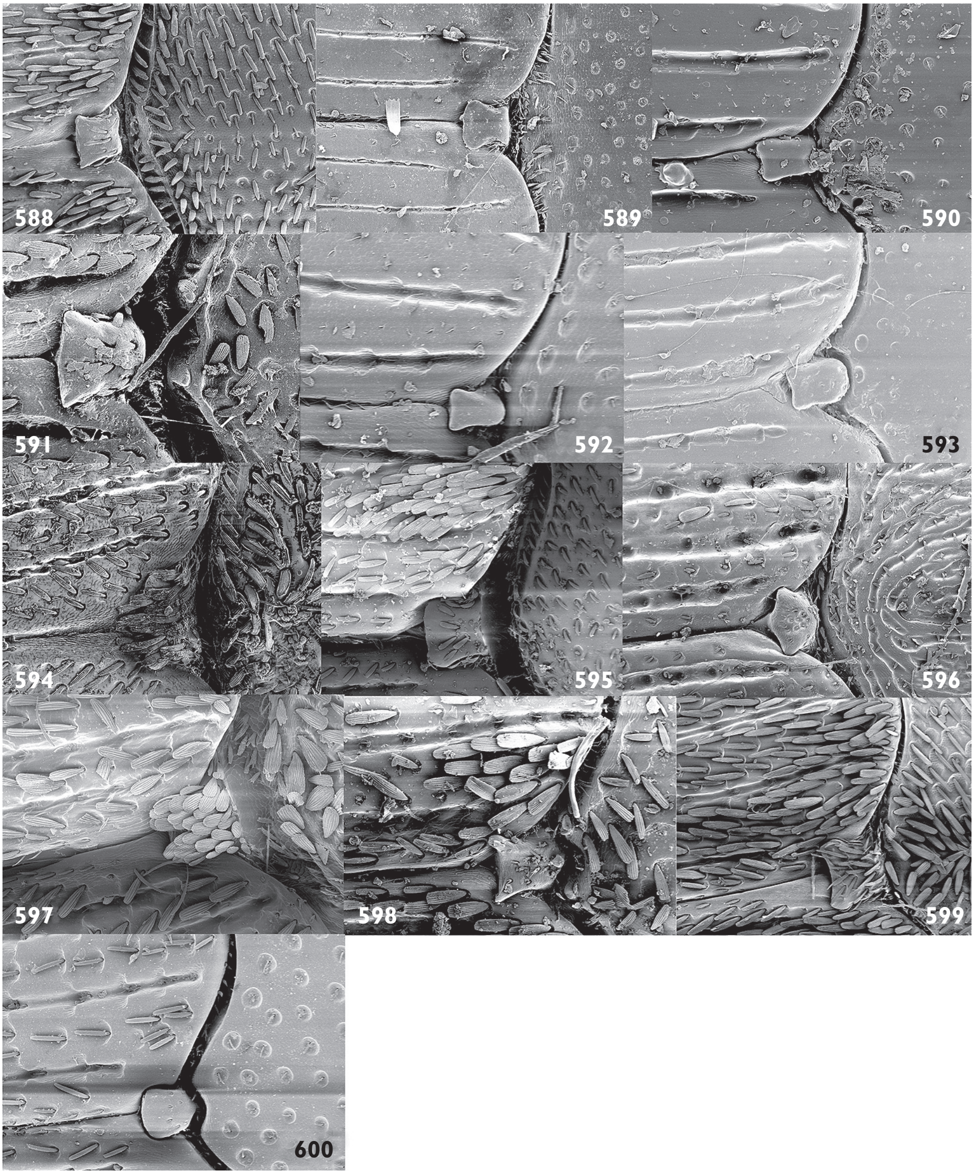



**Figures 538-561**. Mesonotum, dorsal view. 538, *Calandrinus grandicollis*; 539, *Camelodes leachii*, showing truncate shape of axillary cord; 540, *Pseudotorcus rufipes*, showing broad, lobe-like axillary cord; 541, *Madopterus talpa*, showing broad, lobe-like axillary cord and punctures present along part of mesoscutum; 542, *Lipancylus brevirostris*; 543, *Eurhinus aeneus*, showing linear postero-lateral margin; 544, *Diorymerus lancifer*, showing concave postero-lateral margin; 545, *Spilobaris* sp.; 546, *Acythopeus* sp.; 547, *Zena* sp.; 548, *Orthoris crotchii*, showing smooth posterior margin of mesoscutum at longitudinal mesothoracic suture; 549, *Lamprobaris cucullata*; 550, *Pseudogeraeus macropterus*; 551, *Anavallius ruficornis*; 552, *Solenosternus dividuus*; 553, *Telemus* sp.; 554, *Pteracanthus smidtii*; 555, *Stereobaris interpunctata*; 556, *Conoproctus quadripustulatus*, showing cleft at posterior margin of mesoscutum at longitudinal mesothoracic suture; 557, *Athesapeuta vinculata*; 558, *Cyrtepistomus castaneus*, showing reduced and broadly rounded axillary cord; 559, *Derelomus basalis*, showing reduced and broadly rounded axillary cord; 560, *Cryptorhynchus lapathi,* showing reduced and broadly rounded axillary cord; 561, *Dryophthorus americanus*.

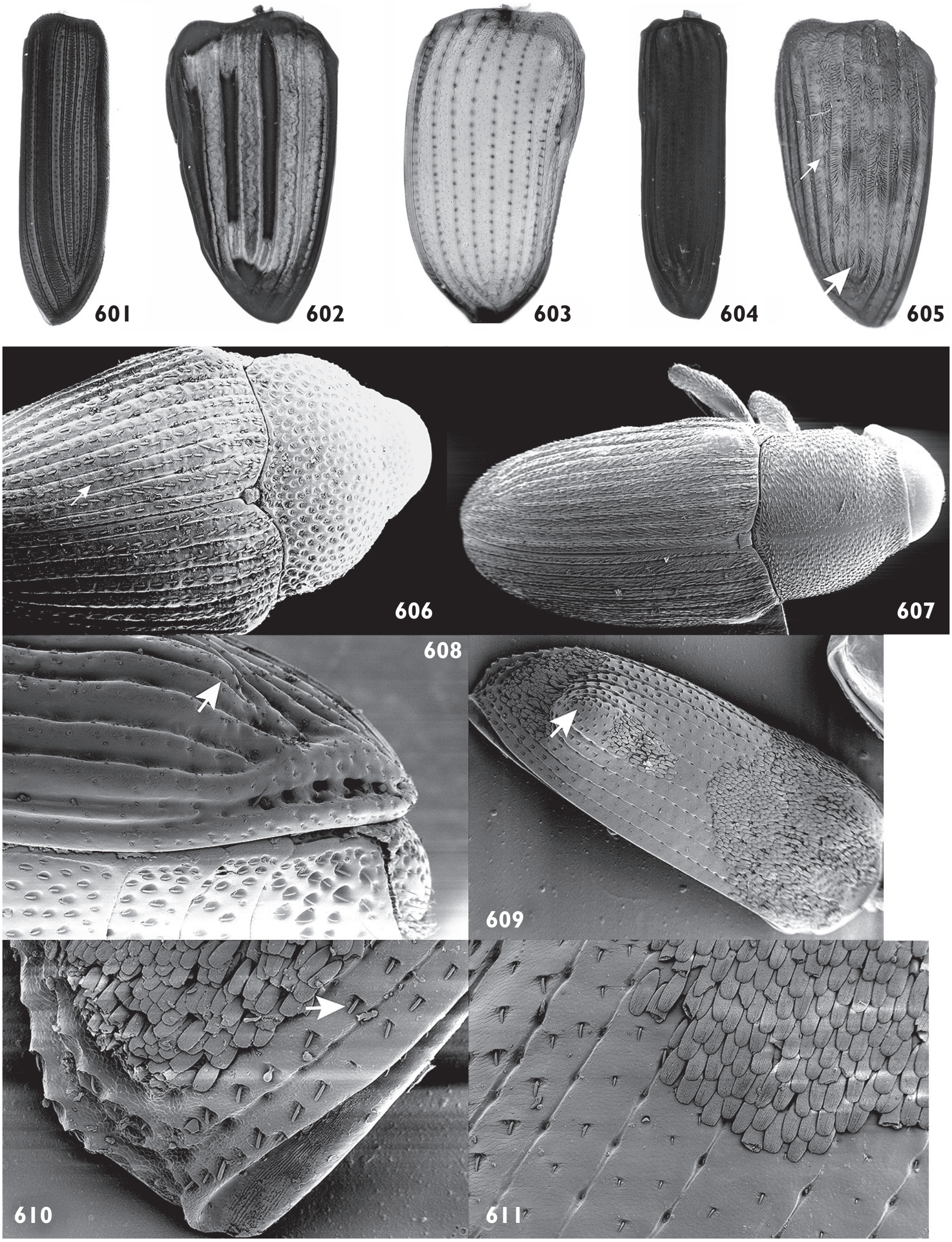



**Figures 562-577**. Mesonotum, dorsal view. 562, *Bagous transversus*, showing reduced and broadly rounded axillary cord; 563, *Cossonus impressifrons*, showing reduced and broadly rounded axillary cord; 564, *Curculio pardalis,* showing reduced and broadly rounded axillary cord; 565, *Hylurgops planirostris*, showing reduced and broadly rounded axillary cord; 566, *Trichodocerus* sp.; 567, *Coeliodes flavicaudis*; 568, *Mononychus vulpeculus*; 569, *Hypurus bertrandi*, showing reduced and broadly rounded axillary cord; 570, *Trigonocolus curvipes*; 571, *Mecopus trilineatus*, showing reduced and broadly rounded axillary cord; 572, *Cylindrocopterus adspersus,* showing reduced and broadly rounded axillary cord; 573, *Telephae oculata*; 574, *Balanogastris kolae*, showing reduced and broadly rounded axillary cord; 575, *Metialma signifera*, showing reduced and broadly rounded axillary cord; 576, *Cyllophorus fasciatus*, showing reduced and broadly rounded axillary cord; 577, *Parorobitis.gibbus*.

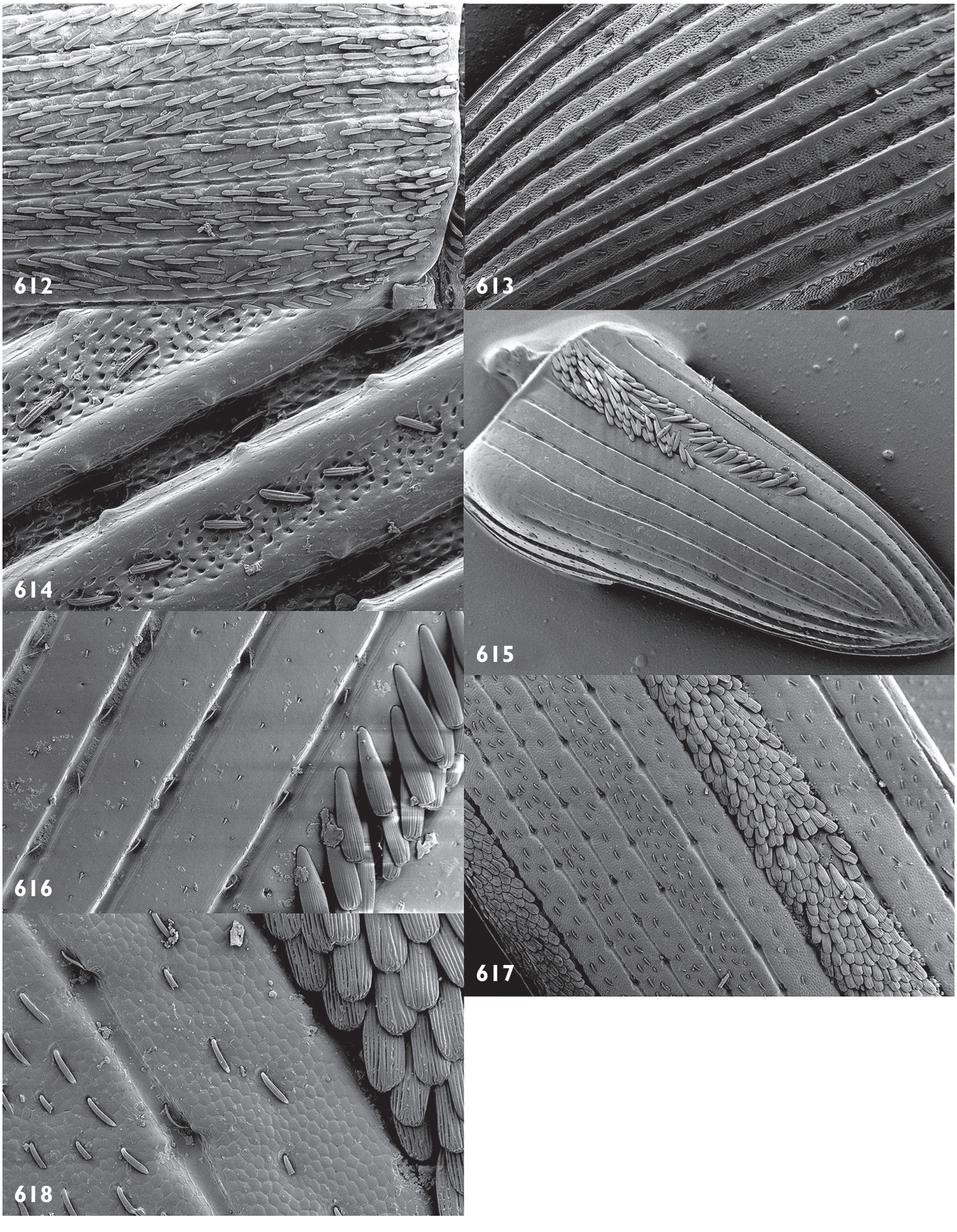

**Figures 578-587**. Thorax. 578, *Madopterus talpa*, thorax, lateral view, showing fused metepisternum and metepimeron, head to the left. 579-581, SEMs of meso- and metanotum, head to the right. 579, *Sibariops concurrens*, left side; 580, *Geraeus lineellus*, left side; 581, *Demoda vittata*, right side. 582-587, SEM's of mesoscutellum. 582, *Taiwanobaris* sp.; 583, *Lophobaris* sp.; 584, *Zygobarella zanthoxyli*; 585, *Idiostethus subcalvus*; 586, *Idiostethus tubulatus*; 587, *Deipyrus hirsutulus*.



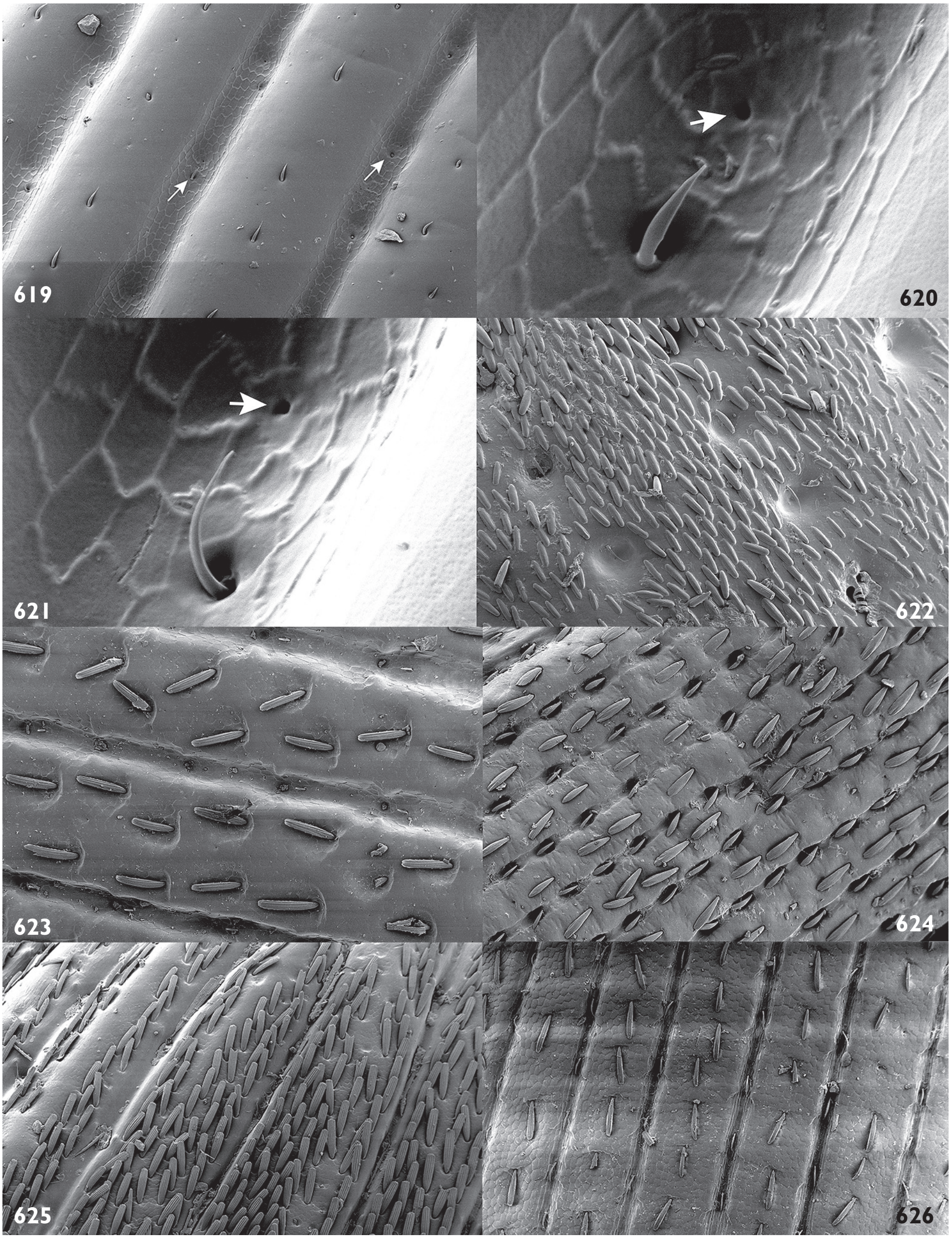

**Figures 588-600**. SEMs of mesoscutellum, head to the right. 588, *Trichodirabius longulus*; 589, *Cylindridia prolixa*; 590, *Stethobaris laevimargo*; 591, *Pycnogeraeus modestus*; 592, *Stethobaris commixta*; 593, *Stethobaroides nudiventris*; 594, *Baris* sp.; 595, *Baris* sp.; 596, *Pertorcus* sp.; 597, *Pseudorthoris devexus*; 598, *Pycnogeraeus striatirostris*; 599, *Pseudocentrinus ochraceus*; 600, *Pachybaris porosa*.



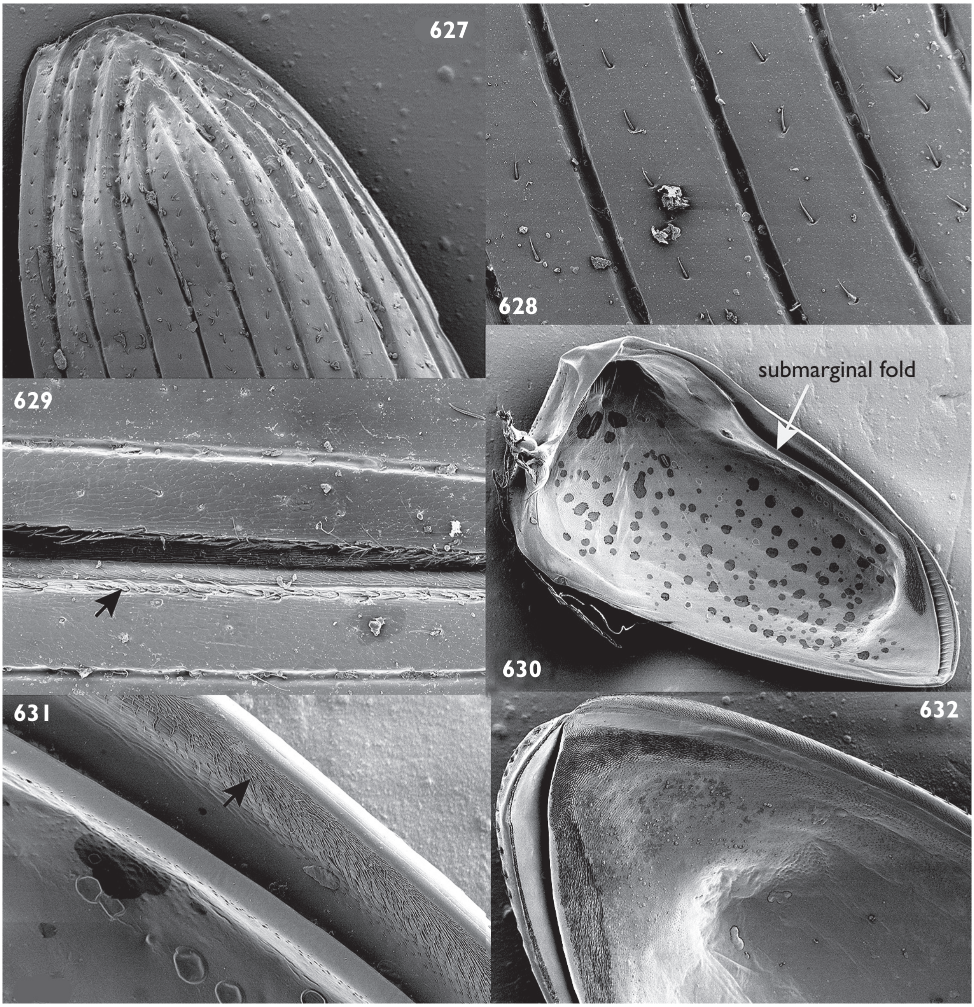

**Figures 601-611**. Elytra. 601-605. Left elytron of: *Demoda vittata*; 602, *Orissus christophori*; 603, *Garnia* sp.; 604, *Madopterus talpa*; 605, *Telemus* sp.; 606, *Anthinobaris* sp., SEM; 607, *Catapastus signatipennis*, SEM; 608, *Centrinopus alternatus*, SEM of lateral aspect showing sub-apical elytral hump; 609-611, *Anthinobaris* sp., SEM's. 609, elytron, showing sub-apical elytral hump; 610, showing single row of punctures along intervals of posterior region; 611, antero-medial region.



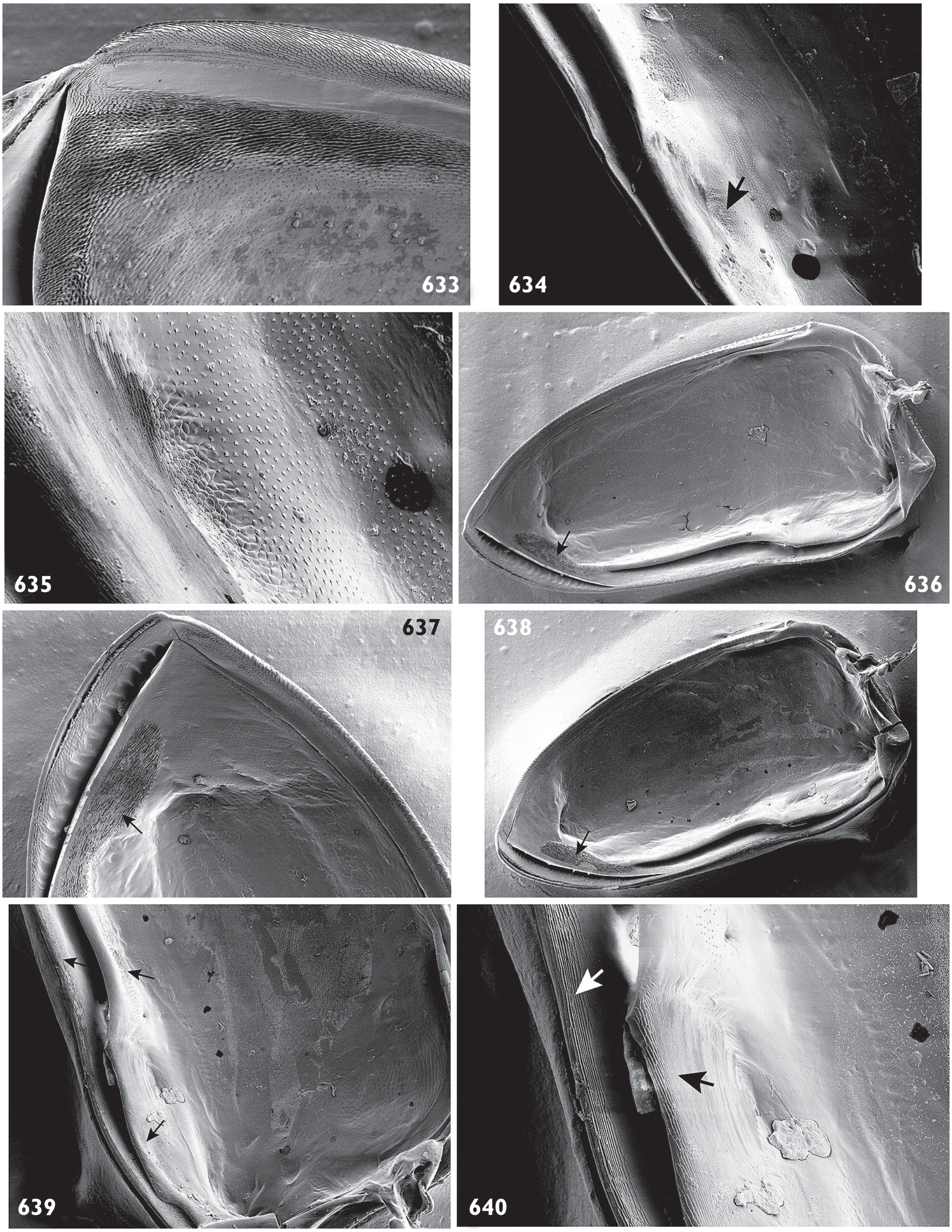

**Figures 612-618**. Elytra, SEM's. 612, *Catapastus signatipennis*, showing scattered setae (not organized into rows) on intervals; 613-614, *Anthinobaris* sp., showing elevated intervals and single row of setae on each interval; 615-616, *Anthinobaris* sp., showing minute, scattered setae (not organized into rows) on intervals and larger scale tufts; 617-618, *Lophobaris* sp., showing scattered setae (not organized into rows) on intervals and scale tufts.



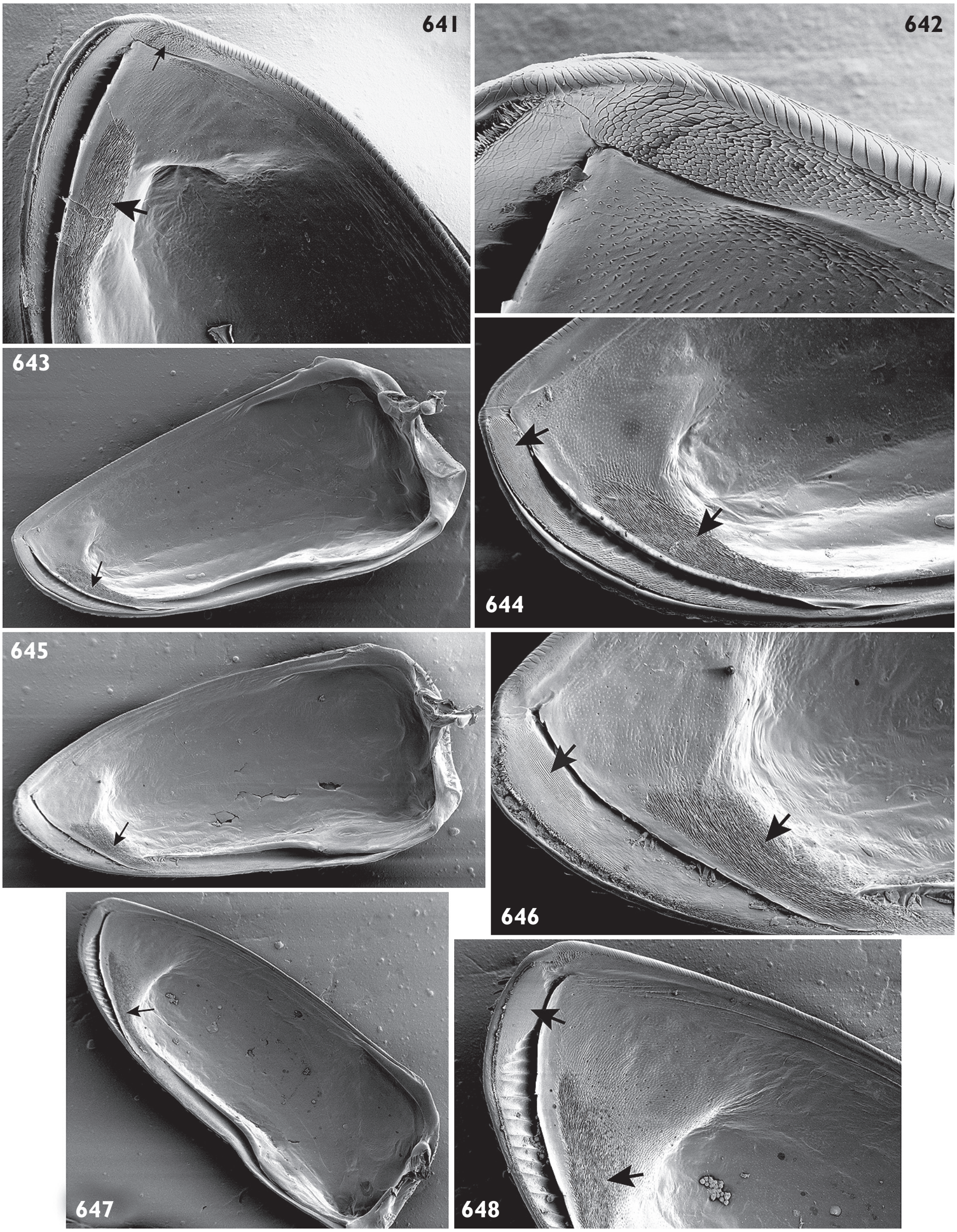

**Figures 619-626**. Elytra, SEMs. 619-621, *Anthinobaris* sp., setae along intervals and associated pores; 622, *Anthinobaris* sp., showing dense covering of setae (not organized into rows) on intervals; 623, *Anthinobaris* sp., showing scattered setae (not organized into rows) on intervals; 624, *Anthinobaris* sp., showing single row of setae on each interval; 625, *Anthinobaris* sp., showing scattered setae (not organized into rows) on intervals; 626, *Anthinobaris* sp., showing single row of setae on each interval.



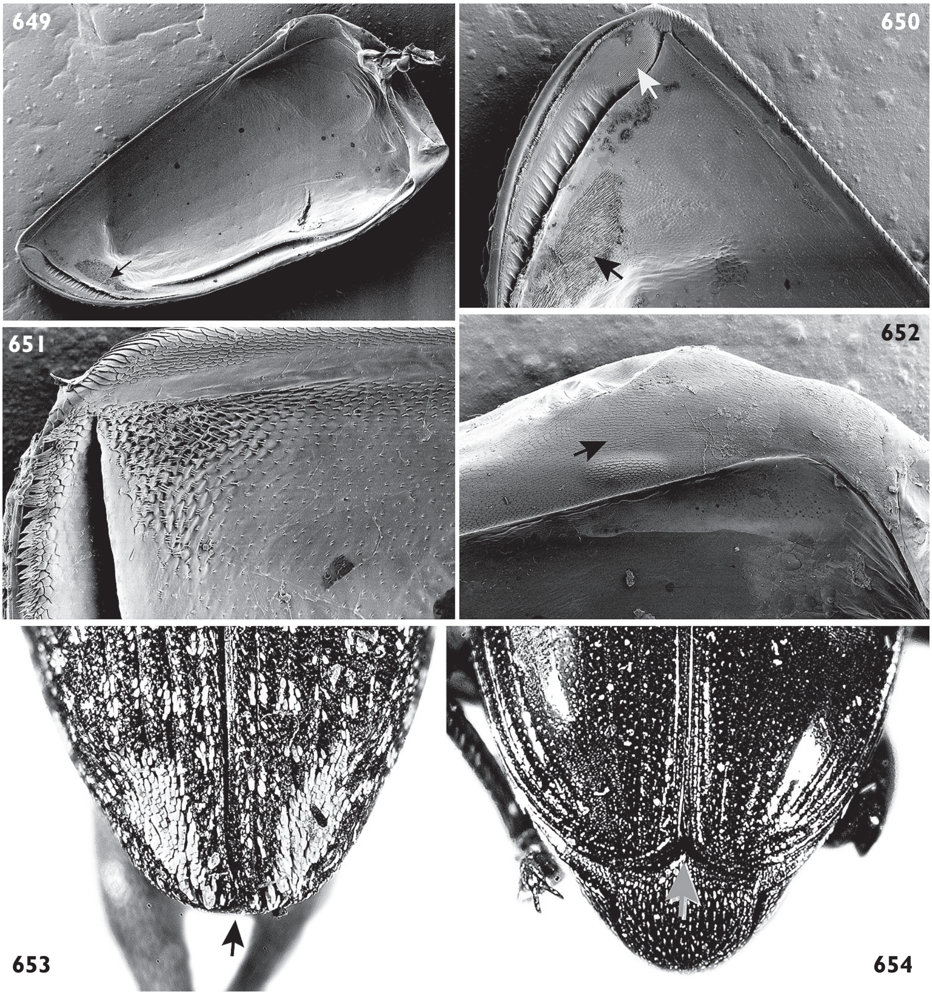

**Figures 627-632**. Elytra, SEMs. 627-628, *Baris* sp. 627, apical region of elytron, dorsal aspect; 628, medial region of elytron, dorsal aspect. 629, *Zygobaris* sp., setae along elytral suture, dorsal aspect; 630, *Diorymeropsis disjuncta*, ventral view showing submarginal fold; 631, *Diorymeropsis disjuncta*, microtrichia along submarginal fold (ventral view); 632, *Pertorcus* sp., elytral apex (ventral view), showing apical field of microtrichia.




**Figures 633-640**. Elytra, SEMs, ventral aspect. 633, *Pertorcus* sp., showing apical field of microtrichia; 634-635, *Acythopeus* sp., showing microtrichia along antero-mesal margin of submarginal fold; 636-637, *Stethobaris commixta*: 636, general view of elytron; 637, detail of apical microtrichial field; 638-640, *Stethobaris laevimargo*: 638, general view of elytron; 639-640: detail of ventral view of elytron and microtrichial fields along anterior regions of submarginal fold.

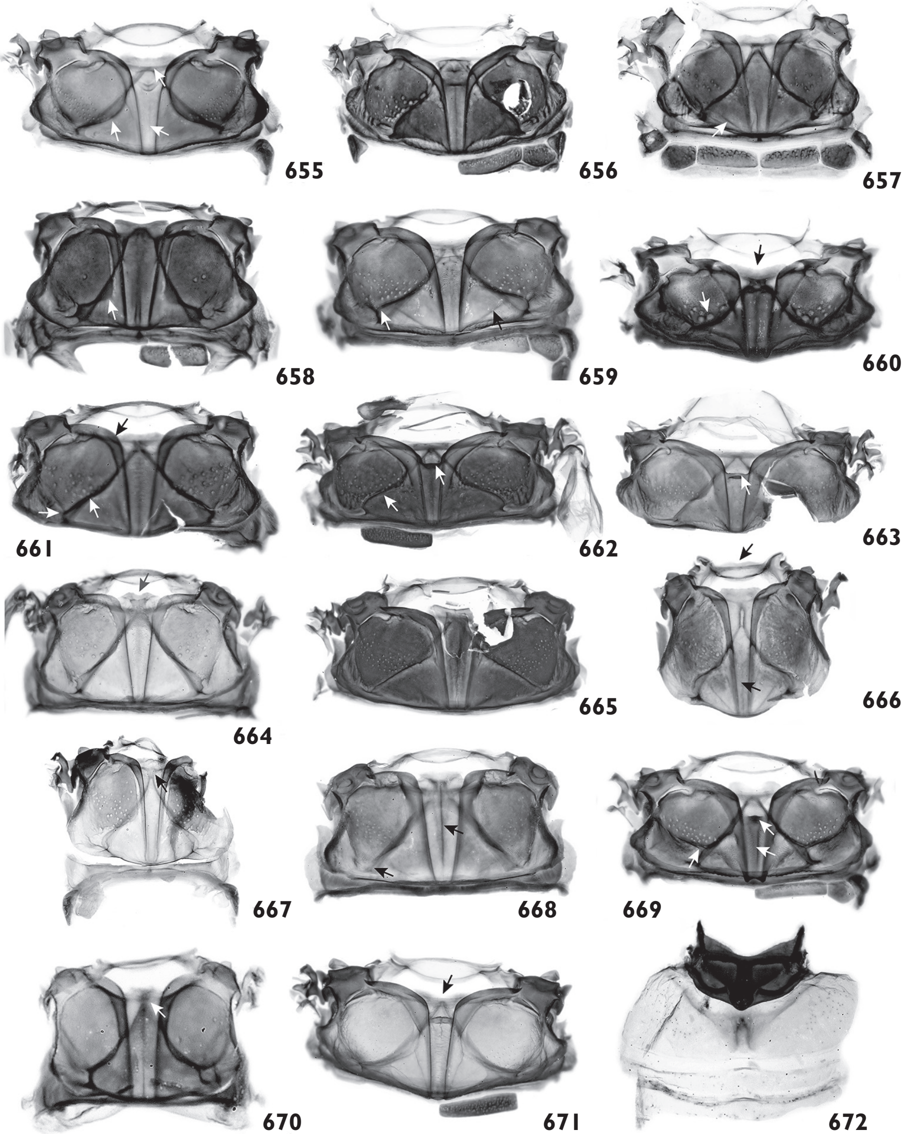



**Figures 641-648**. Elytra (ventral aspect), SEM's. 641-642, *Stethobaris laevimargo*, showing apical microtrichial fields laterally and mesally; 643-644, *Stethobaroides nudiventris*, apical microtrichial field and stridulating file; 645-646, *Pycnogeraeus striatirostris*, apical microtrichial field and stridulating file; 647-648, *Pseudocentrinus ochraceus*, apical microtrichial field and stridulating file.

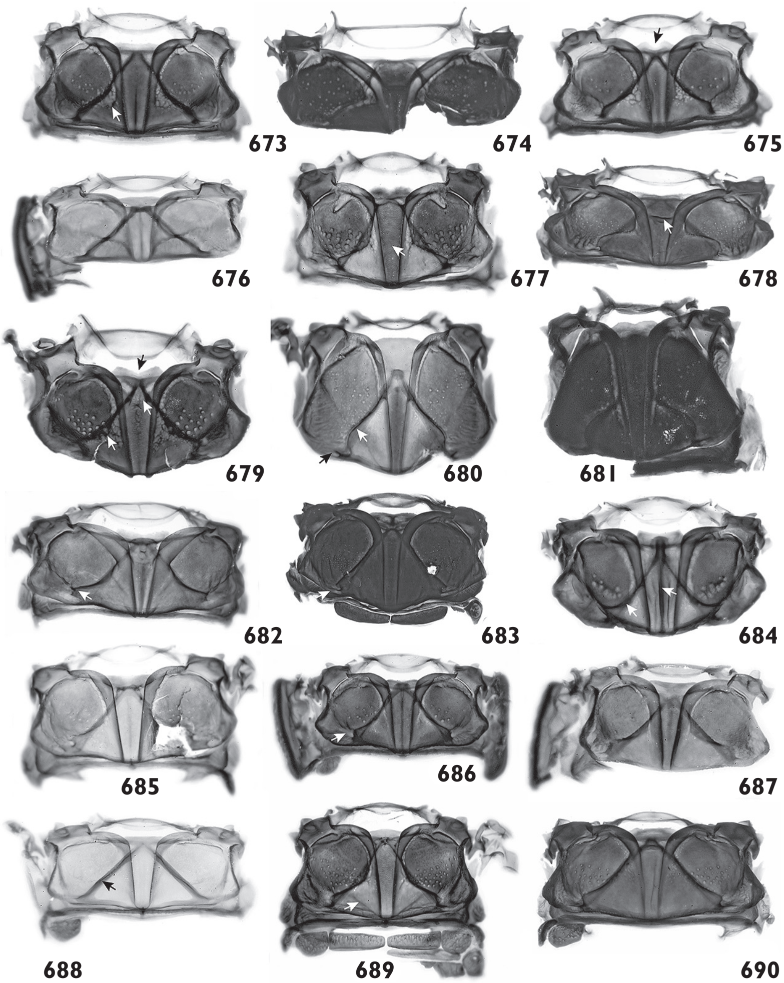



**Figures 649-654**. Elytra. 649-650, *Pachybaris porosa* (SEM), apical microtrichial field and stridulating file; 651, *Spilobaris* sp. (SEM), apical microtrichial field; 652, *Spilobaris* sp. (SEM), ventral view of medial humeral angle showing microtrichia; 653, *Embates chaetopus*, elytral apex; 654, *Loboderes citriventris*, elytral apex.

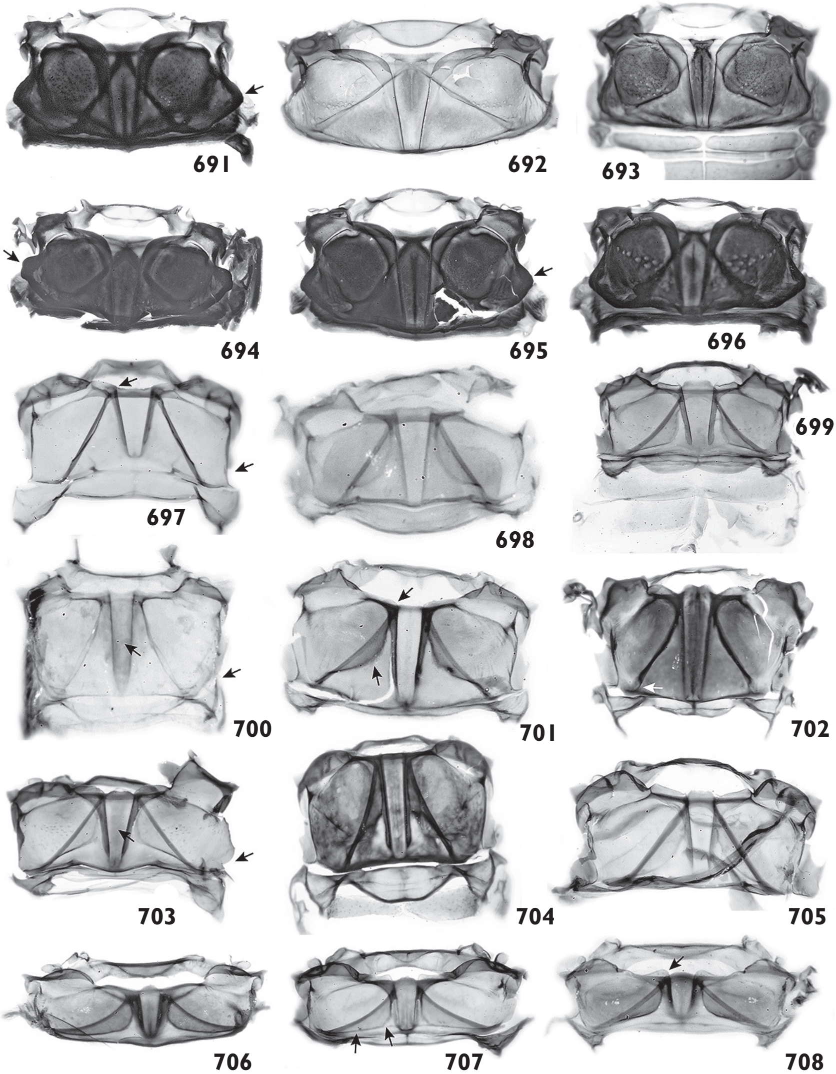
**Figures 655-672**. Metanota (dorsal view). 655, *Centrinus curvirostris*, showing partially developed transverse bridge at anterior end of scutellar groove, metascutum with convex postero-medial margin, and reduced median longitudinal crest on the scutellar groove; 656, *Tenemotes abdominalis*; 657, *Demoda vittata*, showing metascutellar line; 658, *Acythophanes* sp., showing metascutum with strongly convex, angular postero-medial margin; 659, *Pycnogeraeus modestus*, showing metascutellar line and metascutum with well-defined posterior margin not extending to posterior of metanotum; 660, *Stethobaroides nudiventris*, showing concave anterior margin of scutellar groove and metascutum with large punctures; 661, *Pycnogeraeus ochraceus*, showing round antero-medial margin of allocrista, metascutum with nearly linear postero-medial margin, and metascutum with weakly-defined posterior margin nearly extending to posterior of metanotum; 662, *Orissus christophori*, showing well-developed transverse bridge at anterior end of scutellar groove and metascutum with concave postero-medial margin; 663, *Orissus meigenii*, showing



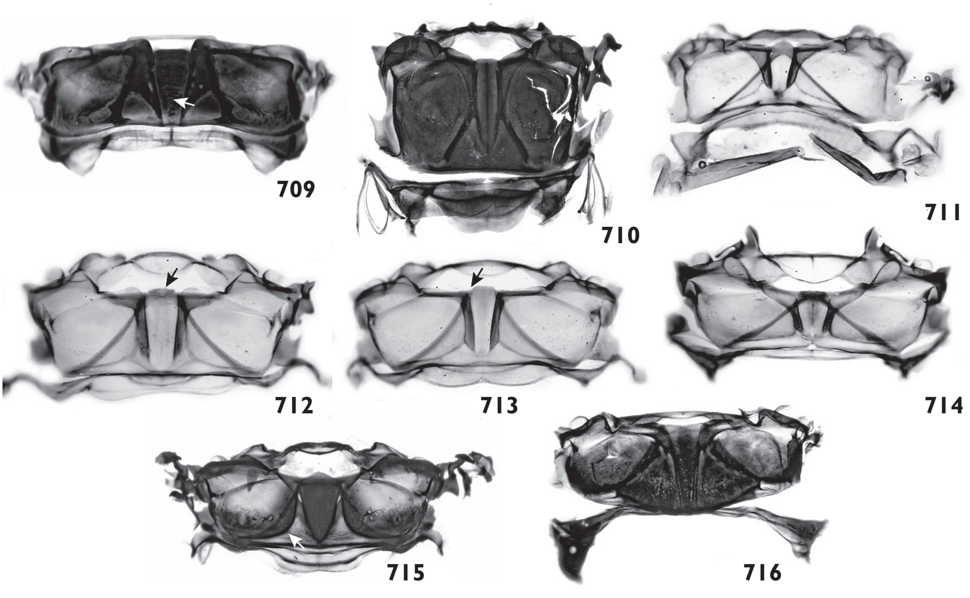
well-developed transverse bridge at anterior end of scutellar groove; 664, *Pantoteles tenvirostris*, showing clefted anterior margin of scutellar groove; 665, *Optatus palmaris*; 666, *Strongylotes squamans*, showing anterior margin of prescutum with large lobes and reduced median longitudinal crest on the scutellar groove; 667, *Nertinus suturalis*, indicating absence of transverse bridge at anterior end of scutellar groove; 668, *Peridinetus irroratus*, showing well-developed median longitudinal crest on the scutellar groove and metascutum with weakly-defined posterior margin nearly extending to posterior of metanotum; 669, *Leptoschoinus fucatus*, showing metascutum with well-defined posterior margin not extending to posterior of metanotum, well-developed transverse bridge at anterior end of scutellar groove, and well-developed median longitudinal crest on the scutellar groove; 670, *Barilepton filiforme*, indicating absence of transverse bridge at anterior end of scutellar groove; 671, *Garnia* sp., showing concave anterior margin of scutellar groove; 672, *Eisonyx crassipes*.



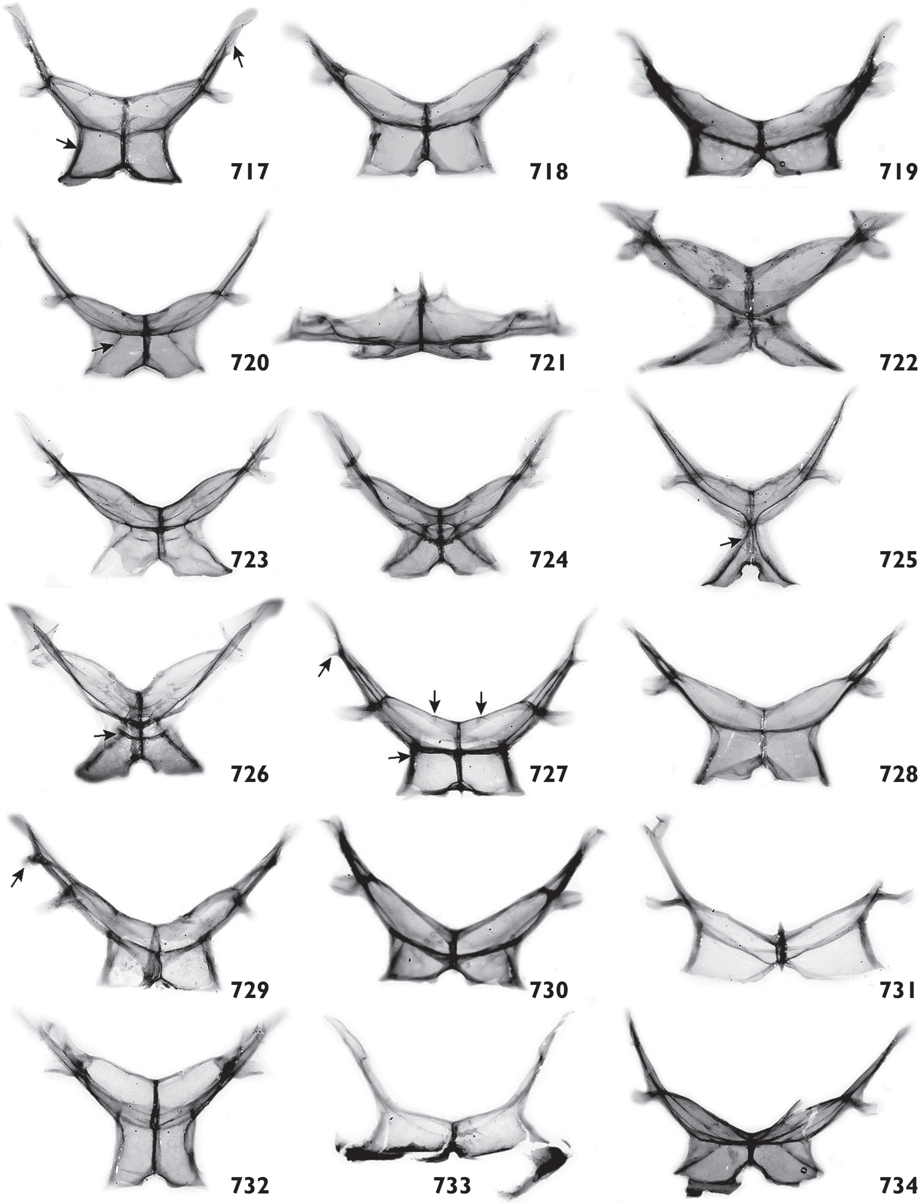

**Figures 673-690**. Metanota (dorsal view). 673, *Dirabius calvus*, showing metascutum with strongly convex, angular postero-medial margin; 674, *Xystus arnoldi*; 675, *Parasomenes curvirostris*, showing clefted anterior margin of scutellar groove; 676, *Plocamus echidna*; 677, *Odontocorynus creperus*, indicating absence of median longitudinal crest on the scutellar groove; 678, *Camelodes leachii*, showing well-developed transverse bridge at anterior end of scutellar groove; 679, *Pseudotorcus rufipes*, showing clefted anterior margin of scutellar groove, partially developed transverse bridge at anterior end of scutellar groove, and metascutum with strongly convex, angular postero-medial margin; 680, *Madopterus talpa*, showing metascutum with concave postero-medial margin, and metascutum with weakly-defined posterior margin and extending to posterior margin of metanotum; 681, *Lipancylus brevirostris*; 682, *Eurhinus aeneus*, showing metascutum with well-defined posterior margin not extending to posterior of metanotum; 683, *Diorymerus lancifer*, showing metascutum with weakly-defined posterior margin nearly extending to posterior of metanotum; 684, *Spilobaris* sp., showing well-developed median longitudinal crest on the scutellar groove and metascutum with convex postero-medial margin; 685, *Acythopeus* sp.; 686, *Zena* sp., showing metascutum with well-defined posterior margin not extending to posterior of metanotum; 687, *Orthoris crotchii*; 688, *Lamprobaris cucullata*, showing metascutum with nearly linear postero-medial margin; 689, *Pseudogeraeus macropterus*, showing metascutellar line; 690, *Anavallius ruficornis*.



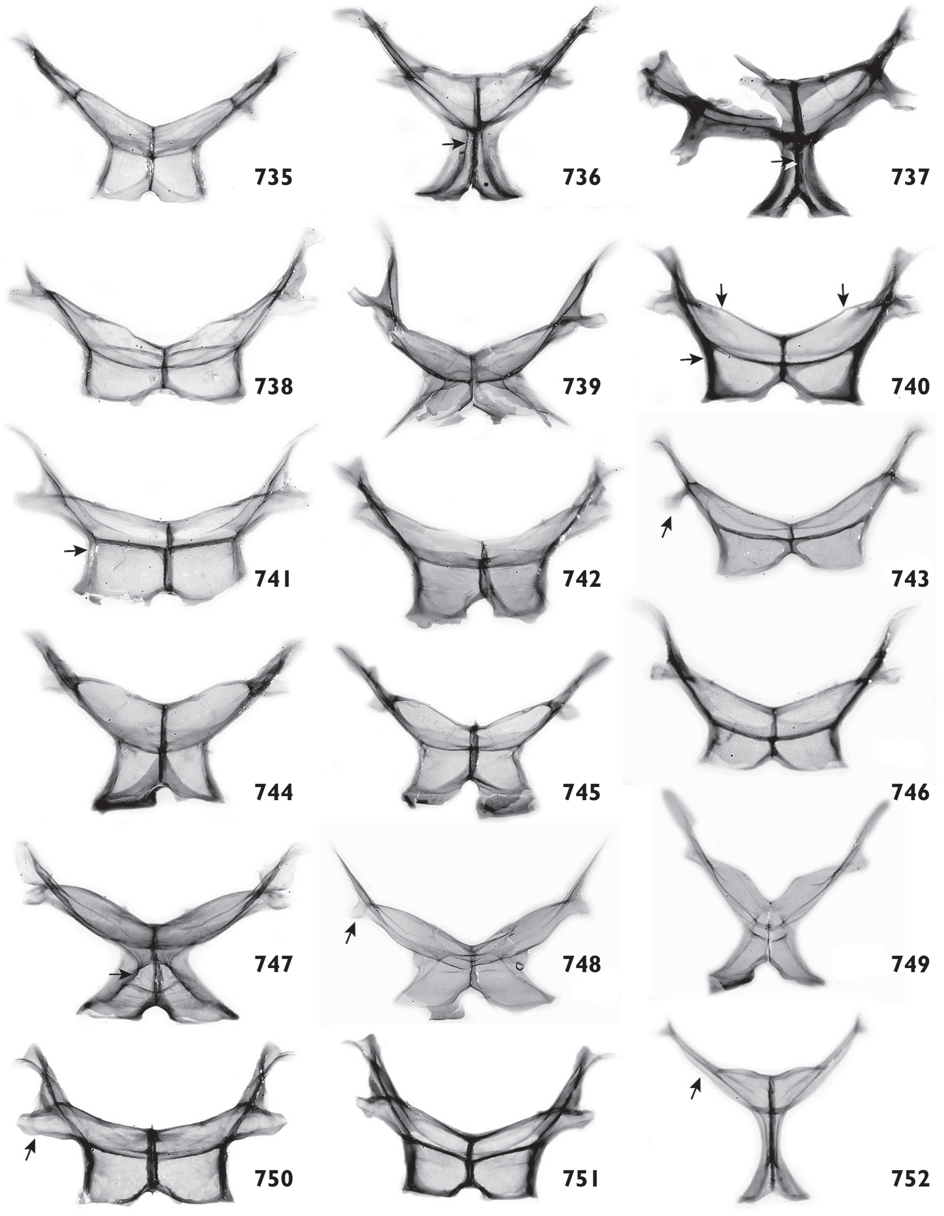

**Figures 691-708**. Metanota (dorsal view). 691, *Solenosternus dividuus*, showing projecting postero-lateral margin of metanotum; 692, *Telemus* sp.; 693, *Pteracanthus smidtii*; 694, *Stereobaris interpunctata*, showing projecting postero-lateral margin of metanotum; 695, *Conoproctus quadripustulatus*, showing projecting postero-lateral margin of metanotum; 696, *Athesapeuta vinculata*; 697, *Cyrtepistomus castaneus*, showing straight postero-lateral margin of metanotum and angular antero-medial margin of allocrista; 698, *Derelomus basalis*; 699, *Cryptorhynchus lapathi*; 700, *Dryophthorus americanus*, showing straight postero-lateral margin of metanotum and indicating absence of median longitudinal crest on the scutellar groove; 701, *Bagous transversus*, showing angular antero-medial margin of allocrista and metascutum with angular, quadrate postero-medial margin; 702, *Cossonus impressifrons*; 703, *Curculio pardalis*, showing straight postero-lateral margin of metanotum and indicating absence of median longitudinal crest on the scutellar groove; 704, *Hylurgops planirostris*; 705, *Trichodocerus* sp.; 706, *Coeliodes flavicaudis*; 707, *Mononychus vulpeculus*, showing metascutum with angular, quadrate postero-medial margin and metascutum extending to posterior of metanotum; 708, *Hypurus bertrandi*, showing angular antero-medial margin of allocrista.



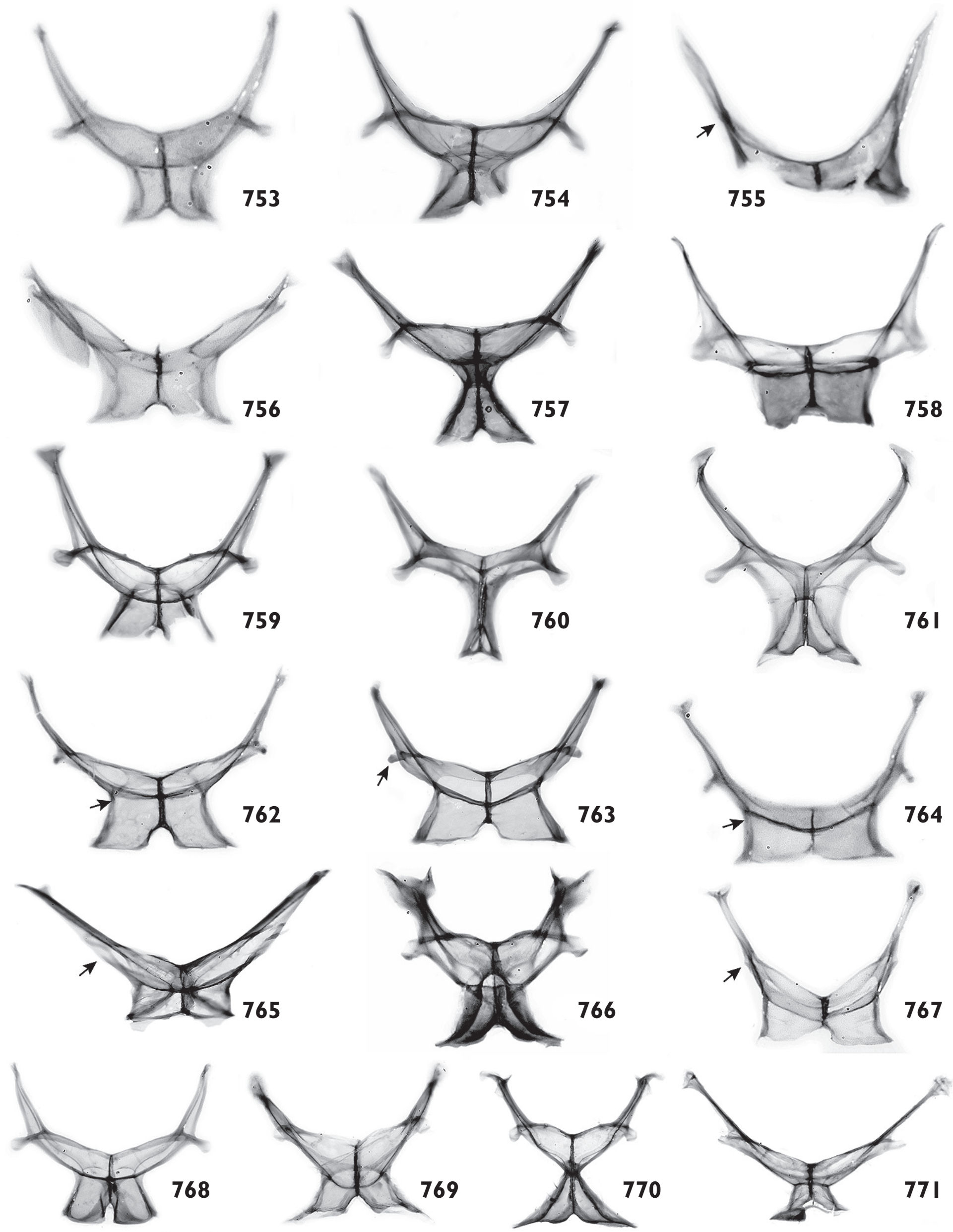

**Figures 709-716**. Metanota (dorsal view). 709, *Trigonocolus curvipes*, showing a modified median longitudinal crest on the scutellar groove composed of series of small ridges; 710, *Mecopus trilineatus*; 711, *Cylindrocopterus adspersus*; 712, *Telephae oculata*, showing straight anterior margin of scutellar groove; 713, *Balanogastris kolae*, showing angular antero-medial margin of allocrista; 714, *Metialma signifera*; 715, *Cyllophorus fausciatus*, showing metascutum with angular, quadrate postero-medial margin; 716, *Parorobitis gibbus*.



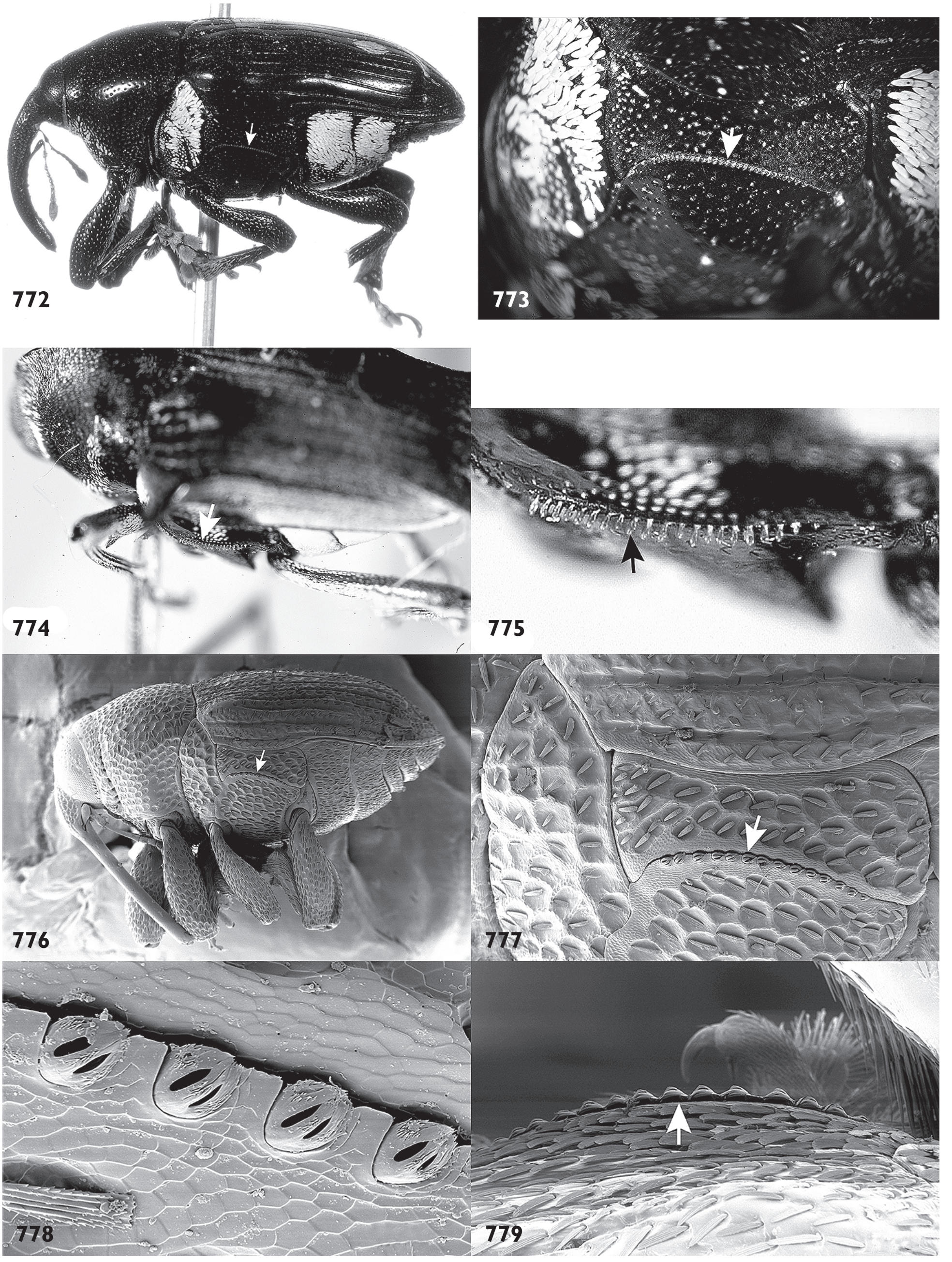

**Figures 717-734**. Metendosternite, posterior view. 717, *Centrinus curvirostris*, showing wide stalk and simple furcal arm; 718, *Pycnogeraeus modestus*; 719, *Stethobaroides nudiventris*; 720-721, *Orissus christophori*, showing V-shaped stalk; 721, dorsal view; 722, *Pantoteles tenvirostris*; 723, *Optatus palmaris*; 724, *Peridinetus cretaceus*; 725, *Nertinus suturalis*, showing V-shaped stalk; 726, *Peridinetus irroratus*, showing V-shaped stalk; 727, *Leptoschoinus fucatus*, showing wide stalk, bifurcate furcal arm, and anterior tendons situated close to longitudinal flange; 728, *Garnia* sp.; 729, *Dirabius calvus*, showing bifurcate furcal arm; 730, *Parasomenes curvirostris*; 731, *Plocamus echidna*; 732, *Odontocorynus creperus*; 733, *Calandrinus grandicollis*; 734, *Camelodes leachii*.



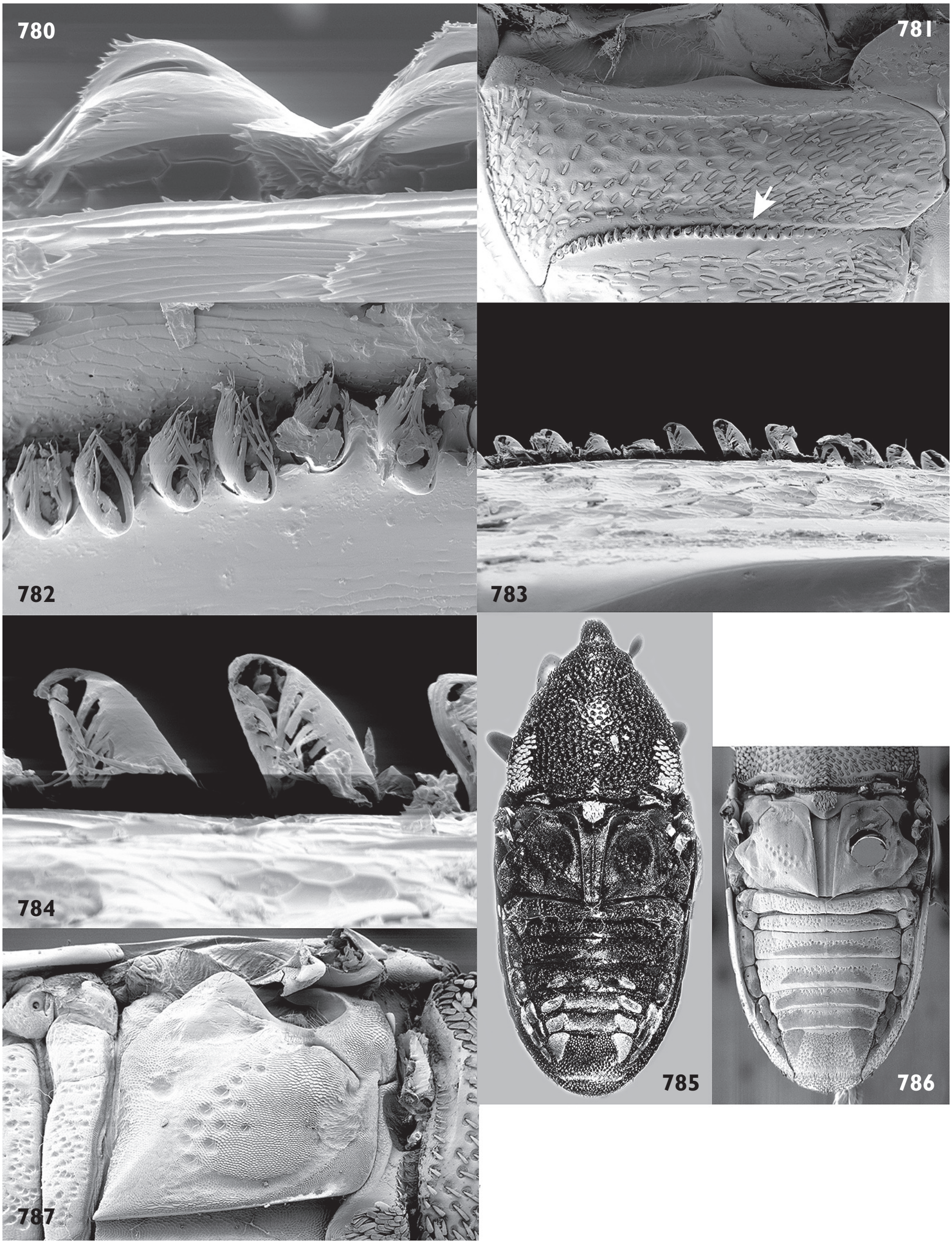

**Figures 735-752**. Metendosternite, posterior view. 735, *Pseudotorcus rufipes*; 736, *Madopterus talpa*, showing V-shaped stalk; 737, *Lipancylus brevirostris*, showing V-shaped stalk; 738, *Eurhinus aeneus*; 739, *Diorymerus lancifer*; 740, *Spilobaris* sp., showing wide stalk and anterior tendons situated close to furcal arm; 741, *Acythopeus* sp., showing wide stalk; 742, *Zena* sp.; 743, *Orthoris crotchii*, showing developed hemiductus; 744, *Pseudogeraeus macropterus*; 745, *Anavallius ruficornis*; 746, *Solenosternus dividuus*; 747, *Pardisomus biplagiatus*, showing V-shaped stalk; 748, *Telemus* sp., showing developed hemiductus; 749, *Pteracanthus smidtii*; 750, *Stereobaris interpunctata*, showing developed hemiductus; 751, *Athesapeuta vinculata*; 752, *Cyrtepistomus castaneus*, showing reduced hemiductus.



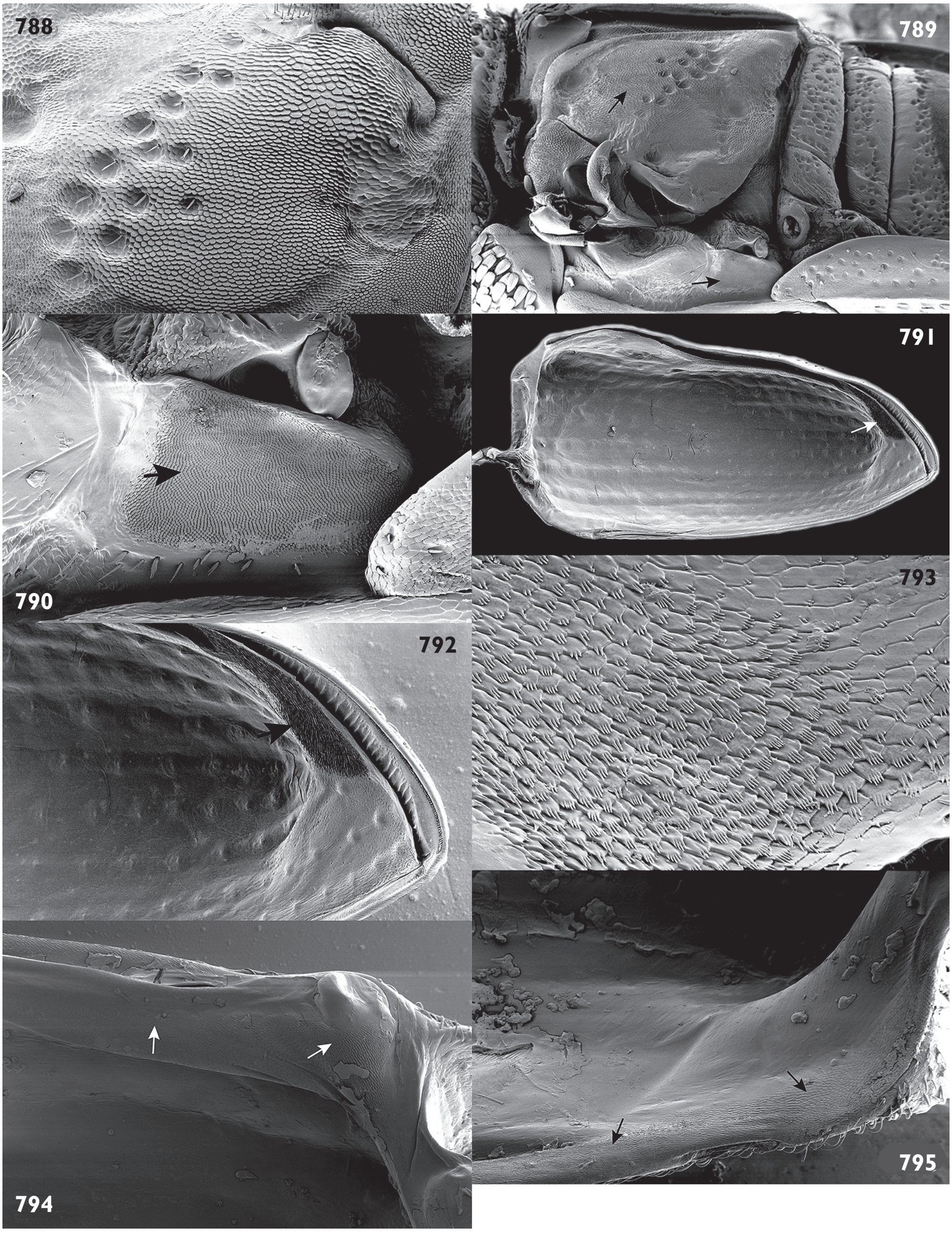

**Figures 753-771**. Metendosternite, posterior view. 753, *Derelomus basalis*; 754, *Cryptorhynchus lapathi*; 755, *Dryophthorus americanus*, showing reduced hemiductus; 756, *Bagous transversus*; 757, *Cholus rana*; 758, *Cossonus impressifrons*; 759, *Curculio pardalis*; 760, *Hylurgops planirostris*; 761, *Trichodocerus* sp.; 762, *Coeliodes flavicaudis*, showing wide stalk; 763, *Mononychus vulpeculus*, showing developed hemiductus; 764, *Hypurus bertrandi*, showing wide stalk; 765, *Trigonocolus curvipes*, showing reduced hemiductus; 766, *Mecopus trilineatus*; 767, *Cylindrocopterus adspersus*, showing reduced hemiductus; 768, *Balanogastris kolae*; 769, *Metialma signifera*; 770, *Cyllophorus fasciatus*; 771, *Parorobitis gibbus*.



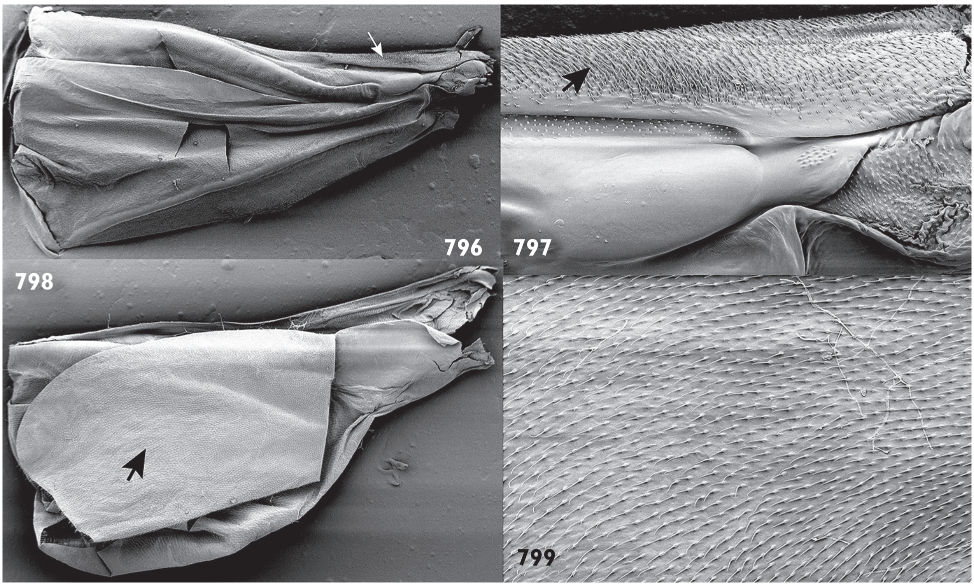

**Figures 772-779**. Sclerolepidia. 772-773, *Megavallius auritarsis*, adult (lateral aspect) showing location of sclerolepidia along dorsal margin of metasternum; 774-775, *Pteracanthus smidtii*, dorso-lateral view of adult showing location of type 2 sclerolepidia; 776-777, *Amercedes subulirostris* (SEM), lateral aspect of adult showing location of sclerolepidia; 778, *Zygobarella zanthoxyli* (SEM), lateral view of adult showing detail of sclerolepidia; 779, *Pseudocentrinus ochraceus* (SEM), dorsal view of adult and sclerolepidia.



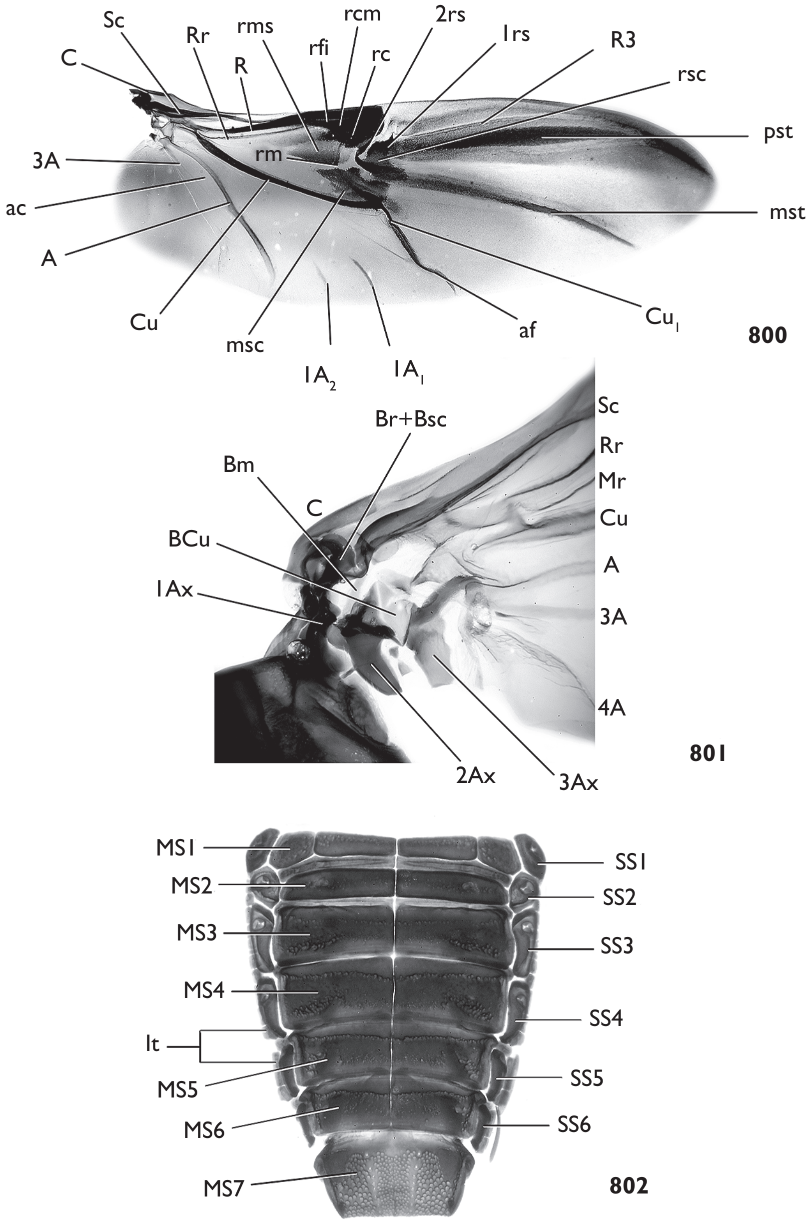

**Figures 780-787**. 780-784, sclerolepidia. 780, *Pseudocentrinus ochraceus*, detail of sclerolepidia in dorsal view; 781-784, *Lydamis cinnamomeus*, type 2 sclerolepidia. 781-782, lateral views; 783-784, dorsal views. 785-787, *Anthinobaris* sp. 785-786, thoracic and tergal wing-locking patches; 787, left side of metanotum (SEM), dorsal aspect.



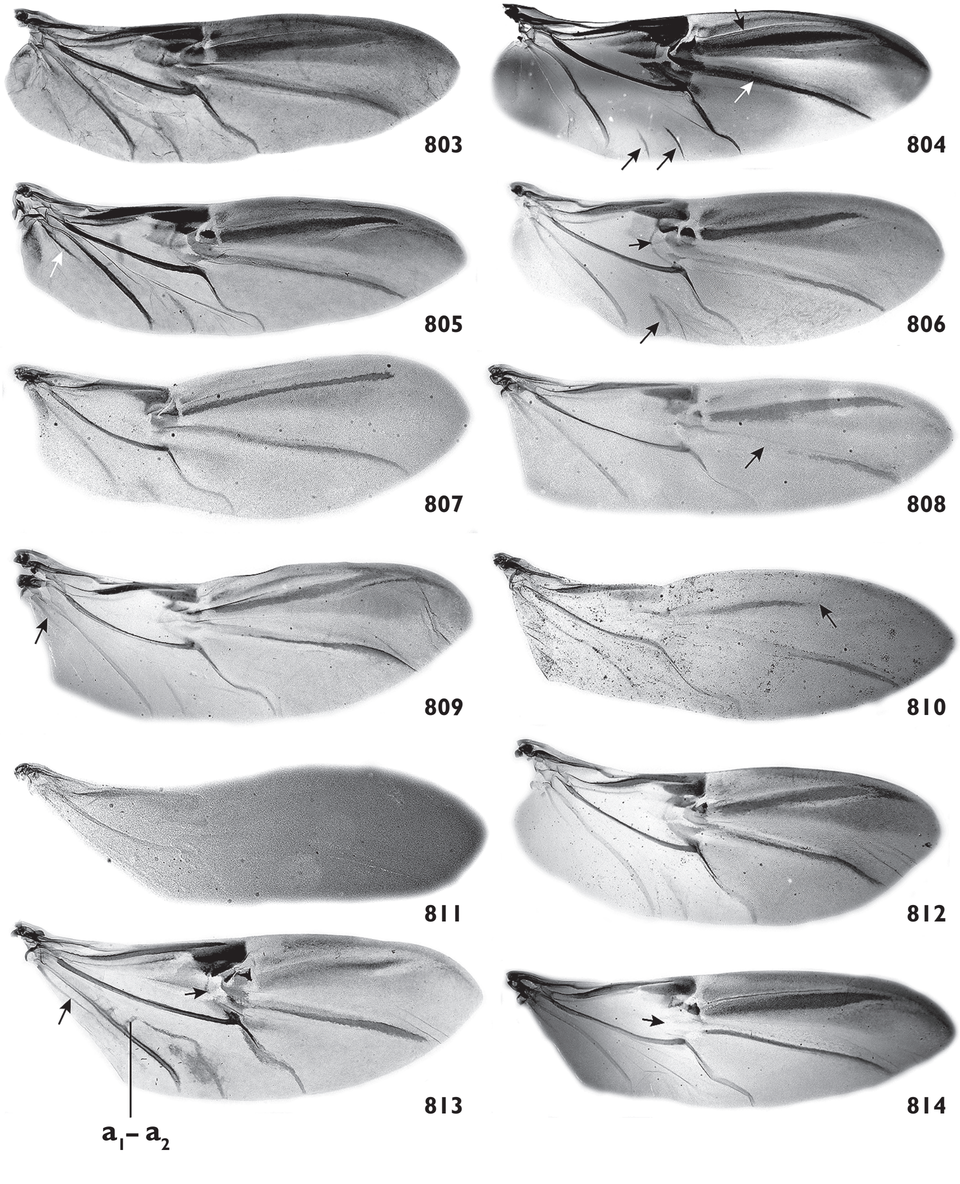

**Figures 788-795**. 788-790, thoracic wing-locking patches (SEMs). 788-795, *Anthinobaris* sp.: 788, metascutum; 789, microtrichial patches on metanotum and above posterior region of metepisternum; 790, enlargement of microtrichial patch above posterior region of metepisternum; 791-795, elytra (ventral view). 791-792, *Amercedes orthorrhinus*, apical microtrichial patch; 793, *Acythophanes* sp., microtrichia along apico-medial region of elytron; 794-795, *Lixus concavus* (Lixinae). 794, medial humeral margin, ventral aspect showing microtrichial field; 795, lateral humeral margin above submarginal fold, ventral aspect showing microtrichial field.



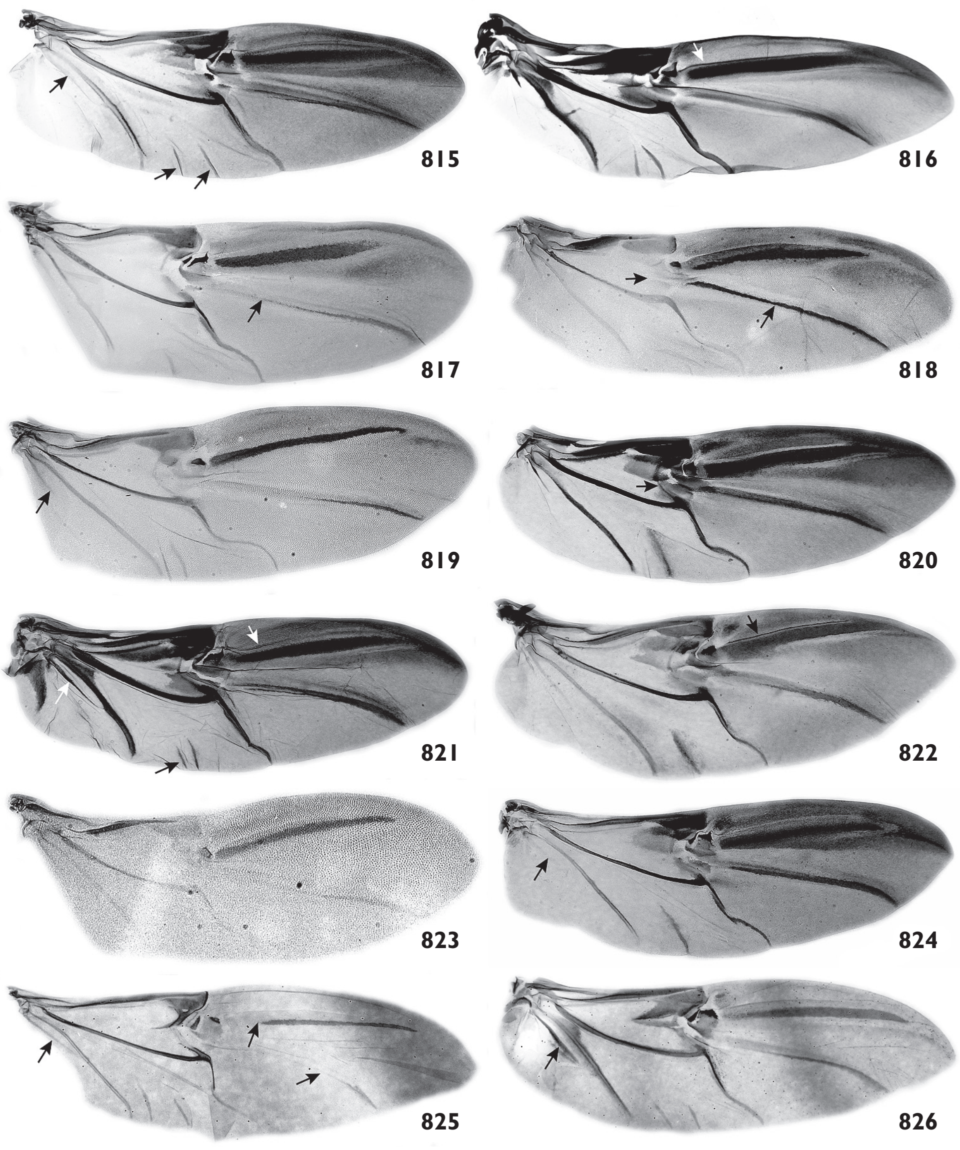

**Figures 796-799**. Hind wings, SEMs of wing-fastening spines, *Anthinobaris* sp. 796-797, spines along costal region, dorsal aspect of hind wing; 798-799, setae along apical region, ventral aspect of hind wing.



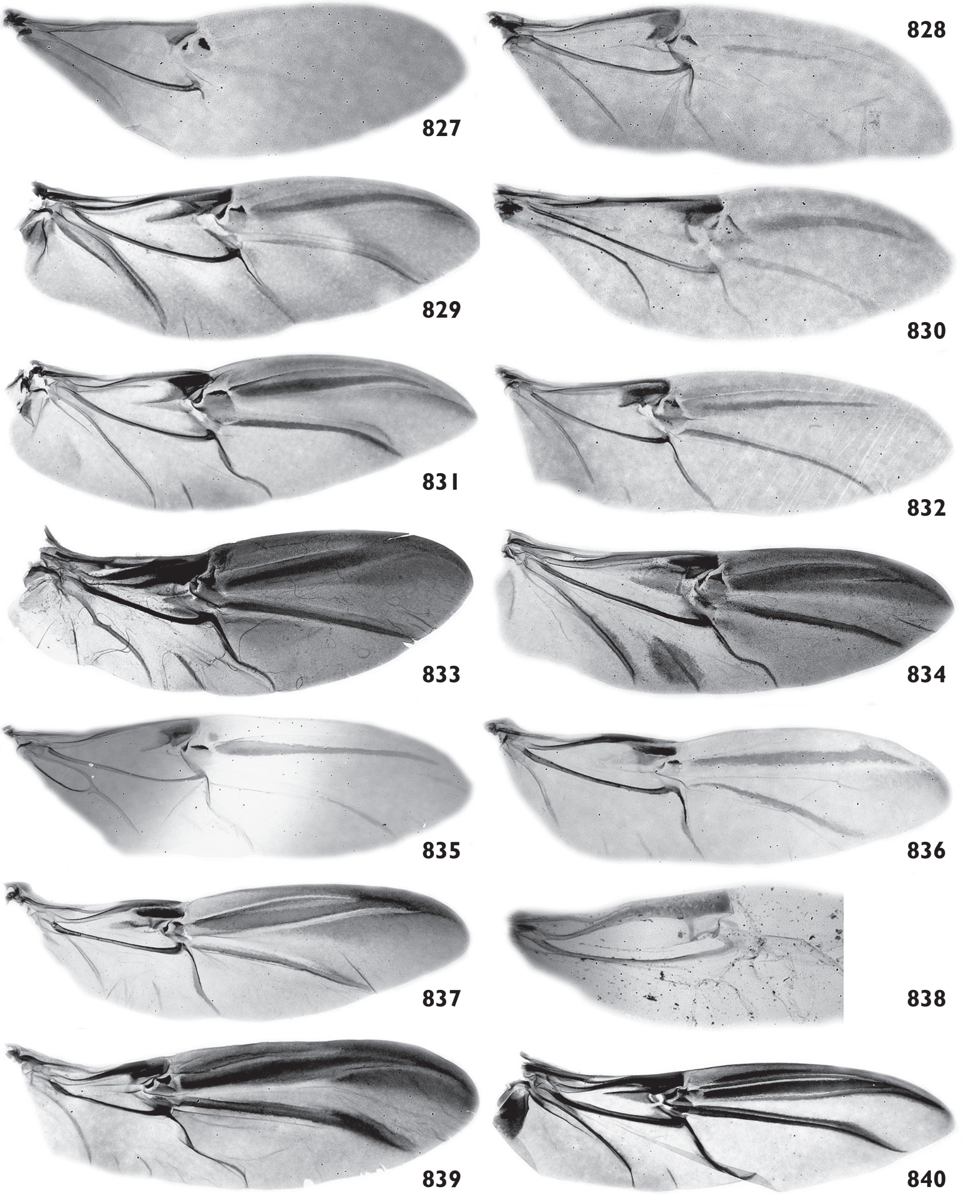

**Figures 800-802**. 800, *Optatus palmaris*, hind wing venation: C=Costa; Sc=Subcosta; Rr=radial recurrent vein; R=Radius; r-m=radiomedia; rms=radiomedial sclerotization; rcm=margin of radial cell; rc=radial cell; rfi=radial fissure; 2rs, 1rs=radial sclerites; R3=3rd radial; rsc=radial sclerotization; pst=postradial stripe; mst=medial stripe; $Cu_1$=1st Cubital; af=apical fold of $Cu_1$; msc=medial sclerotization; $1A_1$, $1A_2$=1st Anal branches; Cu=Cubital; A=Anal; ac=anal cell; 3A=3rd Anal. 801, hind wing, basal sclerites: Mr=medial recurrent vein; 1Ax, 2Ax, 3Ax=Axillary sclerites; BCu=cubital basivenale; Bm=medial basivenale; Br+BSc=radial basivenale + subcostal basivenale. 802, tergites: SS=spiracular sclerite; MS=median sclerite; lt=laterotergite.



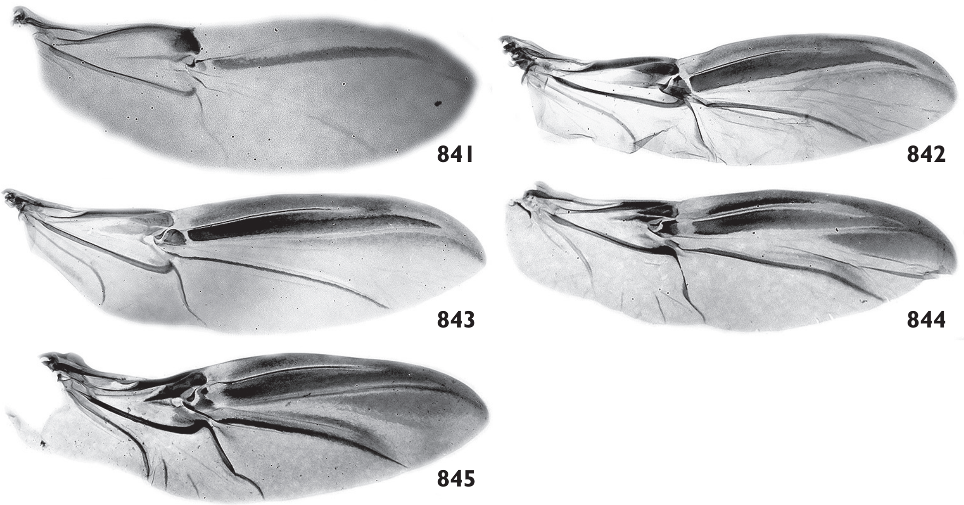

**Figures 803-814**. Hind wings. 803, *Centrinus curvirostris*; 804, *Optatus palmaris*, showing $1A_1$ and $1A_2$ defined near wing margin, developed mst, and R3 forming a white line due to loss of sclerotization; 805, *Eutoxus* sp., showing developed 3A; 806, *Parasaldius* sp., showing developed rm and $1A_1$ and $1A_2$ defined near wing margin; 807, *Buchananius sulcatus*; 808, *Haplostethops ellipsoidea*, showing reduced mst; 809, *Linogeraeus viduatus*, showing reduced 3A; 810, *Plocamus echidna*, showing reduced pst; 811, *Plocamus clavisetis*; 812, *Odontocorynus scutellumalbum*; 813, *Lipancylus brevirostris*, showing $1A_2$ extending dorsally and merging with A through $a_1$-$a_2$, developed rm, and developed 3A; 814, *Orchidophilus aterrimus*, indicating absence of rm.



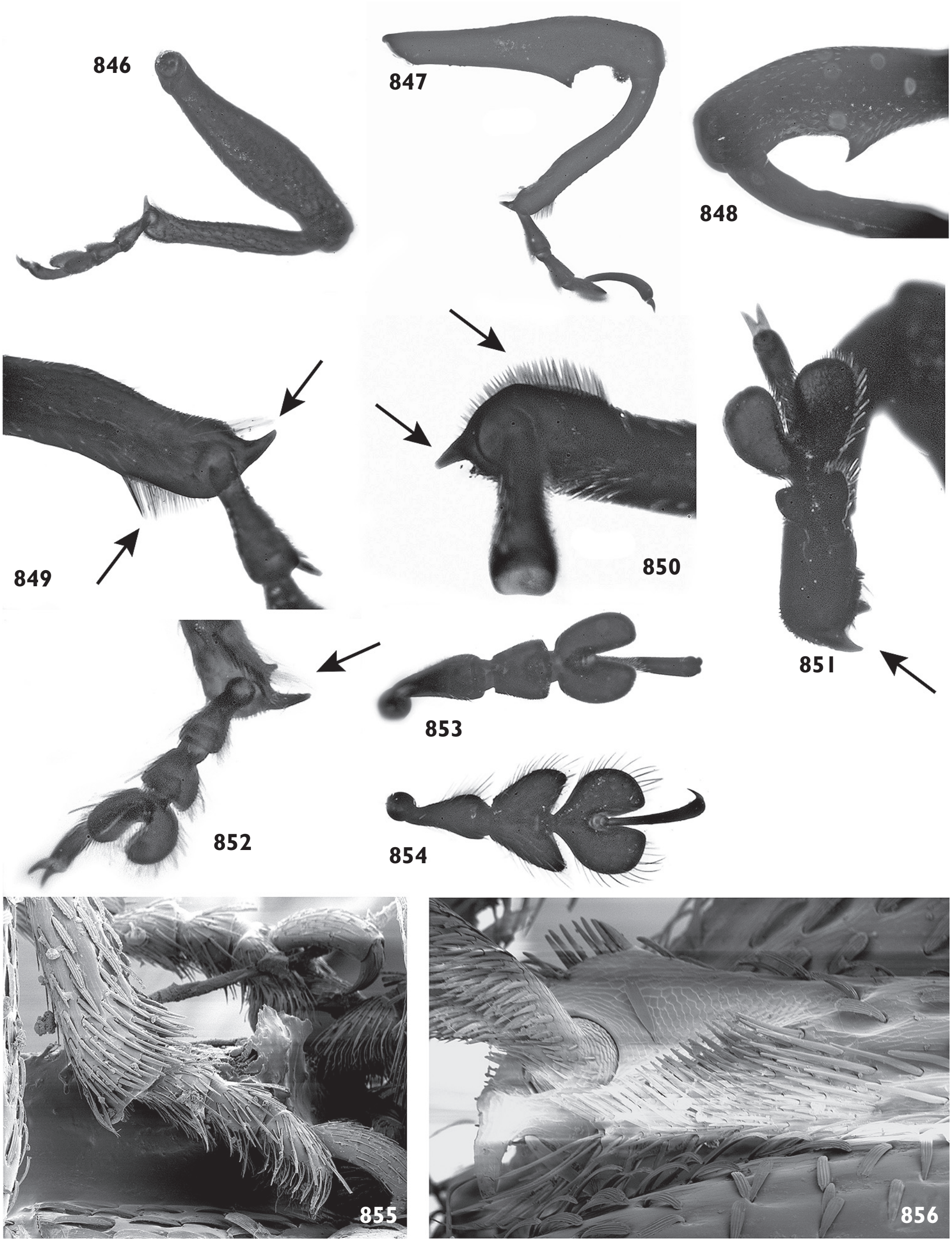

**Figures 815-826**. Hind wings. 815, *Embates chaetopus*, showing $1A_1$ and $1A_2$ defined near wing margin and developed 3A merging with A; 816, *Diorymerus lancifer*, showing R3 forming a thin, sclerotized vein; 817, *Cyrionyx camelus*, showing reduced mst; 818, *Solaria curtula*, indicating absence of rm and showing developed mst; 819, *Palmelampius heinrichi*, showing reduced 3A; 820, *Pycnotheantis* sp., showing developed rm; 821, *Telemus* sp., showing R3 forming a thin, sclerotized vein, developed 3A merging with A, and $1A_1$ and $1A_2$ defined near wing margin; 822, *Megabaris quadriguttata*, showing R3 forming a thin, sclerotized vein; 823, *Zygobaris* sp.; 824, *Trachymeropsis palmipes*, showing reduced 3A; 825, *Cyrtepistomus castaneus*, showing reduced pst, reduced mst, and developed 3A merging with A; 826, *Cryptorhynchus lapathi*, showing developed 3A.



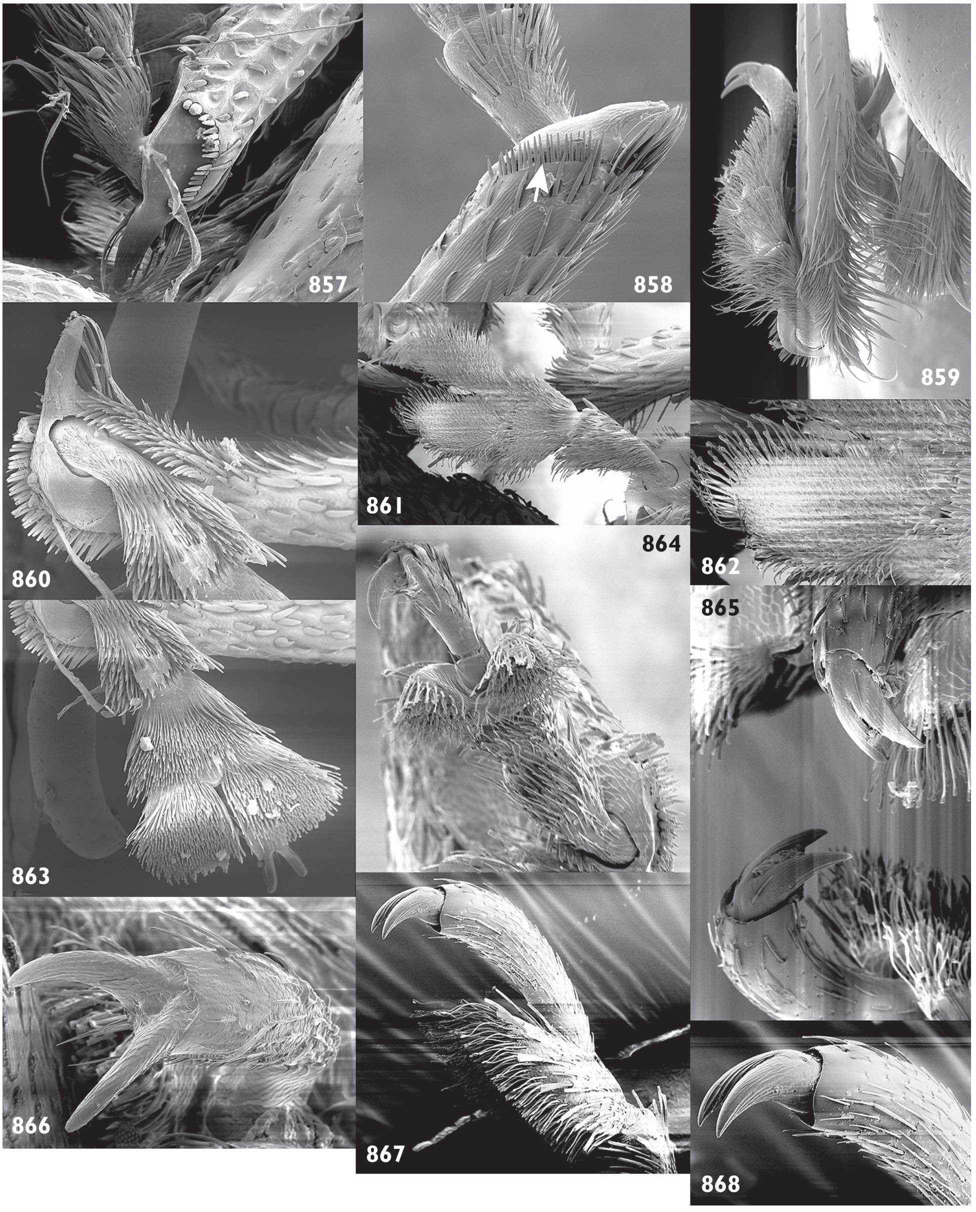

**Figures 827-840**. Hind wings. 827, *Dryophthorus americanus*; 828, *Bagous transversus*; 829, *Cholus rana*; 830, *Cossonus impressifrons*; 831, *Curculio pardalis*; 832, *Hylurgops planirostris*; 833, *Testalthea* sp.; 834, *Pacomes distortus*; 835, *Trichodocerus* sp.; 836, *Coeliodes flavicaudis*; 837, *Mononychus vulpeculus*; 838, *Hypurus bertrandi*; 839, *Trigonocolus curvipes*; 840, *Mecopus trilineatus*.



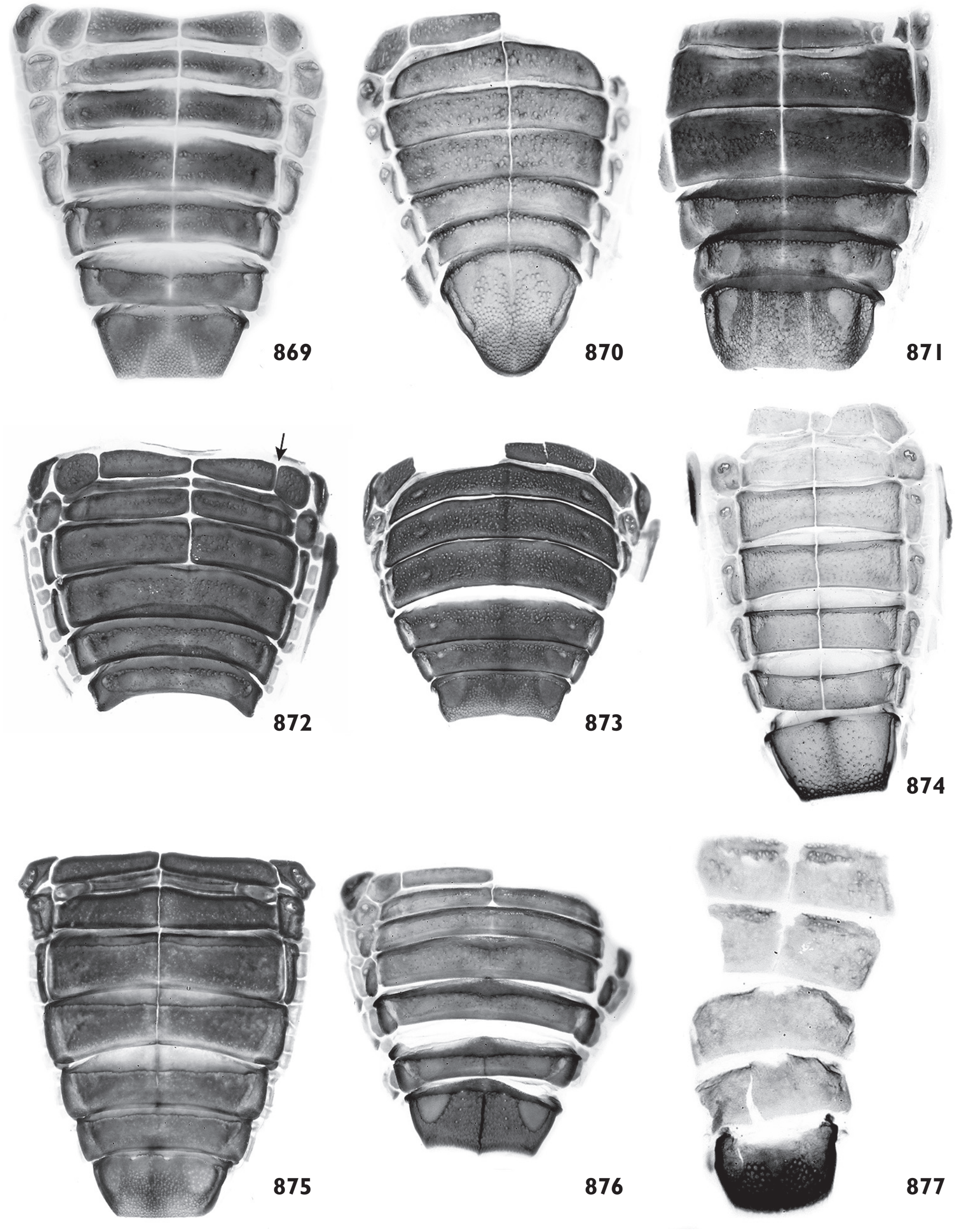

**Figures 841-845**. Hind wings. 841, *Cylindrocopturus adspersus*; 842, *Telephae oculata*; 843, *Balanogastris kolae*; 844, *Metialma signifera*; 845, *Cyllophorus fausciatus*.




**Figures 846-856**. Legs. 846, *Dirabius calvus*, middle leg; 847, *Peridinetus cretaceus*, middle leg; 848-849, *Peridinetus cretaceus*, middle leg. 848, femoral tooth; 849, apex of tibia, showing uncus and outer setose fringe; 850, *Peridinetus irroratus*, mesotibia showing uncus, premucro, and outer setose fringe; 851, *Eurhinus aeneus*, middle leg showing uncus and premucro; 852, *Zena* sp., mesotibia showing uncus and premucro; 853, *Camelodes leachii*, mesotarsus; 854, *Nertinus suturalis*, mesotarsus; 855, *Catapastus squamirostris* (SEM), middle leg; 856, *Baris* sp. (SEM), mesotibia showing uncus and outer and inner setose fringes.

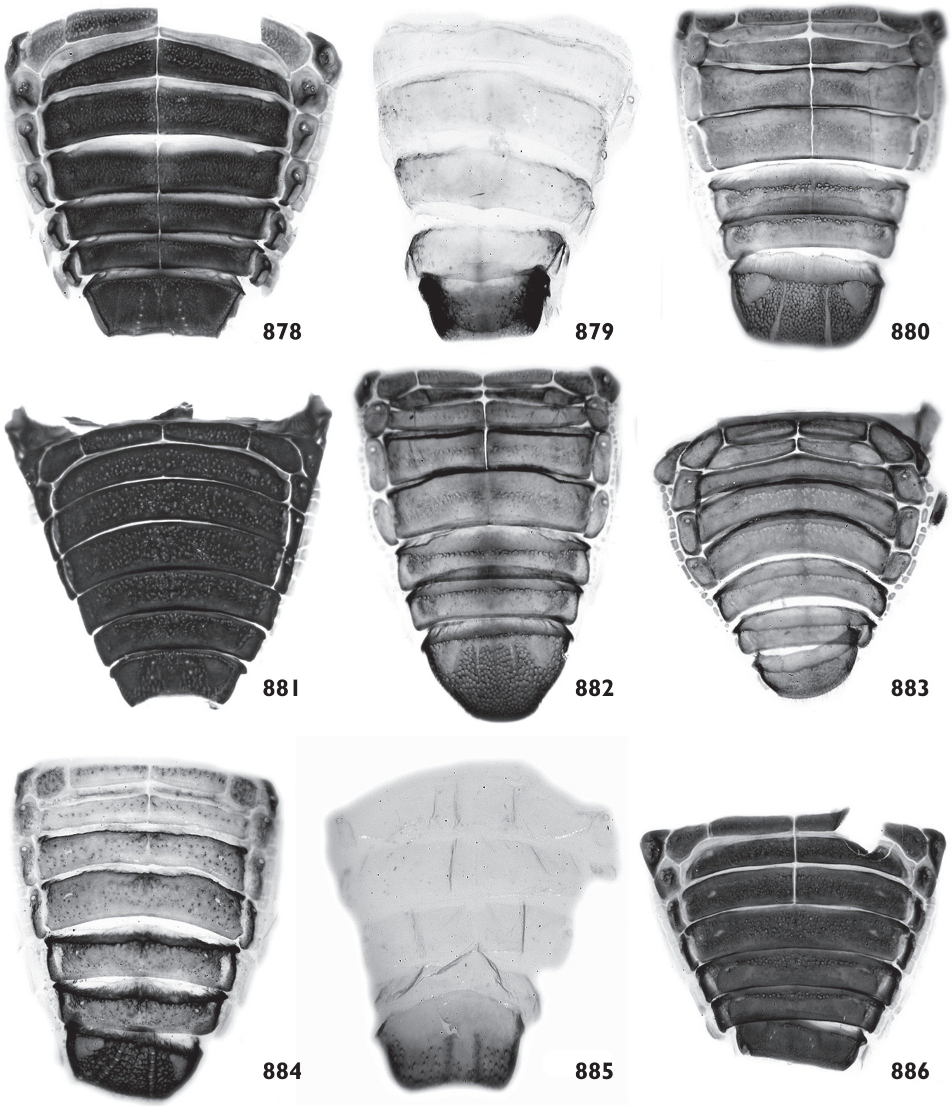



**Figures 857-868**. Legs (SEMs). 857-860, tibial unci. 857, *Pertorcus* sp., mesotibia showing apical uncus and outer setose fringe; 858, *Madarus bistrigellus*, mesotibia showing apical uncus and outer setose fringe; 859, *Cylindrocerus comma*, mesotibia showing elongate scales along the apical region; 860, *Demoda vittata*, mesotibia showing apical uncus and outer and inner setose fringes. 861-868, tarsi and pretarsal ungues of middle legs. 861-862, *Baris* sp., ventral tarsal pads; 863, *Demoda vittata*, ventral tarsal pads; 864, *Centrinopus helvinus*, ventral tarsal pads and separate pretarsal ungues; 865, *Zygobarella zanthoxyli*, connate pretarsal ungues; 866, *Baris* sp., separate pretarsal ungues; 867-868, *Zygobarella zanthoxyli* (lateral views), connate pretarsal ungues.

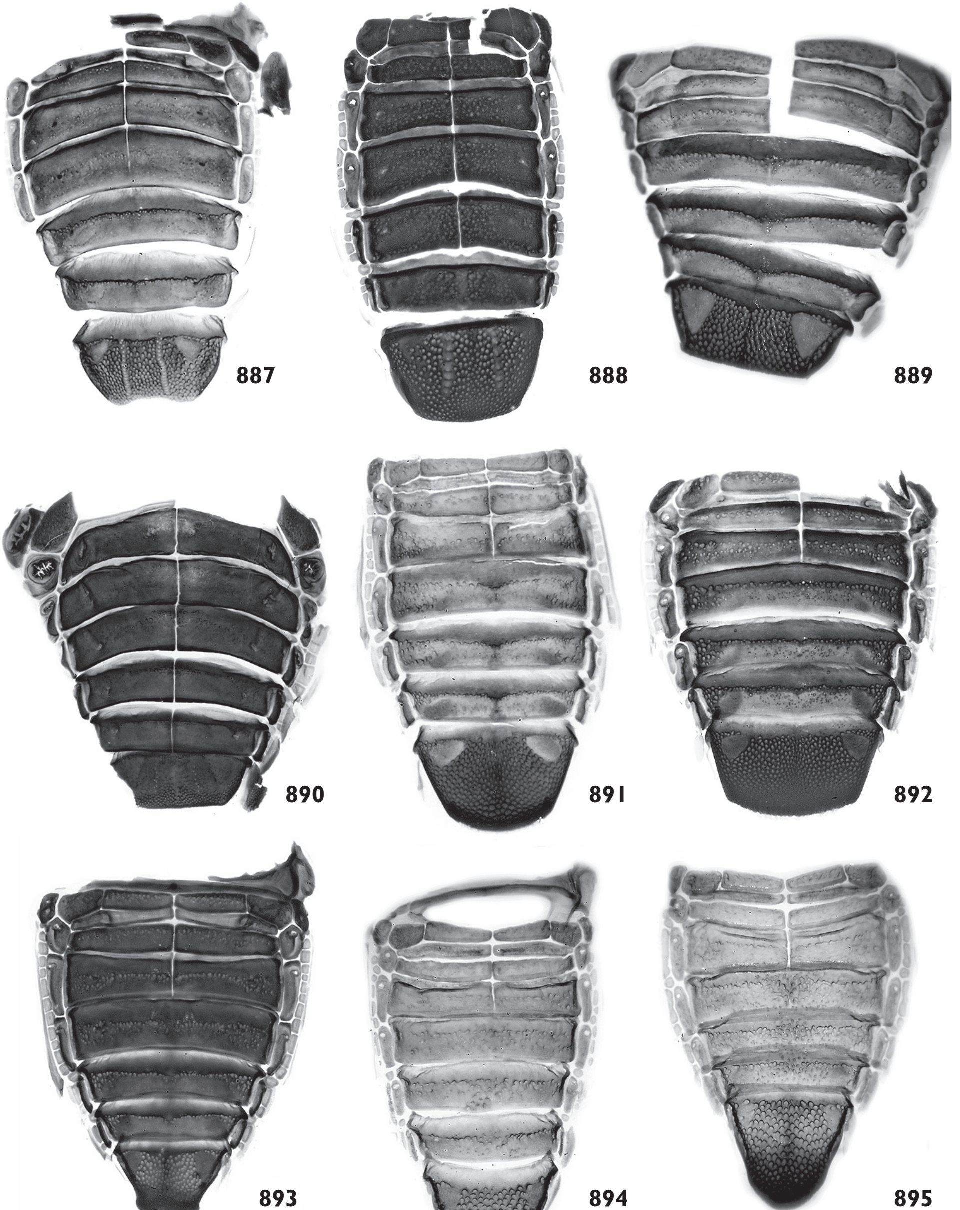



**Figures 869-877**. Tergites. 869, *Centrinus curvirostris*; 870, *Tenemotes abdominalis*; 871, *Demoda vittata*; 872, *Pycnogeraeus striatirostris*, showing subdivision of median sclerite 1; 873, *Orissus christophori*; 874, *Nertinus suturalis*; 875, *Peridinetus irroratus*; 876, *Leptoschoinus fucatus*; 877, *Barilepton filiforme*.

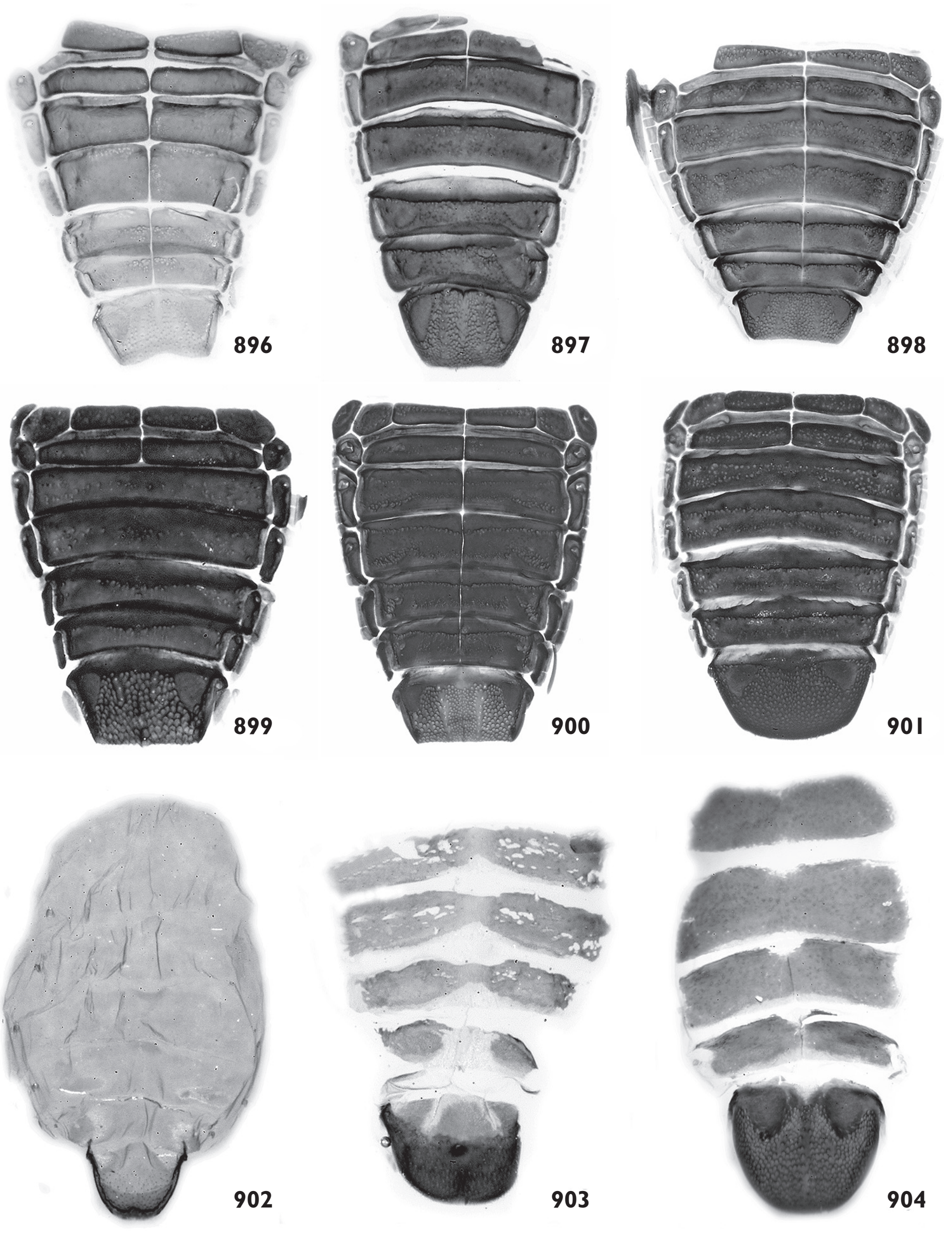
**875**



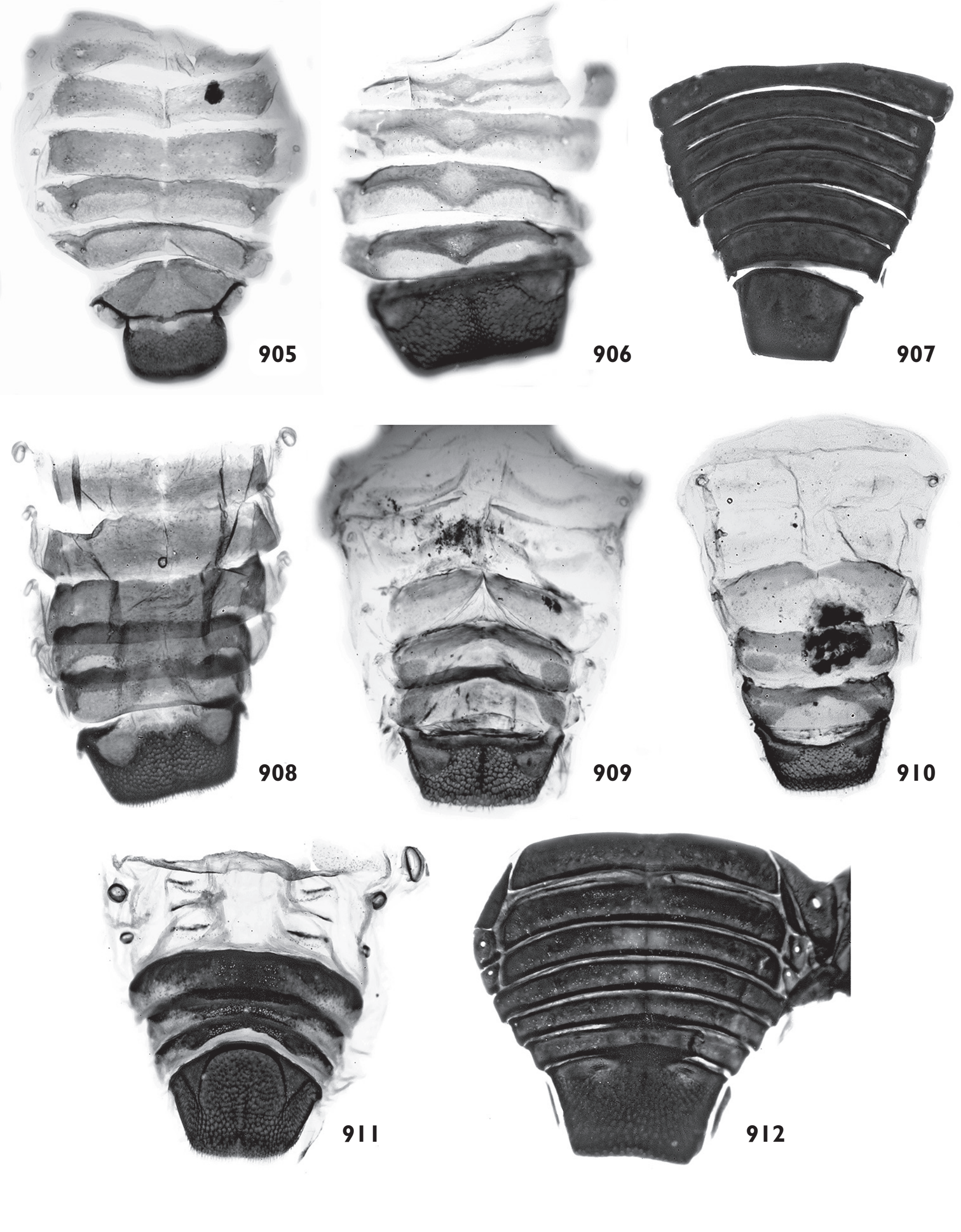

**Figures 878-886**. Tergites. 878, *Garnia* sp.; 879, *Eisonyx crassipes*; 880, *Dirabius calvus*; 881, *Xystus arnoldi*; 882, *Parasomenes curvirostris*; 883, *Plocamus echidna*; 884, *Odontocorynus creperus*; 885, *Calandrinus grandicollis*; 886, *Camelodes leachii*.



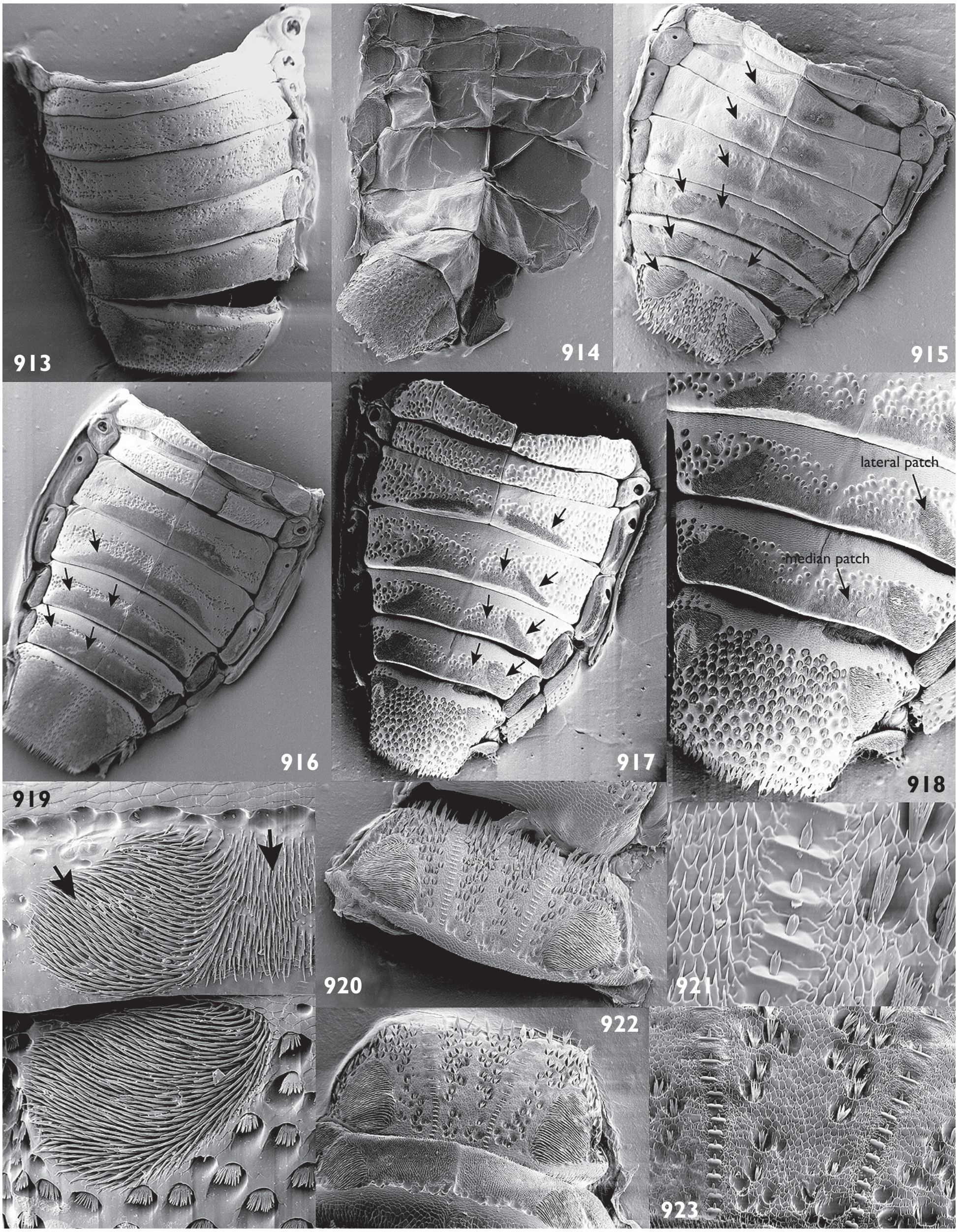

**Figures 887-895**. Tergites. 887, *Pseudotorcus rufipes*; 888, *Lipancylus brevirostris*; 889, *Eurhinus aeneus*; 890, *Diorymerus lancifer*; 891, *Limnobaris* sp.; 892, *Anthinobaris* sp.; 893, *Anthinobaris* sp.; 894, *Orthoris crotchii*; 895, *Orthoris crotchii*.



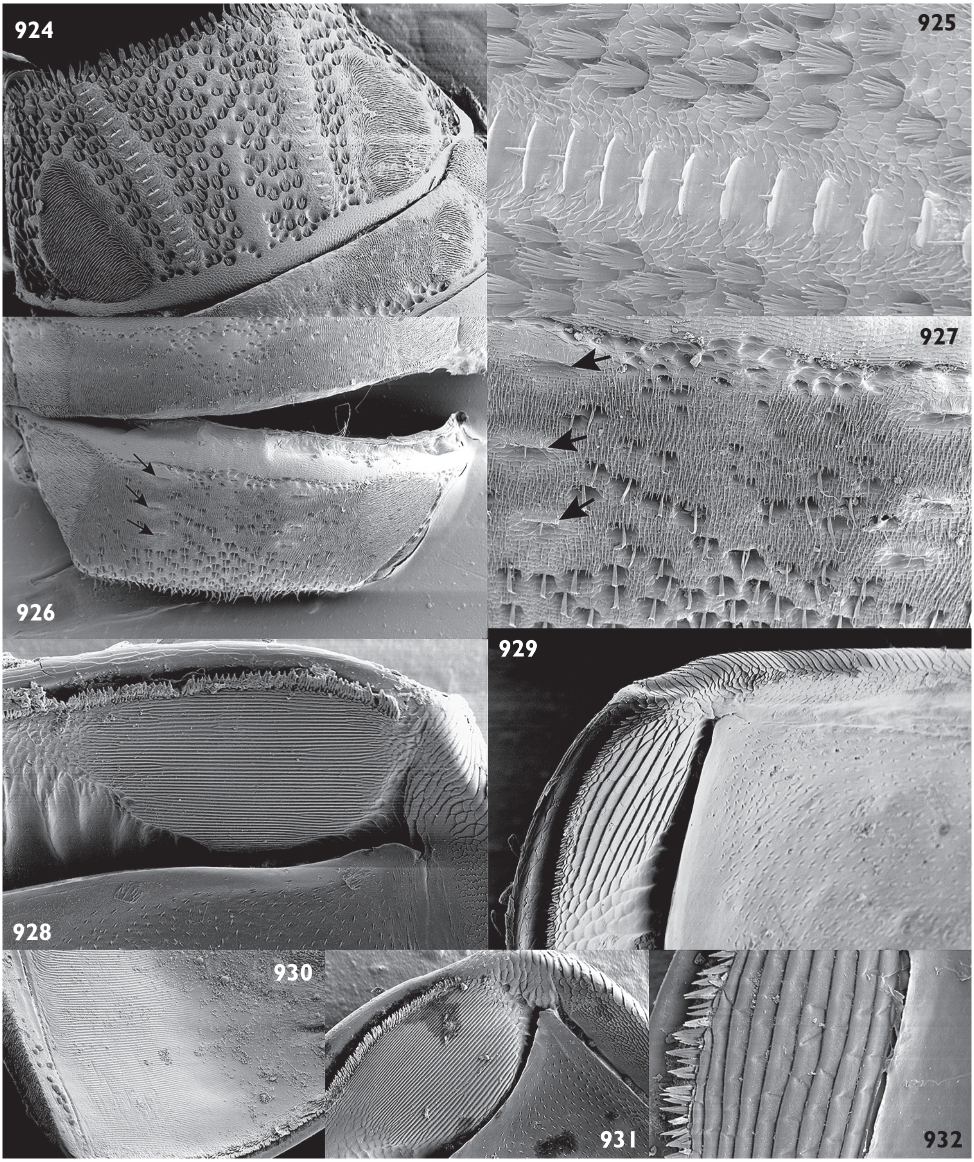
**Figures 896-904**. Tergites. 896, *Lamprobaris cucullata*; 897, *Pseudogeraeus macropterus*; 898, *Anavallius ruficornis*; 899, *Solenosternus dividuus*; 900, *Conoproctus quadripustulatus*; 901, *Athesapeuta vinculata*; 902, *Cyrtepistomus castaneus*; 903, *Bagous transversus*; 904, *Cossonus impressifrons*.



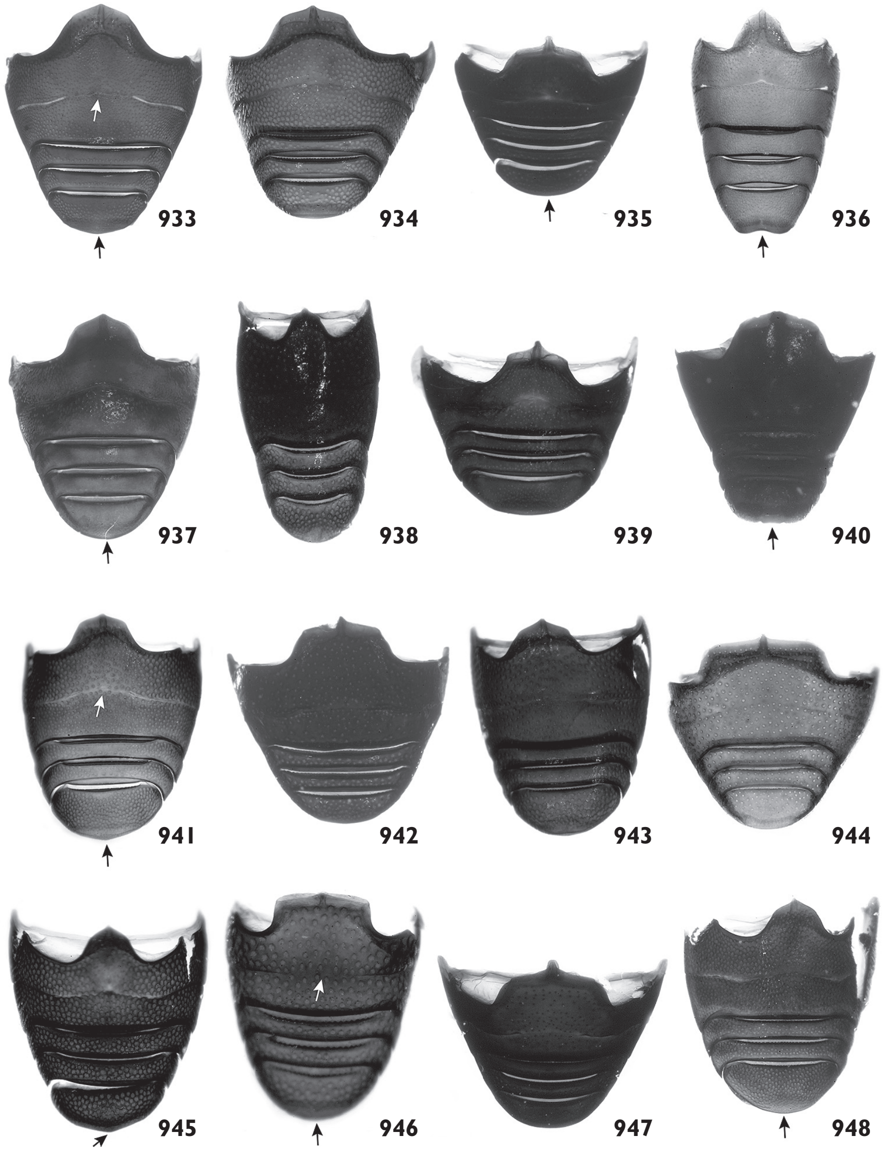
**Figures 905-912**. Tergites. 905, *Hylurgops planirostris*; 906, *Mononychus vulpeculus*; 907, *Trigonocolus curvipes*; 908, *Mecopus trilineatus*; 909, *Telephae oculata*; 910, *Balanogastris kolae*; 911, *Cyllophorus fasciatus*; 912, *Parorobitis gibbus*.



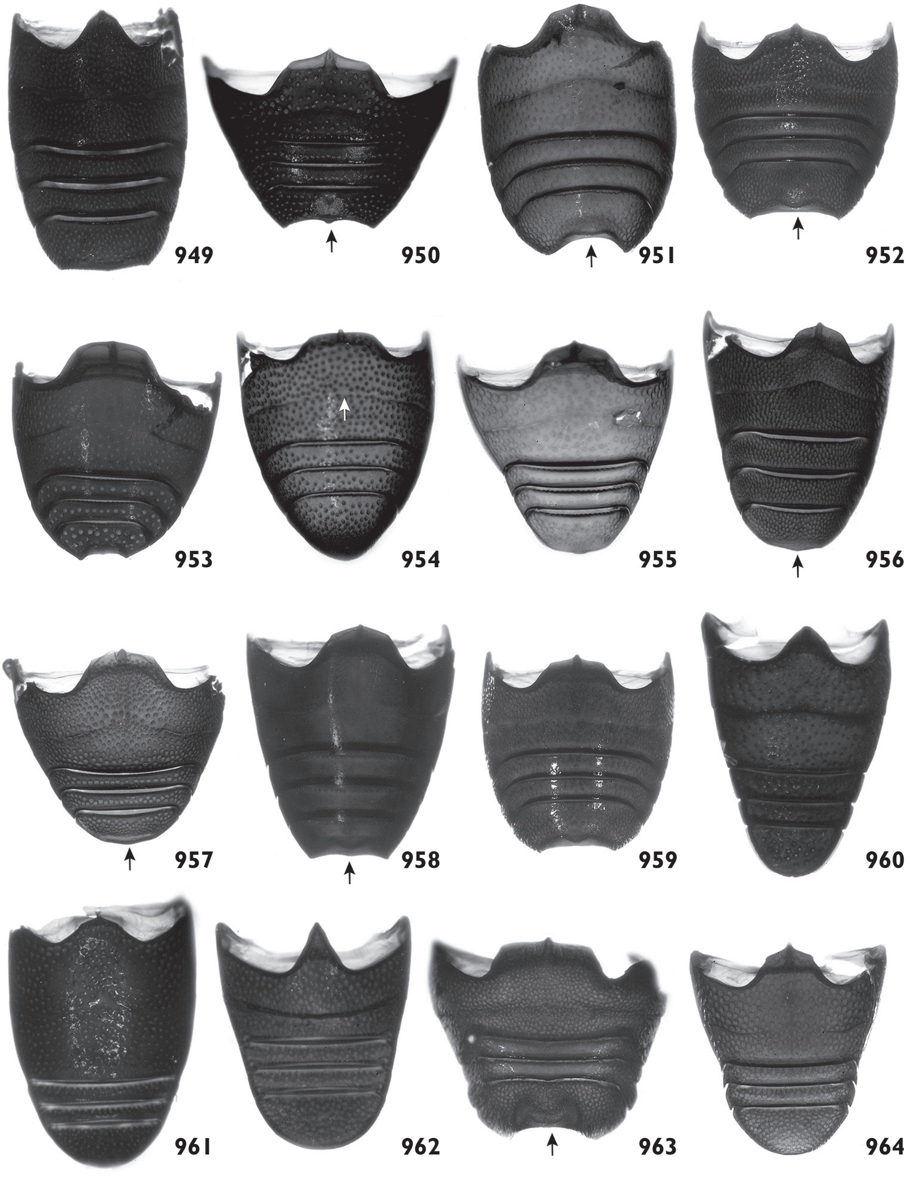

**Figures 913-923**. Tergites (SEMs). 913, *Diastethus eurhinoides*; 914, *Cylindridia prolixa*, weakly-sclerotized tergites; 915, *Zygobarella tristicula*; 916, *Pertorcus* sp.; 917-918, *Acythopeus* sp., arrows pointing to the lateral and median spicule patches on the median sclerites; 919, *Athesapeuta* sp., enlargement of lateral and median spiculate patches on the left side of the 6$^{th}$ and 7$^{th}$ median sclerites; 920-921, *Amercedes subulirostris*, male 7$^{th}$ tergite and associated plectra; 922-923, *Deipyrus hirsutulus*, male 7$^{th}$ tergite and associated plectra.




**Figures 924-932**. 924-927, tergites (SEMs). 924, *Pycnogeraeus modestus*, male 7th tergite; 925, *Pycnogeraeus ochraceus*, plectra on male 7th tergite; 926-927, *Diastethus eurhinoides*, male 7th tergite and associated plectra (distantly-spaced plectra). 928-932, stridulation files on ventral apex of elytra. 928, *Zygobaris nitens*, file composed of densely-spaced ridges; 929, *Idiostethus subcalvus*, file composed of sparsely-spaced ridges; 930, *Diastethus eurhinoides*, file composed of densely-spaced ridges; 931, *Pachybaris porosa*, file composed of densely-spaced ridges; 932, *Pseudorthoris devexus*, file composed of sparsely-spaced ridges.




**Figures 933-948**. Ventrites. 933, *Centrinus curvirostris*, showing posterior margin of ventrite 5 slightly truncate with a small central projection, and sinusoidal posterior margin of ventrite 1; 934, *Pycnogeraeus striatirostris*; 935, *Orissus christophori*, showing round posterior margin of ventrite 5; 936, *Nertinus suturalis*, showing truncate and concave posterior margin of ventrite 5; 937, *Peridinetus irroratus*, showing round posterior margin of ventrite 5; 938, *Barilepton filiforme*; 939, *Garnia* sp.; 940, *Eisonyx crassipes*, showing posterior margin of ventrite 5 truncated with a small central projection; 941, *Dirabius calvus*, showing posterior margin of ventrite 5 slightly truncate with a small central projection, and sinusoidal posterior margin of ventrite 1; 942, *Xystus arnoldi*; 943, *Parasomenes curvirostris*; 944, *Plocamus echidna*; 945, *Odontocorynus creperus*, showing posterior margin of ventrite 5 slightly truncate with a small central projection; 946, *Calandrinus grandicollis*, showing round posterior margin of ventrite 5 and broadly curved posterior margin of ventrite 1; 947, *Camelodes leachii*; 948, *Pseudotorcus rufipes*, showing round posterior margin of ventrite 5.




**Figures 949-964**. Ventrites. 949, *Lipancylus brevirostris*; 950, *Eurhinus aeneus*, showing truncate and sinusoidal posterior margin of ventrite 5; 951, *Limnobaris* sp., showing truncate and concave posterior margin of ventrite 5; 952, *Anthinobaris* sp., showing truncate and concave posterior margin of ventrite 5; 953, *Anthinobaris* sp.; 954, *Orthoris crotchii*, showing broadly curved posterior margin of ventrite 1; 955, *Lamprobaris cucullata*; 956, *Pseudogeraeus macropterus*, showing posterior margin of ventrite 5 slightly truncate with a small central projection; 957, *Anavallius ruficornis*, showing posterior margin of ventrite 5 slightly truncate with a small central projection; 958, *Conoproctus quadripustulatus*, showing truncate and sinusoidal posterior margin of ventrite 5; 959, *Athesapeuta vinculata*; 960, *Cyrtepistomus castaneus*; 961, *Cossonus impressifrons*; 962, *Hylurgops planirostris*; 963, *Mononychus vulpeculus*, showing truncate and concave posterior margin of ventrite 5; 964, *Balanogastris kolae*.


965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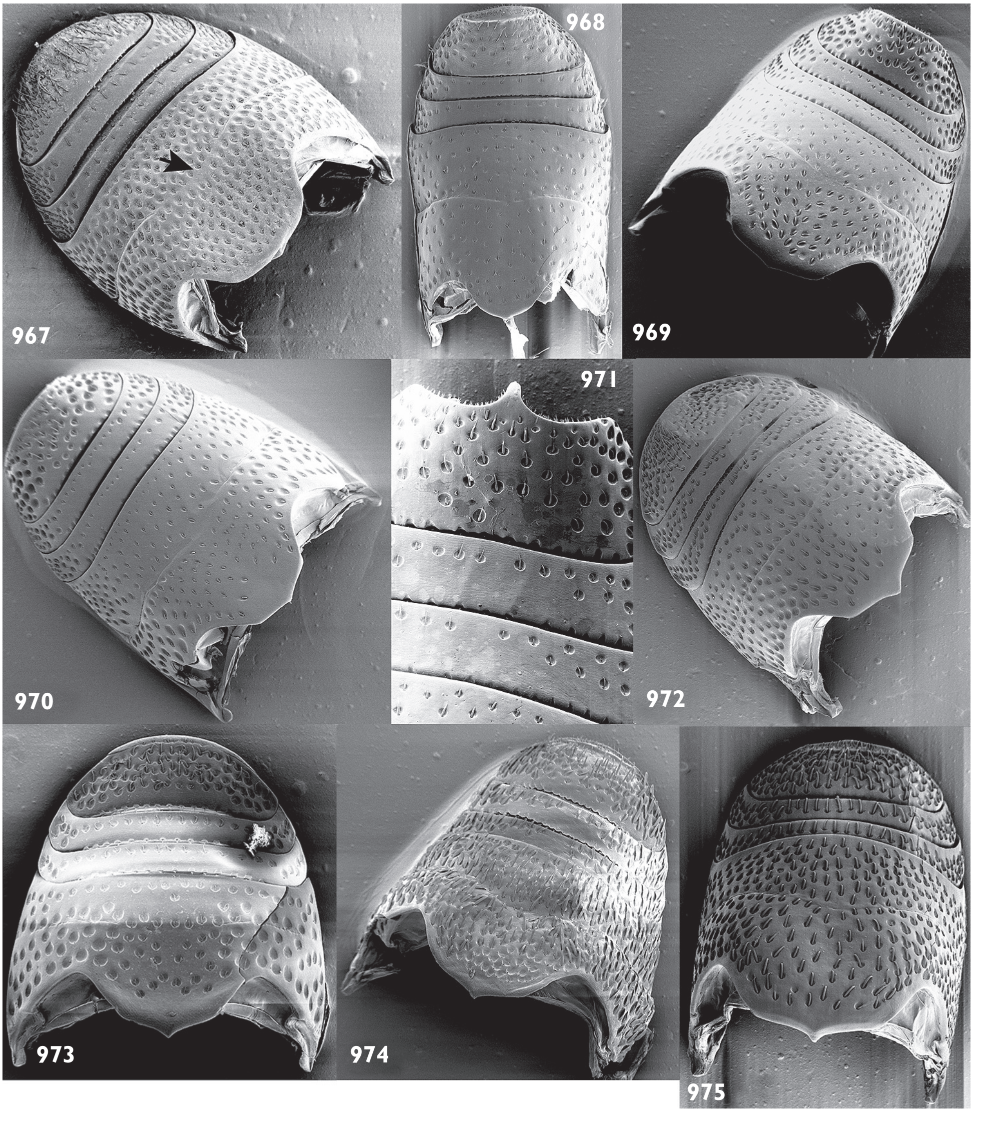
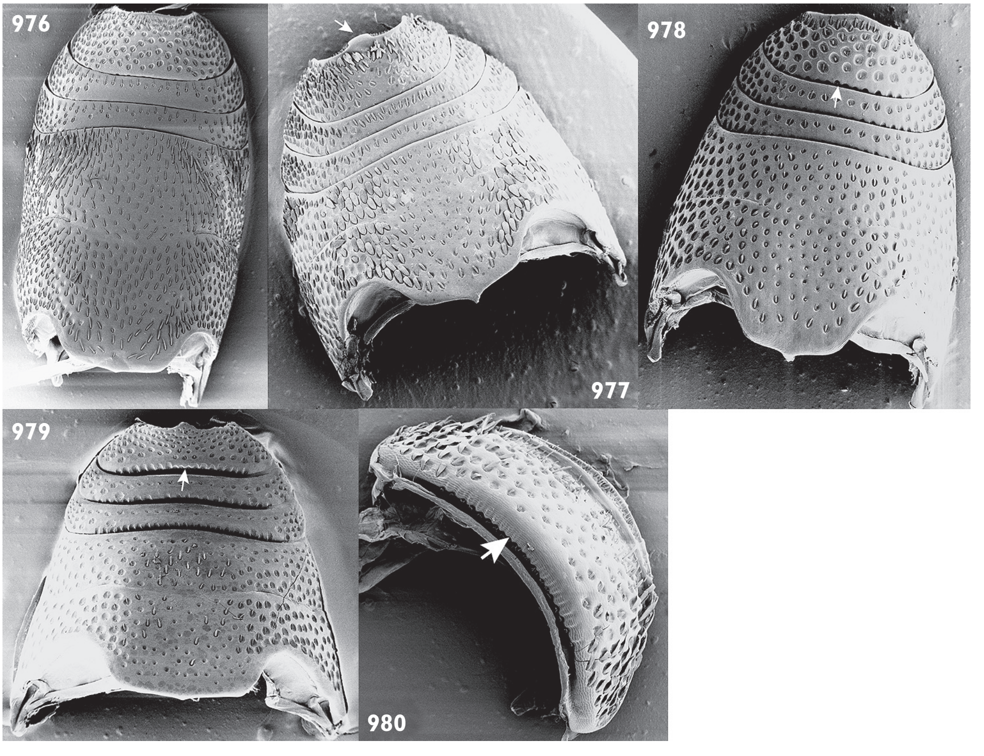
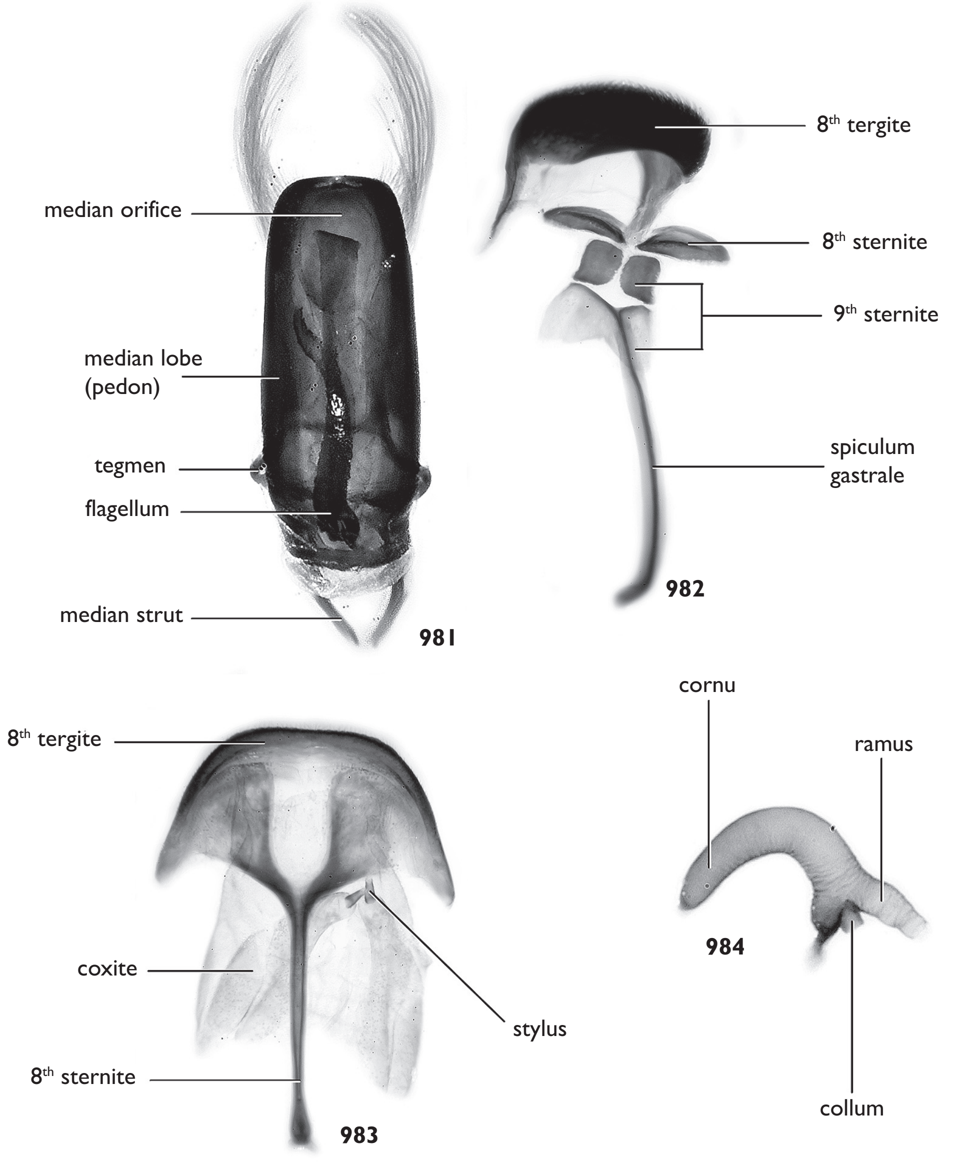
**Figures 965-966**. Ventrites. 965, *Cyllophorus fasciatus*; 966, *Parorobitis gibbus*.



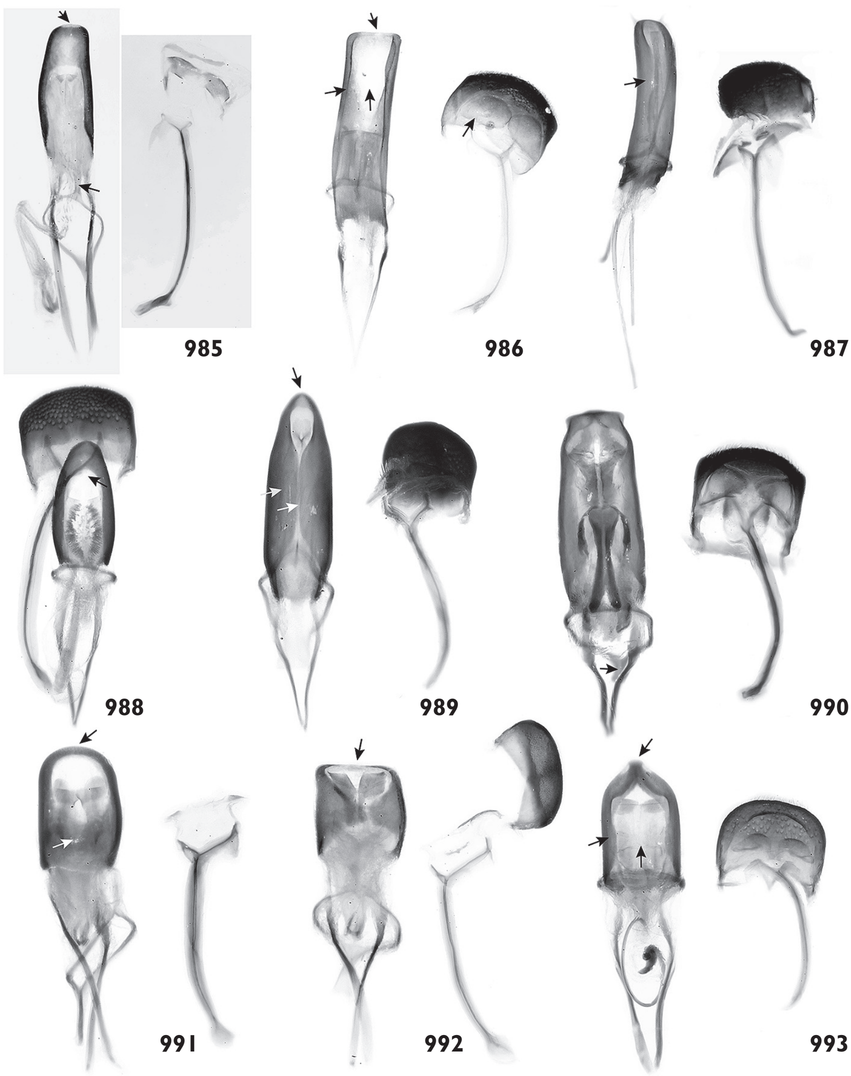

**Figures 967-975**. Ventrites (SEMs). 967, *Idiostethus tubulatus*, showing sinusoidal posterior margin of ventrite 1; 968, *Cylindridia prolixa*; 969, *Pertorcus* sp.; 970, *Pertorcus* sp.; 971, *Acythopeus* sp., showing central projection on posterior margin of ventrite 5; 972, *Stethobaris commixta*; 973, *Stethobaris laevimargo*; 974, *Pycnogeraeus striatirostris*; 975, *Pachybaris porosa*.



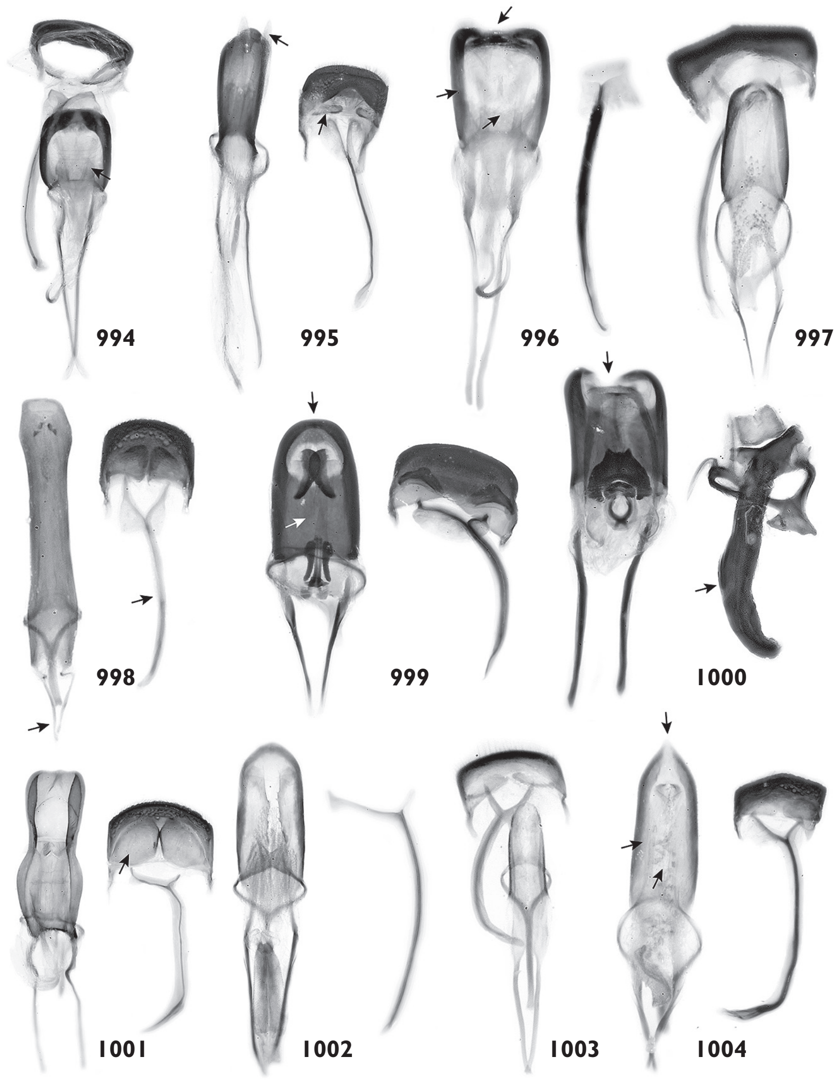

**Figures 976-980**. Ventrites (SEMs). 976, *Acythophanes* sp.; 977, *Spilobaris* sp., showing posterior margin of ventrite 5 truncated with a small central projection; 978, *Spilobaris* sp., showing punctures along anterior margin of ventrite 5; 979, *Acythopeus* sp., showing punctures along anterior margin of ventrite 5; 980, *Pycnogeraeus modestus*, ventrite 5 and punctures along anterior margin.



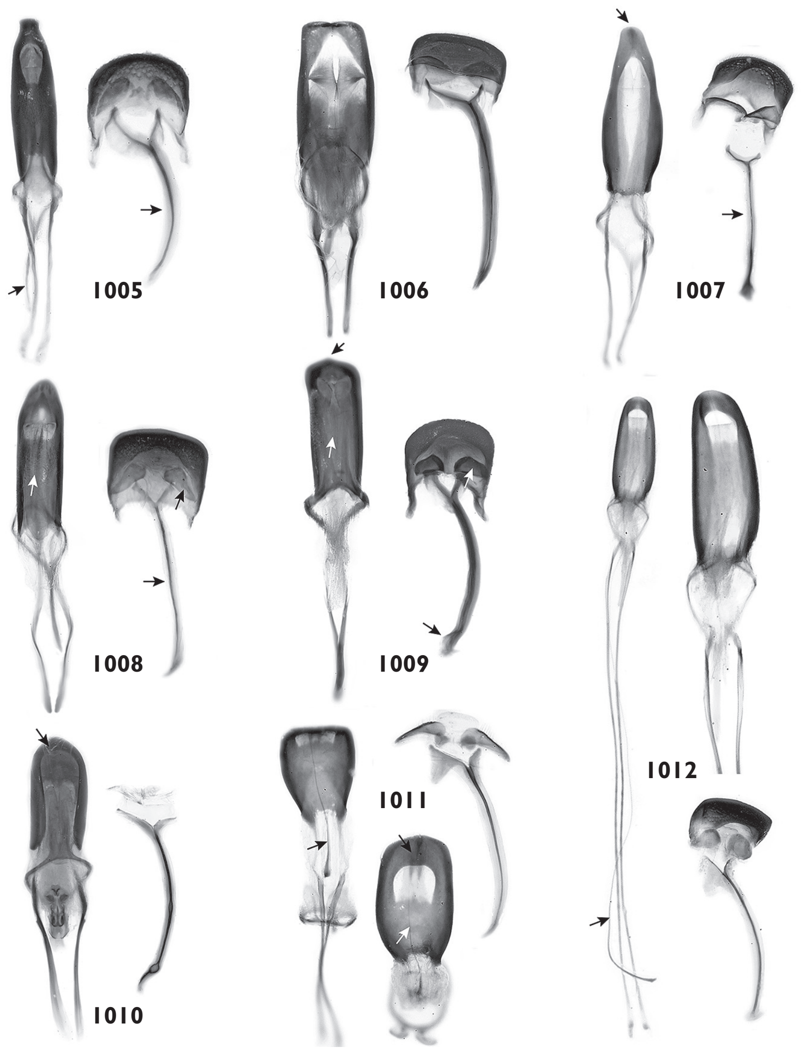

**Figures 981-984**. Terminalia. 981-982, *Anthinobaris* sp., male genitalia. 981, aedeagus; 982, spiculum gastrale and associated 8th tergite and 8th and 9th sternites; 983-984, *Peridinetus cretaceus*, female genitalia. 983, 8th sternite, 8th tergite, and hemisternites; 984, spermatheca.



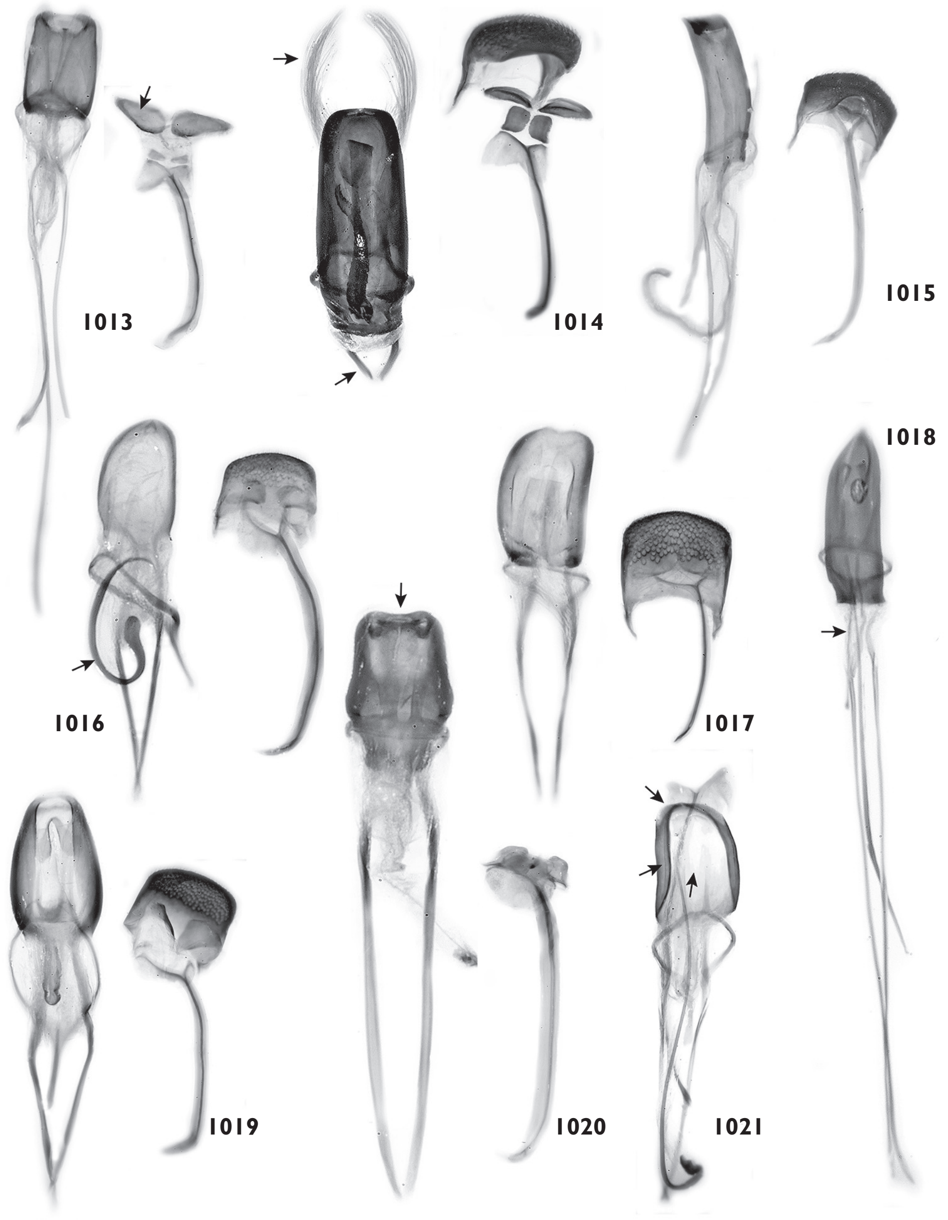

**Figures 985-993**. Male genitalia: aedeagus, spiculum gastrale, and associated $8^{th}$ tergite and $8^{th}$ and $9^{th}$ sternites (dorsal view). 985, *Centrinus curvirostris*, showing broadly curved apex of aedeagus and elongate parameroid lobes of tegmen; 986, *Demoda vittata*, showing concave apex of aedeagus, median lobe with lightly sclerotized central area broad and heavily sclerotized lateral margin narrow, and sclerites of $8^{th}$ sternite large and rounded; 987, *Acythophanes* sp., showing median lobe with lightly sclerotized central area narrower and heavily sclerotized lateral margin wider; 988, *Pycnogeraeus modestus*, showing median lobe with lateral margins broadly curved; 989, *Stethobaroides nudiventris*, showing acutely lobed apex of aedeagus, and median lobe with lightly sclerotized central area narrow and heavily sclerotized lateral margin wide and nearly touching medially; 990, *Pycnogeraeus ochraceus*, showing short ventral tegminal apodeme; 991, *Orissus christophori*, showing broadly curved apex of aedeagus, and median lobe with lightly sclerotized central area and heavily sclerotized lateral margin merged medially; 992, *Orissus meigenii*, showing slightly concave apex of aedeagus; 993, *Pantoteles tenuirostris*, showing lobed apex of aedeagus with a central projection, and median lobe with lightly sclerotized central area broad and heavily sclerotized lateral margin narrow.



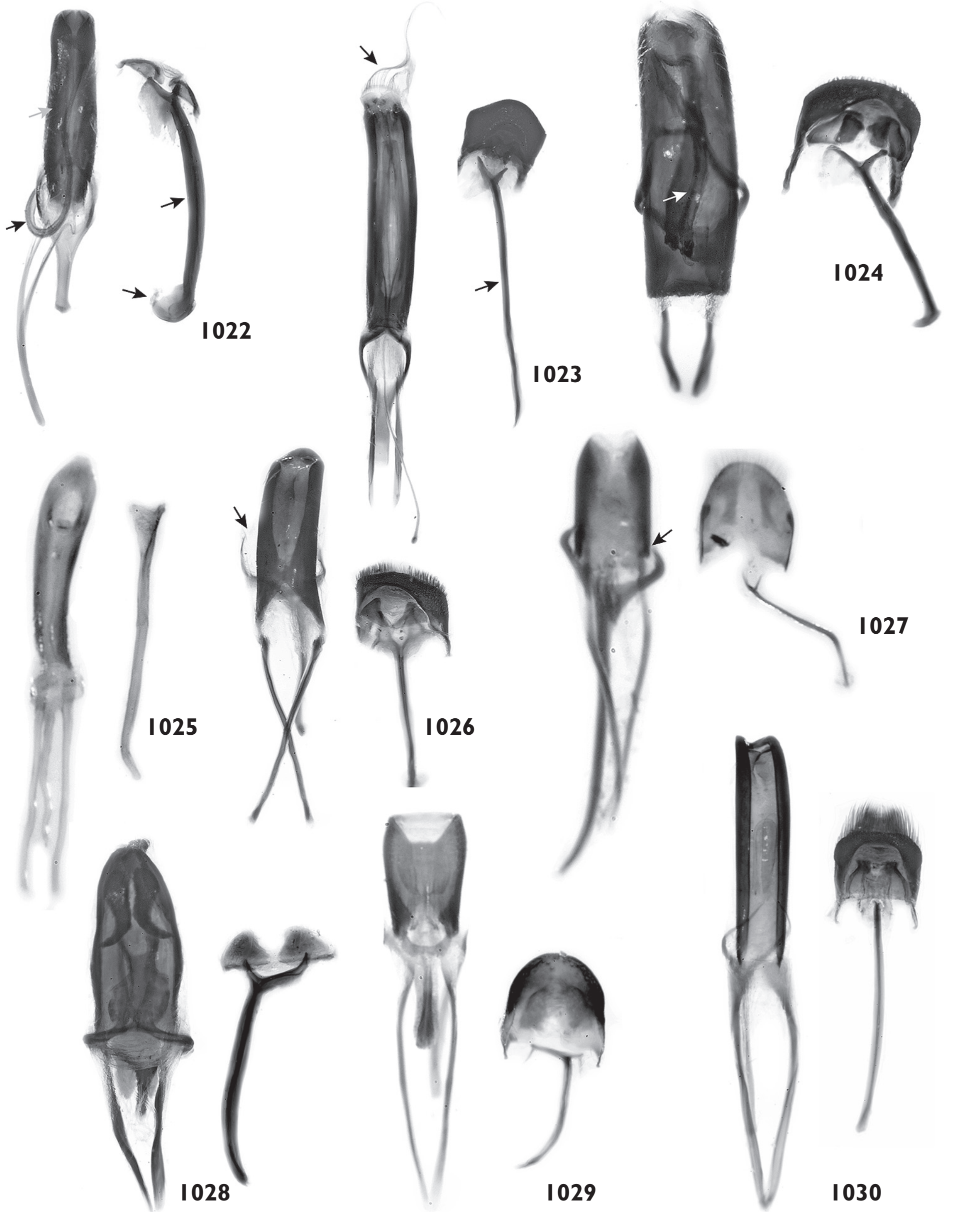

**Figures 994-1004**. Male genitalia: aedeagus, spiculum gastrale, and associated 8th tergite and 8th and 9th sternites (dorsal view). 994, *Peridinetus cretaceus*, showing elongate parameroid lobes of tegmen; 995, *Nertinus suturalis*, showing elongate parameroid lobes of tegmen, and wide sclerites of 8th sternite with short length; 996, *Peridinetus irroratus*, showing concave apex of aedeagus, median lobe with lightly sclerotized central area broad and heavily sclerotized lateral margin narrow; 997, *Leptoschoinus fucatus*; 998, *Barilepton filiforme*, showing aedeagus with short median struts, and spiculum gastrale broadly curved and relatively narrow; 999, *Garnia* sp., showing broadly curved apex of aedeagus, and median lobe with lightly sclerotized central area and heavily sclerotized lateral margin merged medially; 1000, *Eisonyx crassipes*, showing concave apex of aedeagus and wide spiculum gastrale; 1001, *Dirabius calvus*, showing sclerites of 8th sternite large and rounded; 1002, *Xystus arnoldi*; 1003, *Plocamus echidna*; 1004, *Odontocorynus creperus*, showing acutely lobed apex of aedeagus, and median lobe with lightly sclerotized central area narrower and heavily sclerotized lateral margin wider.



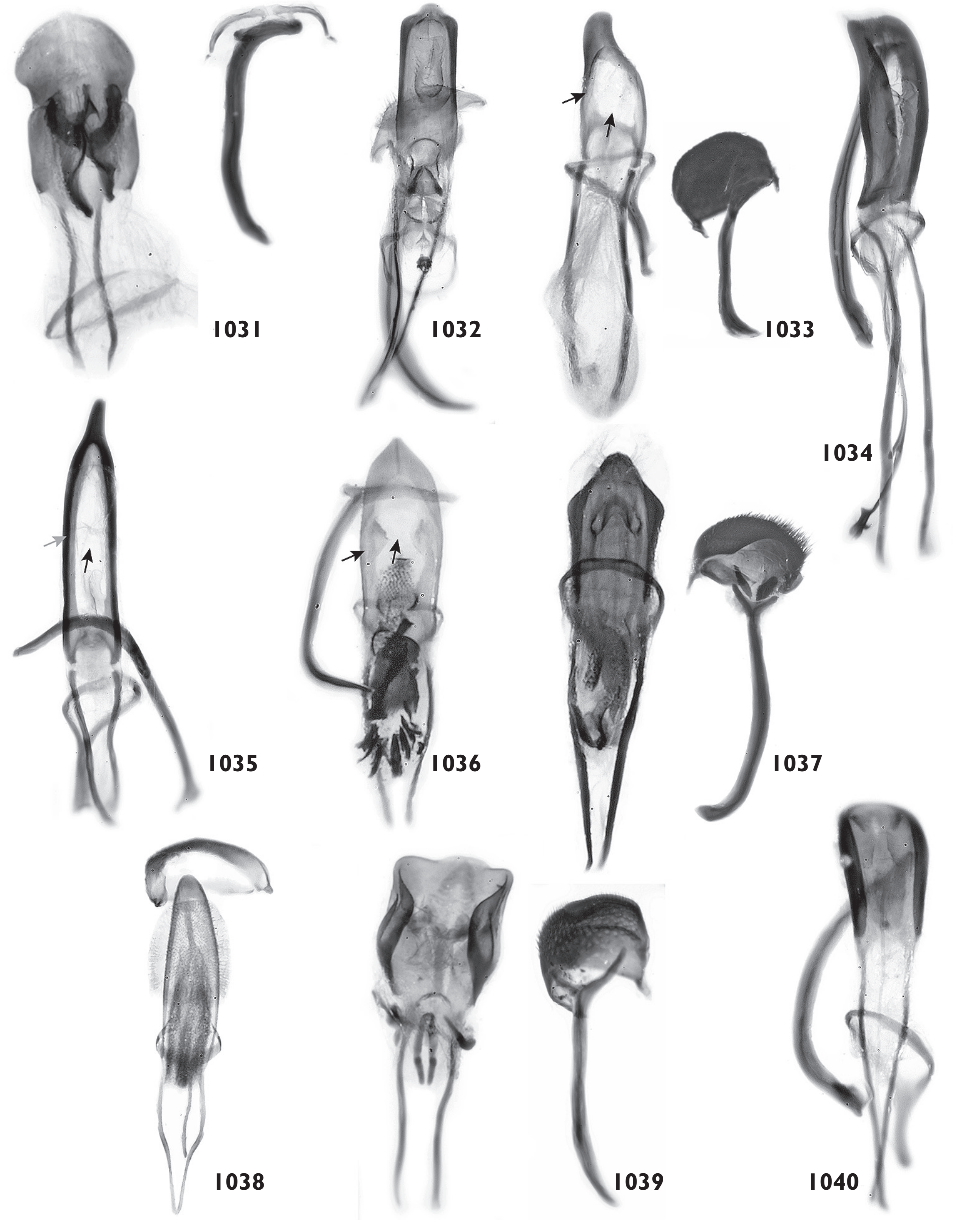

**Figures 1005-1012**. Male genitalia: aedeagus, spiculum gastrale, and associated 8th tergite and 8th and 9th sternites (dorsal view). 1005, *Calandrinus grandicollis*, showing elongate ventral tegminal apodeme and spiculum gastrale broadly curved and relatively narrow; 1006, *Camelodes leachii*; 1007, *Pseudotorcus rufipes*, showing acutely lobed apex of aedeagus and spiculum gastrale relatively linear and narrow; 1008, *Madopterus talpa*, showing median lobe with lightly sclerotized central area and heavily sclerotized lateral margin merged medially, wide sclerites of 8th sternite with short length, and spiculum gastrale relatively linear and narrow; 1009, *Lipancylus brevirostris*, showing lobed apex of aedeagus with a central projection, median lobe with lightly sclerotized central area and heavily sclerotized lateral margin merged medially, wide sclerites of 8th sternite with short length, and spiculum gastrale broadly curved, relatively narrow and with apex flattened and expanded; 1010, *Diorymerus lancifer*, showing aedeagus with narrow apical margin and median orifice adjacent to apex; 1011, *Eurhinus aeneus*, showing aedeagus with wide apical margin and median orifice more distant from apex, median lobe with lightly sclerotized central area and heavily sclerotized lateral margin merged medially, and thin flagellum; 1012, *Acythopeus* sp., showing aedeagus with thin, elongate flagellum and elongate median struts.



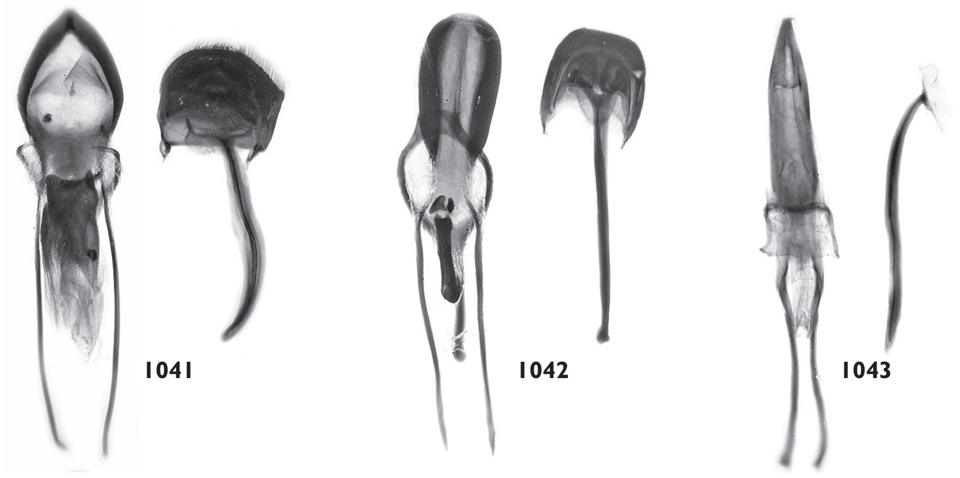

**Figures 1013-1021**. Male genitalia: aedeagus, spiculum gastrale, and associated 8th tergite and 8th and 9th sternites (dorsal view). 1013, *Spilobaris* sp., showing wide sclerites of 8th sternite with short length; 1014, *Anthinobaris* sp., showing aedeagus with short median struts and setal tufts at apex; 1015, *Orthoris crotchii*; 1016, *Lamprobaris cucullata*, showing aedeagus with thin, elongate flagellum; 1017, *Pseudogeraeus macropterus*; 1018, *Solenosternus dividuus*, showing elongate median struts; 1019, *Anavallius ruficornis*; 1020, *Pardisomus biplagiatus*, showing concave apex of aedeagus; 1021, *Pteracanthus smidtii*, showing broadly curved apex of aedeagus, aedeagus with narrow apical margin and median orifice adjacent to apex, and median lobe with lightly sclerotized central area broad and heavily sclerotized lateral margin narrow.



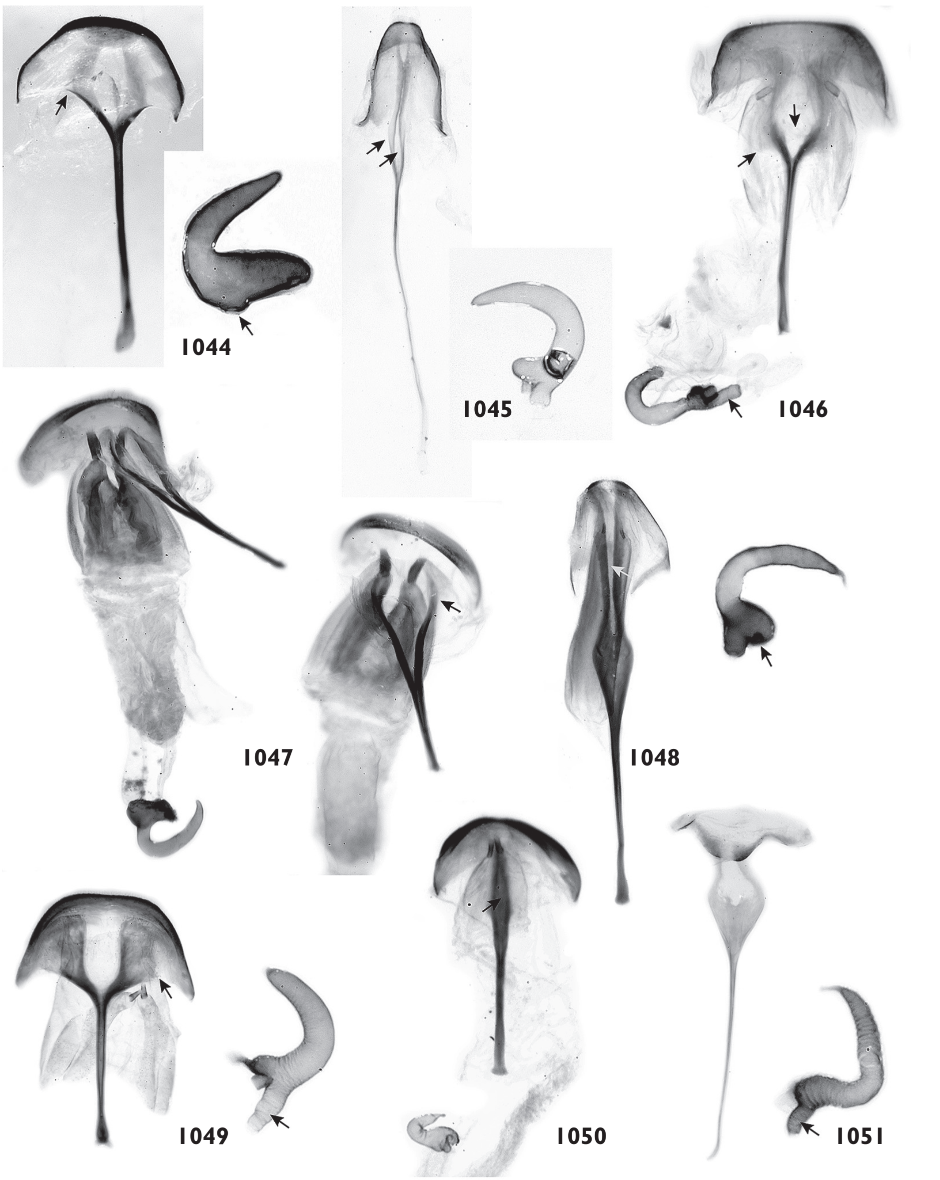

**Figures 1022-1030**. Male genitalia: aedeagus, spiculum gastrale, and associated 8$^{th}$ tergite and 8$^{th}$ and 9$^{th}$ sternites (dorsal view). 1022, *Stereobaris interpunctata*, showing aedeagus with elongate flagellum, median lobe with lightly sclerotized central area narrow and heavily sclerotized lateral margin wide and nearly touching medially, and spiculum gastrale broadly curved, relatively wide and with apex flattened and expanded; 1023, *Conoproctus quadripustulatus*, showing aedeagus with setal tufts at apex and spiculum gastrale relatively linear and narrow; 1024, *Athesapeuta vinculata*, showing aedeagus with elongate, wide flagellum; 1025, *Derelomus basalis*; 1026, *Cryptorhynchus lapathi*, showing incomplete tegmen; 1027, *Dryophthorus americanus*, showing incomplete tegmen; 1028, *Cholus rana*; 1029, *Cossonus impressifrons*; 1030, *Curculio pardalis*.



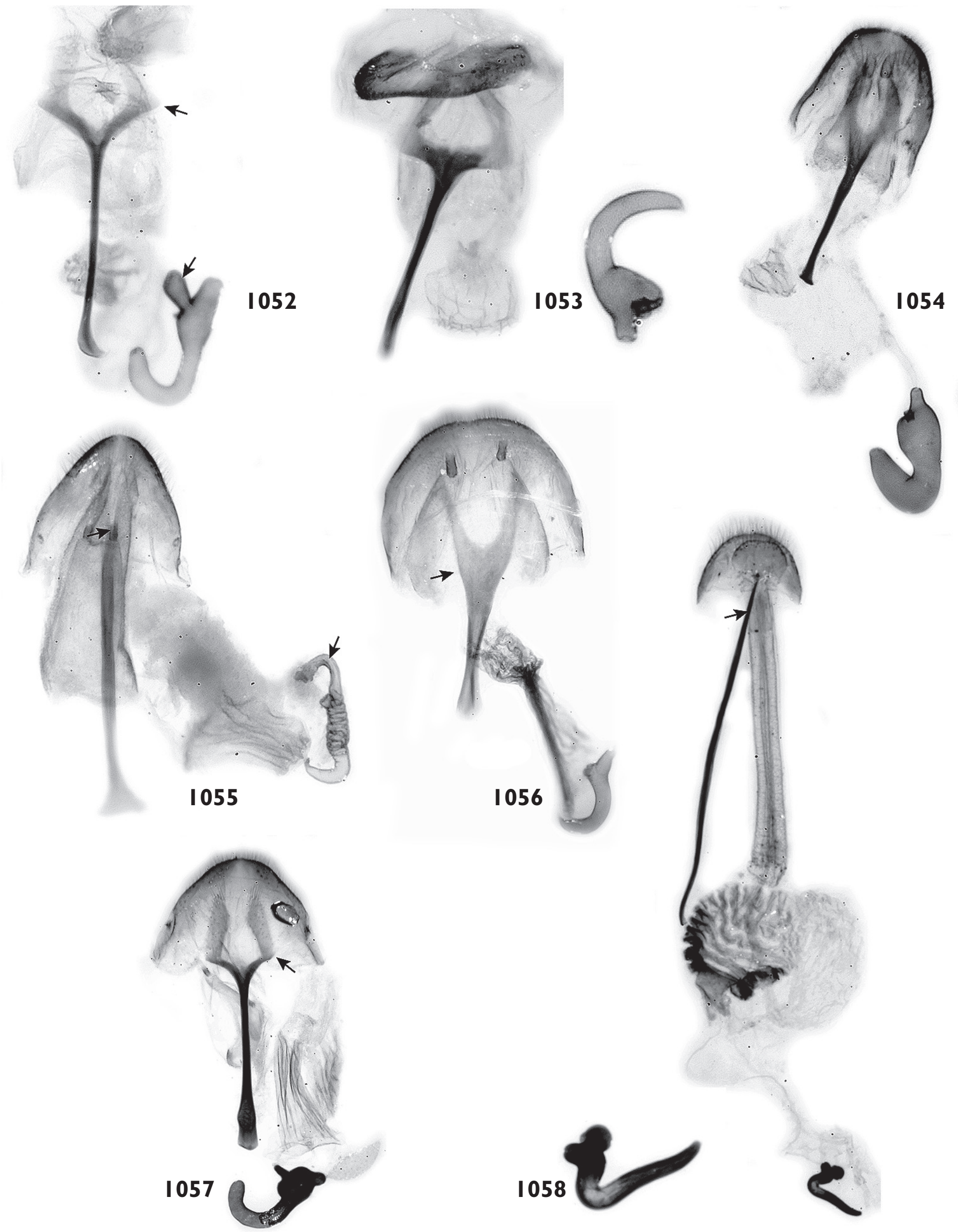

**Figures 1031-1040**. Male genitalia: aedeagus, spiculum gastrale, and associated 8th tergite and 8th and 9th sternites (dorsal view). 1031, *Hylurgops planirostris*; 1032, *Trichodocerus* sp.; 1033, *Coeliodes flavicaudis*, showing median lobe with lightly sclerotized central area broad and heavily sclerotized lateral margin narrow; 1034, *Trigonocolus curvipes*; 1035, *Mononychus vulpeculus*, median lobe with lightly sclerotized central area broad and heavily sclerotized lateral margin narrow; 1036, *Hypurus bertrandi*, median lobe with lightly sclerotized central area broad and heavily sclerotized lateral margin narrow; 1037, *Mecopus trilineatus*; 1038, *Cylindrocopturus adspersus*; 1039, *Telephae oculata*; 1040, *Balanogastris kolae*.




**Figures 1041-1043**. Male genitalia: aedeagus, spiculum gastrale, and associated 8th tergite and 8th and 9th sternites (dorsal view). 1041, *Metialma signifera*; 1042, *Cyllophorus fausciatus*; 1043, *Parorobitis gibbus*.




**Figures 1044-1051**. Female genitalia: 8th sternite, spermatheca, 8th tergite, and hemisternites. 1044, *Diastethus eurhinoides*, showing 8th sternite with angular latero-basal margins and spermatheca with small ramus; 1045, *Tenemotes abdominalis*, showing 8th sternite with rounded latero-basal margins and narrowly divided basal area; 1046, *Anthinobaris* sp., showing 8th sternite with angular latero-basal margins and spermatheca with elongate ramus; 1047, *Pycnogeraeus striatirostris*, showing 8th sternite with rounded latero-basal margins; 1048, *Nertinus suturalis*, showing 8th sternite with rounded latero-basal margins and narrowly divided basal area, and spermatheca with small collum; 1049, *Peridinetus cretaceus*, showing 8th sternite with angular latero-basal margins and spermatheca with elongate ramus; 1050, *Parasomenes curvirostris*, showing 8th sternite with rounded latero-basal margins and fused basal area; 1051, *Strongylotes squamans*, showing spermatheca with elongate ramus.




**Figures 1052-1058**. Female genitalia: 8th sternite, spermatheca, 8th tergite, and hemisternites. 1052, *Limnobaris* sp., showing 8th sternite with angular latero-basal margins and spermatheca with elongate collum; 1053, *Zena* sp.; 1054, *Anthinobaris* sp.; 1055, *Orthoris crotchii*, showing 8th sternite with rounded latero-basal margins and fused basal area, and spermatheca with elongate ramus, longer than cornu; 1056, *Telemus* sp., showing 8th sternite with rounded latero-basal margins; 1057, *Athesapeuta vinculata*, showing 8th sternite with angular latero-basal margins; 1058, *Cyrtepistomus castaneus*, showing 8th sternite with fused basal region.