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REVIEW OF THE GENERA OF THE TRIBE LOBERINI (Coleoptera: Languriidae)

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ABSTRACT. The subfamily Loberinae (Bruce 1951) and the tribe Loberini are fully characterized for the first time; the genera of Loberini are redefined; three new subgenera of *Hapalips* are introduced, and a key to the adults of the subgenera of *Hapalips* is given; a new species *Hapalips acaciae* and the larva of *Hapalips prolixus* are described; a key to the genera of the adults of the tribe Loberini is given.

INTRODUCTION

Bruce (1951) was the first author to point out that species of *Telmatophilus* Heer have male genitalia like those of *Cryptophagus* Herbst and unlike those of *Hapalips* Reitter, *Loberus* LeConte, and *Toramus* Grouvelle. He also noted that in the confusedly punctured elytra, *Telmatophilus* agrees with *Cryptophagus* and differs from the last three genera mentioned above, in which the punctures form regular rows. He proposed the name Loberinae for the old Telmatophilinae, excluding *Telmatophilus* but including *Leucohimatium* Rosenhauer, which, despite the simple tarsi, have male genitalia and elytral punctation similar to those in *Loberus.* Sen Gupta and Crowson (1967) considered *Pharaxonotha* Reitter and related genera, including *Leucohimatium* and *Xenoscelis* Wollaston, as comprising the tribe Pharaxonothini of the Loberinae. Recently, Martinez and Berrera (1966) established a new genus *Loberopsyllus,* in the family Cryptophagidae and related to *Loberus,* which is here considered to be in the Pharaxonothini because of the simple tarsi, rather short trochanters, absence of femoral lines on the first ventrite, and narrowly open front coxal

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cavities. The genus *Toramus* and its allies are considered by me (1967) as a subfamily Toraminae of the Languriidae. The characters of the larvae of *Hapalips, Pharaxonotha,* and *Bolerus* Grouvelle, given by Rymer Roberts (1939) and Rymer Roberts and Van Emden (1958), and of the larva of *Eicolyctus* Sahlberg, described by Sen Gupta and Crowson (1967), support the classification here proposed.

The chief characters in which the Loberinae differ from the Cryptophagidae are as follows:

Elytral epipleura well defined up to the apex, and elytral punctation usually in regular rows. Wing always with subcubital fleck and radial cell, never with five anal veins. Tarsal formula never 5-5-4 in male. First ventrite not markedly longer than second. Aedeagus turned on one side in resting condition, with long, threadlike, double median struts. Sternal fitting between the mesocoxae with a single knob (found only among the Atomariinae in the Cryptophagidae). Larvae never with annular spiracles, single jointed labial palpi, bifid apex, or serrated caudal margin of prostheca. Larvae with five to six ocelli on each side of head, and granulated upper body surface.

The subfamily Loberinae may be defined by the following characters:

With general characters of Clavicornia, Languriidae (according to Crowson, 1955).

1) Head often with stridulatory files; fronto-clypeal suture absent; transverse line on occipital region sometimes present; anterior part of gular region with (Fig. 20) or without a transverse groove, sometimes with a large transverse cavity (Fig. 23).

2) Antennal insertions hidden by the sides of frons; antennal club three-jointed, sometimes very weakly developed. Mandible with well-developed mola (Fig. 13); maxillary lacinia with three apical spines, galea narrow and elongated (Fig. 8); labium with apical segment of palpi somewhat transverse, mentum sometimes with single or paired cavities on ventral side; ligula usually poorly developed.

3) Front coxal cavities internally open behind (Figs. 2, 6, 24), externally moderately wide open (Fig. 6) to nearly (Fig. 24) or completely closed behind (*Xenoscelis*).

4) Elytra glabrous or pubescent, usually regularly punctured, scutellary striole often present. Wings (Figs. 18, 19) always with four anal veins, radial cell, r-m cross vein; anal cell sometimes present.

5) Mesocoxae usually closely situated, and sternal fitting between them with a single knoblike projection (Fig. 9). Mesosternal pockets (Fig. 9) rarely present, mesepisternal pockets usually well developed (Fig. 9).

6) Metendosternite with anterior tendons separated by slightly less than width of basal stalk, and lateral plates narrow (Figs. 21, 25).

7) Tarsi lobed or simple; trochanters broadly elongate (Fig. 26) or broad and short.

8) Ventrite 1 with (Fig. 1) or without femoral lines. Ovipositor as in Figure 12, with styli attached at the apex of coxites, except in *Leucohimatium,* where the styli are attached slightly above the apex of coxites. Aedeagus of Erotylidae-Languriidae type (Figs. 10, 11).

9) Larvae as far as known with mandibular prostheca large, translucent, and triangular; ocelli usually five to six on each side of the head, sometimes absent; dorsal surface granulated; two tarsungular setae; larvae not endophytic as in Languriinae.

TRIBE LOBERINI

(Loberinae Bruce, 1951: 4, partim.)

This group includes those members of the Loberinae that have lobed tarsi, front coxal cavities that are usually clearly open behind, and cryptophagid-like facies, but that have regular rows of punctures on the elytra. Previously these genera have been included in the family Cryptophagidae. According to present knowledge, the tribe includes seven genera: *Loberus* LeConte, *Telmatoscius* Sharp, *Hapalips* Reitter, *Truquiella* Champion, *Pseudohenoticus* Sharp, *Pseudhapalips* Champion, and *Bolerus Grouvelle.* Of these, only the two largest, *Loberus* and *Hapalips,* occur in both the New and Old Worlds. The genera *Telmatoscius, Truquiella, Pseudohenoticus,* and *Pseudhapalips* are restricted to the New World, and the genus *Bolerus* to the Old World. The species occur mainly in tropical and subtropical climatic zones, a few species of *Loberus* and *Hapalips* extending into warm temperate climates. None have been recorded from Europe. The only previously known larvae are those of *Bolerus* (=*Platycladoxena*) *angulosus* Arrow and a Mexican *Hapalips,* both described by Rymer Roberts (1939). The larva of *Hapalips prolixus* (Sharp) from New Zealand is described below.

The tribe Loberini may be defined by the following characters: With general characters of Languriidae, Loberinae.

1) Head never with a transverse line on vertex.

2) Transverse groove on anterior part of gular region (Fig. 20) almost always present.

3) A pair of stridulatory files on vertex often present (Fig. 22).

4) Antennal club well developed and three-jointed.

5) Front coxal cavities usually moderately wide open, sometimes very narrowly so (*Hapalips,* Fig. 24), but never completely closed behind.

6) Elytra rarely glabrous, usually with punctures in regular rows, and sometimes with scutellary striole.

7) Wing with (Fig. 18) or without (Fig. 16) anal cell.

8) Mesocoxae closely situated except in *Pseudhenoticus;* mesepisternal pockets well developed (Fig. 9).

9) Tarsi pseudotetramerous and trochanters broadly elongated (Fig. 26).

10) Femoral lines on first ventrite always present, and ovipositor of Loberinae-type (Fig. 12); styli attached at the apex of coxites.

11) Larvae as far as known with granules of tergites arranged in regular transverse and longitudinal rows (Fig. 34), frontale without endocarina (Fig. 27), and mandible without hairy appendages at the base of mola (Fig. 29).

Genus LOBERUS LeConte

Loberus LeConte, 1861: 98. Type species, by subsequent monotypy, *Loberus impressus* LeConte, 1863: 70.
Glisonotha Motschulsky, 1863: 430.

LeConte (1861) established this genus in the family Cryptophagidae but did not name a species of it until 1863. This is the largest genus of the tribe; Schenkling (1923) included 59 species, and Bruce has subsequently added another nine from Africa, Java, and Mexico. Grouvelle (1919) gave a key to the Old World species known at the time, and another for American species that he had seen.

Description. With general characters of Loberinae, Loberini. Facies somewhat cryptophagid-like. Head usually with a pair of stridulatory files; eyes large and moderately coarsely faceted; clypeus with straight apical margin. Antenna with scape longer than pedicel, which is shorter than segment 3; segments 4-8 equal in length, segments 9 and 10 semicircular and transverse, segment 9 slightly narrower than 10, terminal segment slightly longer than broad, its apical margin rather asymmetrically rounded. Prothorax (Fig. 4) transverse, side margins weakly curved, more or less

smooth, front and hind margins almost equal in breadth, front angles obtuse, hind angles more acute; prebasal impressions on pronotum present; prosternal process narrow and its apex almost straight. Elytra usually pubescent, rarely almost glabrous, pubescence often double with recumbent setae and sparsely distributed long erect ones as in *Toramus;* punctation on elytra usually in more or less regular rows, rarely quite irregular; scutellary striole absent; epipleura narrow, rather indistinct toward the apex as in *Toramus.* Wing without anal cell (cf. Fig. 15). Mesocoxae closely situated, mesepisternal pockets well developed; metasternum wider than its length, median impressed line extending half of its length. Tarsi with segment 1 very slightly longer than segment 2, segment 3 lobed below, segment 5 almost equal to first three segments together, excluding the lobes; tibiae narrow, not widened at apex. Ventrite 1 with intercoxal process broad at base, narrowed to a pointed apex. Aedeagus as figured (Fig. 11); ovipositor of Loberinae-type (cf. Fig. 12).

Species examined. The species *L. impressus* LeConte and *L. humeralis* Reitter have been studied in detail for the characterization of the genus.

Habitat. Nothing recorded, and larva undescribed.

Geographical distribution. Very extensive, occurring in both the New and Old Worlds, species recorded from North and South America, Ethiopian and Madagascar regions, Indo-Malayan region, and Australia, but absent from Palaearctic region except for the Far East, and not known from New Zealand. It is unfortunate that no authors have made critical comparisons between the New and Old World species of *Loberus.*

Genus TELMATOSCIUS Sharp

Telmatoscius Sharp, 1900: 581. Type species, by monotypy, *Telmatoscius claviger* Sharp.

Sharp (1900) established this genus for a single described species, placing it in the Cryptophagidae, close to *Loberus.* Grouvelle (Grouvelle and Raffray, 1912) added another species, but none has been described since.

Description. With general characters of Loberinae, Loberini. General appearance as in *Loberus* and not very easily distinguishable from it. Differs from *Loberus* in having comparatively long, dense recumbent setae on elytra; prothorax more narrowed in front, and segment 9 of antenna narrower in comparison to segment 10 than in *Loberus.* Head as figured (Fig. 22), with a pair

of well-separated stridulatory files; eyes large, fairly coarsely faceted; clypeus with straight apical margin. Antennae with scape slightly larger than pedicel, which is as long as segment 3, segment 4 slightly shorter than 3 and 5, segments 6-8 equal in length, segment 10 distinctly larger than segment 9, terminal segment wider than long, its apex slightly depressed. Prothorax (Fig. 7) weakly narrowed in front, side margins curved and smooth, front angles more or less rounded, hind angles acute; prebasal impressions on pronotum present; prosternal process as in *Loberus*. Elytra without scutellary striole. Meso- and metasterna as figured (Fig. 9), metasternum longer than in *Loberus*, median impressed line extending half of its length. Metendosternite as figured (cf. Fig. 25). Legs and abdomen as in *Loberus*. Aedeagus and ovipositor as figured (cf. Figs. 11, 12).

Species examined. A male and female of *T. claviger* have been studied in detail for generic characters.

Habitat. Nothing recorded, and larva undescribed.

Geographical distribution. Central America.

Genus HAPALIPS Reitter

Hapalips Reitter, 1877: 122. Type species, by present designation, *Hapalips mexicanus* Reitter.

Reitter (1877) established this genus in the family Rhizophagidae, Gorham (1898) transferred it to Languriidae, Fowler (1908) retained it in Languriinae, Champion (1913) and Grouvelle (1919) placed it in Cryptophagidae, and Arrow (1929a) proposed that *Hapalips*, together with all Cryptophagidae having lobed tarsi, be placed in Languriidae. Rymer Roberts (1939) placed *Hapalips* with *Bolerus* (=*Platycladoxena*) *angulosus* in Languriidae, Cladoxeninae, after studying larvae of the two genera. Bruce (1951) noted that the aedeagus of *Hapalips* is similar to those of *Leucohimatium*, *Loberus*, and *Toramus*. Crowson (1955) retained *Hapalips* in the Languriidae and considered it as a transitional form between that family and Erotylidae. This is the second largest genus of the tribe Loberini. Reitter (1877) described eight species, Schenkling (1923) listed 47, to which Arrow (1927) added another one, and more recently, Bruce (1952, 1963) added five more species and excluded one of his older species, *H. spegazzini*, because of its different type of aedeagus. Thus the genus at present consists of 54 valid species. There appears to have been no previous designation of a type for this genus, so I here designate as type *H. mexicanus*, one of the original species described by Reitter (1877) and quite common in Mexico.

Description. With general characters of Loberinae, Loberini. General appearance more or less as in *Xenoscelis* Wollaston; form narrow, elongate, rather flattened, and more or less parallel sided. Head (Fig. 23) with broad clypeus, its front margin evenly rounded; antennal insertions completely hidden by the sides of frons. Stridulatory files rarely present and, if so, paired and well separated; sometimes files represented by a pair of longitudinal ridges without any striations (e.g. *H. fuscus* and *H. acaciae*). Transverse groove on anterior part of gular region sometimes replaced by transverse cavity (Fig. 23). Antenna of moderate length, scape small but longer than pedicel, which is often shorter than segment 3, segments 4-8 usually equal in length, segments 9 and 10 transverse and equal in size, terminal segment equal in breadth to segment 10 and more or less rounded at apex. Prothorax (Fig. 24) usually elongate with side margins smooth, more or less parallel sided, front and hind margins equal in width, all the angles rather obtuse; prebasal impressions on pronotum often indistinct. Front coxal cavities usually with narrow, sometimes slitlike (Fig. 24) opening behind; prosternal process with its apical margin straight. Sometimes shape of pronotum differs between male and female. Elytra with regular rows of strial punctures, usually with a scutellary striole, and pubescence absent or fine and recumbent. Wing with (Fig. 18) or without (Fig. 16) anal cell, radial cell rarely without spur of radial sector (Fig. 17). Mesocoxae closely situated; mesepisternal pockets often obscured; metasternum elongate or as broad as long; median impressed line of metasternum usually extending ⅔ of its length. Tarsi short and compact, first three segments rather broad and equal in length, segment 3 lobed below, segment 4 minute, received in the lobe of segment 3, segment 5 about equal in length to first three together; tibiae rather short, broad at apex, which is obliquely truncate with two normal spurs. Ventrite 1 with intercoxal process pointed at apex. Ovipositor and aedeagus as figured (Figs. 12, 10).

Species examined. The species *H. mexicanus* Reitter, *H. eichelbaumi* Grouvelle, *H. cribricollis* Gorham, *H. grouvellei* Gorham, *H. nigriceps* Reitter, *H. nitidulus* Champion, *H. filum* Reitter, *H. scotti* Grouvelle, *H. prolixus* Sharp, *H. fuscus* Reitter, *H. acaciae* sp. n., and also *H. taprobanae* Grouvelle (external characters only), have been studied in detail for generic characters.

Habitat. Little is known about the habitat of members of this genus. *H. filum* has been recorded from Cuba in corn (maize) stalks, and *H. annulosus* Grouvelle from Guadeloupe in flowers of the cactus *Cereus triangularis*. *H. prolixus* has been recorded from

New Zealand in tree ferns, and more recently R. A. Crowson collected both larvae and adults of this species under the sheathing bases of dead palm leaves. *H. championi* Grouvelle and *H. scotti* Grouvelle are recorded from the Seychelles, both from the bases of palm leaves.

Geographical distribution. This genus is widely distributed in both the New and Old Worlds, mainly in tropical and subtropical regions; a few species extend into warm temperate areas. No species are yet recorded from Australia, and only one species, *H. prolixus,* is known from New Zealand.

Subgenus HAPALIPS *sensu stricto*

Description. With the general characters of *Hapalips.* Form more convex, less parallel-sided; elytra with scutellary striole; wing (Fig. 18) with anal cell and radial cell with spur of Rs. Head sometimes with a pair of stridulatory files; a transverse groove present on gular region (Fig. 20); eyes large, facets moderately coarse. Pronotum more convex, length and breadth more or less equal. Metasternum not elongate, more or less equal in length and breadth.

This subgenus includes the majority of the species.

CAVOPHORUS *subgenus novum*

Type species, *Hapalips fuscus* Reitter

Description. With the general characters of *Hapalips.* General appearance as in *Hapalips sensu stricto.* Head with vestiges of stridulatory files, represented by two longitudinal ridges without striation (Fig. 23). On the gular region, in place of the usual transverse line, there is a large trilobed cavity (Fig. 23), opening ventrally and protected by hairs. Eyes large, as in *Hapalips sensu stricto.* Elytra, wing venation, shape of pronotum and metasternum as in *Hapalips sensu stricto.*

According to present knowledge, this subgenus includes only two Central American species, *H. fuscus* Reitter and *H. acaciae* sp. n.

XENOSCELOIDES *subgenus novum*

Type species, *Hapalips prolixus* Sharp

Description. With the general characters of *Hapalips.* Form more flattened and parallel-sided. Wing without anal cell (Fig. 16), radial cell sometimes without spur of Rs (Fig. 17). Elytra

often without stridulatory files; gular region with a transverse groove as in *Hapalips sensu stricto.*

This subgenus includes *Hapalips prolixus* Sharp, *H. filum* Reitter, *H. scotti* Grouvelle, and possibly *H. taprobanae* Grouvelle. I have not been able to check in detail the characters of *H. taprobanae,* which is less flattened than the other species; if it truly belongs in this subgenus, then Grouvelle's name *Loberina* will have priority over *Xenosceloides.*

Key to the Subgenera of Hapalips

1. Anterior part of gular region with a large cavity (Fig. 23) . . *Cavophorus*
   Anterior part of gular region without cavity but with a transverse groove (Fig. 20) 2
2. Wing with anal cell (Fig. 18); body shape more convex and less parallel sided; elytra with scutellary striole. Prothorax and metasternum more or less equal in length and breadth. Stridulatory files on head sometimes present; eyes large with moderately coarse facets . . . . . *Hapalips*
   Wing without anal cell (Fig. 16); body shape more flattened and parallel sided; elytra often without scutellary striole. Prosternum (Fig. 24) and metasternum longer than broad. Stridulatory files on head absent; eyes smaller with finer facets . . . . . *Xenosceloides*

Hapalips acaciae *species novum*

Holotype, ♀, and paratype ♂, Cotaxtla Exp. Sta., Veracruz, MEXICO, VIII-15-1962, D. H. Janzen coll., seed pods of *Acacia cornigera,* deposited in the Museum of Comparative Zoology, Cambridge, Mass. (holotype MCZ No. 31604). Paratype (on slide), same data, deposited in the Department of Zoology, The University, Glasgow, Scotland.

Measurements of holotype. Total length: 5.58 mm; width of head across eyes: 1.18 mm; length of antenna: 1.26 mm; length of prothorax along midline: 1.23 mm, width across middle: 1.40 mm; length of elytra: 3.60 mm, width across middle: 1.45 mm.

Description. With the general characters of Loberini, *Hapalips (Cavophorus).* Larger and more elongate than *H. fuscus* Reitter; upper surface uniformly reddish brown. Head (Fig. 23) transverse; eyes large and rather coarsely faceted. Vestiges of stridulatory files represented by a pair of widely separated longitudinal ridges without transverse striations. Occipital region glabrous, anterior half of dorsal side of head sparsely clothed with recumbent setae. A large transverse trilobed cavity (Fig. 23) present on anterior part of gular region, opening ventrally and protected by

fine hairs. Antenna with scape about double the length of pedicel, which is shorter than segment 3, segments 4-8 equal in length, segments 9 and 10 roughly semicircular, segment 9 slightly less wide than segment 10, terminal segment asymmetrically rounded in apical part and longer than preceding two segments. Prothorax slightly wider than its length, side margins more or less parallel sided, bordered by fine hairs, posterior angles pointed and anterior angles obtuse. Punctation on pronotum coarser and closer than on head, setae minute and directed toward center. Elytra uniformly reddish brown, strial punctures in rows, interstices with sparse fine punctures, scutellary striole rather irregular and indistinct, pubescence short and recumbent. Scutellum minute, narrowed in front and weakly angulate on posterior margin, pubescent. Wing with anal cell. Mesocoxal lines present but very short; mesepisternal pockets obscured. Tarsi densely hairy on underside, first three tarsal segments more or less equal in length, segment 5 about as long as first three segments together. Femoral lines on ventrite 1 very short; intercoxal process narrow and pointed.

Key to the Species of Cavophorus

1. Species larger and more elongate, about 5.80 mm in length; prothorax more or less equal in length and breadth. Femoral lines on ventrite 1 very short ..... *H.* (*c.*) *acaciae* sp. n.
   Species smaller and less elongate, about 3.80 mm in length; prothorax distinctly transverse. Femoral lines on ventrite 1 fairly long ..... *H.* (*c.*) *fuscus* Reitter

Description of a Larva of Hapalips prolixus Sharp

One larva recorded from New Zealand under the base of dead palm leaves (*Rhopalostylis sapida*) along with the adults, by R. A. Crowson, deposited in the Glasgow University Zoology Department.

Total length 3.48 mm; length of head including labrum 0.64 mm, width across the middle 0.56 mm; width of prothorax across the middle 0.64 mm; width of 9th abdominal segment across the front margin 0.48 mm.

General appearance narrow, elongated, somewhat flattened, tapered in front and behind. Dorsal surfaces bearing many granules symmetrically arranged in a definite pattern of lines, except on pronotum and head, wartlike setiferous tubercles on either side of each tergite, setae near middle line minute and blunt, becoming

longer towards sides. Setae on ventral surface rather short, fine and pointed.

Head rather elongate, shape of head and arrangement of setae on dorsal surface as figured (Fig. 27), dorsal surface granulated. Frontal suture rather indistinct, as figured (Fig. 27); endocarina absent. At the base on either side of occipital foramen there are three microscopic peglike setae. Ocelli not distinct. Antennae short, narrow, length of the segments 1:2:2, sensory appendage lying ventrally, ⅔ of the length of segment 3. Mandible (Fig. 29) with two equal teeth, mola well developed bearing transverse ridges and asperites. Between the apical teeth and mola the prostheca translucent and pointed at apex. Ventral crushing tubercle well developed; single sensory pit present in the middle of dorsal side of mandible, another one on ventral side anterior to dorsal one. Maxillary mala (Fig. 31) acute at apex, with three apical spines as in *Hapalips* sp. larva described by Rymer Roberts (1939), a row of seven setae present on dorsal side of inner margin of mala; at the base of these setae on dorsal side a group of small denticles, similar denticles present at the base of palpiger (Fig. 31). Cardo rather long, narrow, at right angle to stipes; maxillary articulating area well developed and oval. Labium (Fig. 32) with two jointed palpi, palpiger not distinguishable; ligula rather indistinct; hypopharynx with well developed hypopharyngeal bracon.

Pronotum slightly wider than head; granulation on dorsal surface irregular. Meso- and metathorax slightly shorter and progressively wider than prothorax; granulation on dorsal side in a regular symmetrical pattern as in abdominal tergites (Fig. 33). Abdominal segments 1-6 equal in length and breadth and equal to metasternum, segments 7-9 progressively narrower. Arrangement of setae and granulation are similar on meso- and metanotum and first 8 abdominal tergites, on tergite 9 granules and setae are arranged as in Figure 33. Each segment with two transverse rows of four minute blunt setae; two pairs of tubercles on either side of each segment, anterior pair carrying two blunt and comparatively short setae, posterior pair with single long and pointed seta (Fig. 33). Urogomphi well developed, as figured (Fig. 33), not hooked or upturned, projecting posteriorly. A pair of setiferous tubercles (pregomphal process) present anterior to urogomphi. Pygopod small, rounded, and not projecting.

All spiracles are bicameral (Fig. 34), lying on body surface, lateral air tubes directed posterolaterally. Legs fairly long, coxae closely situated, claws simple with two tarsungular setae.

This larva may be distinguished from that of *Hapalips* sp. described by Rymer Roberts (1939) by the following key:

Urogomphi long, not hooked (Fig. 33). Mandibular prostheca not narrow or hooked at apex (Fig. 29). Ocelli obscured. Tubercles on each segment with pointed and blunt setae (Fig. 33) .... *H. prolixus* Sharp

Urogomphi short, hooked. Mandibular prostheca rather narrow and hooked at apex. Ocelli 5 posterior to antenna. Tubercles on each segment with single long pointed seta ..... *Hapalips* sp.

Discussion. Although all the species of *Hapalips* are restricted to the warmer climatic zones, the two larger subgenera are represented in both the New and Old Worlds; even within these subgenera there are no obvious general differences between the New and Old World forms. The subgenus *Cavophorus,* with only two known species, both restricted to the New World, appears to represent a specialized development from *Hapalips sensu stricto,* at least in respect to the vestigial stridulatory files and the big cavity in the anterior part of the gular region, apparently developed from the transverse groove which is present in other *Hapalips* in the same position. The subgenus *Xenosceloides* is another group which may represent a specialized off-shoot of *Hapalips sensu stricto;* the main differences between *Xenosceloides* and *Hapalips sensu stricto* parallel those between the genus *Hemipeplus* Berth and its relatives in the Mycteridae (Heteromera). Typical *Hemipeplus* spp. as far as known occur under leaf bases of palms, as do *Xenosceloides* adults. Thus the distinguishing features of *Xenosceloides* may be adaptive to this mode of life and may have originated independently in the Old and New Worlds, in which case *Xenosceloides* would not be a natural subgenus. Further research will be needed to establish whether this is in fact the case. The only specifically identified larva of this genus is that of *H. prolixus* from New Zealand, which shows considerable differences, as well as similarities, when compared with the larva of *Hapalips* sp. described by Rymer Roberts (1939) from Mexico; the differences are such that the two larvae would be expected to represent at least different subgenera. If the Mexican larva is really of a *Hapalips sensu stricto,* then larval characters support the separation of *Hapalips sensu stricto* and *Xenosceloides* as subgenera; if, on the other hand, the Mexican larva proves to be of a *Xenosceloides,* this will strongly support the theory that the New and Old World forms of the subgenus are not really related.

Genus TRUQUIELLA Champion

Truquiella Champion, 1913: 87. Type species, by monotypy, *Truquiella gibbifera* Champion.

This monotypic genus was established by Champion (1913) under Cryptophagidae; I have found no subsequent references to it. Champion described it as having tetramerous tarsi, but I found its tarsi to be pseudotetramerous, as in other Loberini. The genus seems to be very closely related to *Hapalips.*

Description. With general characters of Loberinae, Loberini. General facies more or less as in *Hapalips.* Head with fairly large and coarsely faceted eyes. Stridulatory files apparently absent. A pair of protuberances present on anterodorsal side of eyes (Fig. 3) in both sexes, more prominent in male; clypeus broad with rounded apical margin as in *Hapalips;* antennal insertions completely hidden by frons. Antenna moderately long, with scape small but larger than pedicel, which is shorter than segment 3; segments 4-8 equal in length and shorter than segment 3; segments 9 and 10 weakly transverse, terminal one elongate with rounded apex. Prothorax weakly transverse, side margins smooth, front and hind margins more or less equal in breadth, front angles slightly projecting forward and weakly acute, hind angles obtuse. Prebasal impressions on pronotum obscured; front coxal cavities rather narrowly open behind; prosternal process narrow and truncated at apex. Elytra with regular rows of punctures, scutellary striole present. Wing with closed anal cell, venation as in *Hapalips eichelbaumi* Grouvelle (Fig. 18). Mesocoxae closely situated; mesepisternal pockets weakly developed; metasternum weakly transverse; median impressed line extending ⅔ of its length. Tarsi with first three segments equal in length, segment 3 lobed below, segment 4 minute and segment 5 about as long as first four together; tibiae weakly broadened at apex with two normal spurs. Intercoxal process of ventrite 1 narrow and pointed at apex.

Habitat. Unknown, larva undescribed.

Geographical distribution. Mexico.

Genus PSEUDHAPALIPS Champion

Pseudhapalips Champion, 1913: 112. Type species, by monotypy, *Pseudhapalips lamellifer* Champion.

Champion (1913) established this genus under Cryptophagidae, and described it as closely related to *Hapalips,* although he noted several dissimilarities from *Hapalips,* e.g. the extraordinary form

of head, very prominent eyes and thorax, as in *Platoberus,* etc. He described the front coxal cavities as closed behind, but careful study of a slide preparation reveals that these cavities are distinctly open behind (Fig. 6). Arrow (1929a) described *Pseudhapalips* as having stridulatory files on the head, but neither I nor Mr. R. D. Pope of the British Museum could find stridulatory files on the head of *P. lamellifer.* It seems that the genus may be related to *Hapalips,* as suggested by Champion and Arrow, but not very closely. Since Champion's description only one species has been added to this genus, and that was by Grouvelle (1919) from French Guiana.

Description. With general characters of Loberinae, Loberini. Head transverse, in male with a strong ridge between the eyes; in female this ridge is less distinct and flattened in front; clypeus broad with rounded apical margin. Eyes large, markedly projecting and moderately coarsely faceted. Antenna moderately long with scape slightly longer than pedicel, which is slightly shorter than segment 3, segments 3-8 equal in length, club loose, segment 9 very slightly wider than segment 10, terminal segment rather transverse and rounded at apex.

Prothorax (Fig. 6) strongly transverse, slightly narrowed behind, side margins weakly undulate or dentate, front angles slightly projecting and obtuse, hind angles acute. Prebasal impressions on pronotum strongly marked; prosternal process weakly broadened posteriorly with straight apical margin (Fig. 6). Elytra glabrous, strial punctures in regular rows and with a scutellary striole. Wing as figured (Fig. 15), without anal cell. Mesepisternal pockets weakly developed; metasternum elongate and median impressed line extending to ⅔ of its length. Tarsi are unlike *Hapalips,* first three segments lobed below, segment 5 equal to length of first two segments together; tibiae broadened at apex. Ventrite 1 with intercoxal process narrow and pointed at apex.

Habitat. Unknown, larva undescribed.

Geographical distribution. Amazon, Surinam, and French Guiana.

Genus Pseudhenoticus Sharp

Pseudhenoticus Sharp, 1900: 596. Type species, by monotypy, *Pseudhenoticus parallelus* Sharp.

Sharp (1900) established this genus under Cryptophagidae and placed it just before *Henoticus.* Grouvelle (1919) added 10 species to it, and more recently, Bruce (1943) described another

species from Madagascar. From Bruce's figure and description it seems very doubtful whether this specimen is a true *Pseudhenoticus* or even a member of Loberini; if it is a *Pseudhenoticus,* then the genus will manifest a distribution pattern unusual in Clavicornia, though it is known in some other organisms.

Description. With general characters of Loberiinae, Loberini. Head transverse, clypeus less broad than in *Hapalips,* broad at base, narrowed in front, its apical margin rounded. Unlike *Hapalips,* frons scarcely projecting over antennal insertions. Stridulatory files apparently absent; eyes of moderate size and very finely faceted. Antenna rather short and stout, scape, pedicel and segment 3 more or less equal in length, segments 4-8 slightly shorter than segment 3 and equal in size, segments 9 and 10 somewhat semicircular, and terminal segment elongated, about double the length of segment 10. Prothorax (Fig. 5) transverse, weakly narrowed in front, side margins undulate or more or less dentate, prebasal impressions on pronotum present. Front coxal cavities rather narrowly open behind; prosternal process broad at apex as in *Bolerus* (cf. Fig. 2). Elytra with regular rows of punctures and without scutellary striole, pubescent. Meso- and metacoxae moderately widely separated, sternal fitting between the mesocoxae in a straight line. Metasternum transverse, narrowed in front, median impressed line extending ⅔ of its length. First three tarsal segments more or less equal in length, segment 2 weakly and segment 3 strongly lobed below and narrow, segment 5 almost equal in length to first three segments together; tibiae slightly broadened at apex. Ventrite 1 with intercoxal process moderately broad and its apical margin rounded.

Habitat. Unknown, larva undescribed.

Geographical distribution. Panama, Bolivia,? Madagascar.

Genus Bolerus Grouvelle

Bolerus Grouvelle, 1919: 93. Type species, by present designation, *Crotchia minuta* Fleutiaux, 1887: 68.

Thallisellodes Arrow, 1925: 257. Type species, by original designation, *Thallis transversus* Gorham, 1895: 325.

Platycladoxena Kraatz (partim), — Arrow, 1929a: 316.

Crotchia Fowler (partim), — Fleutiaux, 1887: 68.

The nomenclature of this genus is very complicated. The genus *Platycladoxena* (type *P. castanea* Kraatz) was established by Kraatz (1899), in the Languriidae. Arrow (1925) synonymized it with *Microlanguria* Lewis and erected a new genus *Thallisellodes* with four species. He later (1929a) stated that *P. castanea* and

P. javanica of Kraatz are congeneric with *Thallisellodes* and sank the latter name. In the same paper, he listed 13 valid species in this genus. Grouvelle (1919) described the genus *Bolerus,* which he considered to be related to *Hapalips* and *Loberus,* and transferred *Crotchia minuta* Fleutiaux to the genus *Bolerus.* Arrow (1929a) pointed out that the species of *Bolerus* are congeneric with *Thallisellodes.* Villiers (1961), having seen the type material of *Platycladoxena castanea* Kraatz, stated that the two specimens represented two distinct species, both of the genus *Microlanguria;* the lectotype should be named *Microlanguria castanea* (Kraatz), while the other specimen was described as *M. angulosa* Villiers. The above facts indicate that the genus *Bolerus* Grouvelle (1919) must have priority over *Thallisellodes* Arrow (1925). Unfortunately, Grouvelle did not specify a type of his genus *Bolerus;* therefore I here designate *Crotchia minuta* Fleutiaux as type species. This is one of the species originally included by Grouvelle (1919).

The species *Bolerus minutus,* which I have studied in detail, seems to be very similar to *Thallisellodes angulosus* Arrow and *T. transversus* (Gorham). I have found its characters more similar to those of the Loberini than to those of Cladoxenini (e.g. front coxal cavities internally open behind and ovipositor like other Loberini with styli attached at the apex of coxites). Rymer Roberts (1939) described the larva of *Bolerus* (=*Platycladoxena*) *angulosus* Arrow and stated that it is very similar to the larva of *Hapalips.* The present study supports the view of Grouvelle and Rymer Roberts and shows that the genus is actually related to *Hapalips* and probably *Pseudhenoticus.*

Description. With the general characters of Loberinae, Loberini. General appearance less linear than in *Microlanguria* and prothorax strongly transverse. Head transverse, with a pair of closely situated stridulatory files; eyes fairly large and moderately coarsely faceted. Clypeus broad at base and narrowed in front, with straight or weakly rounded apical margin; antennal insertions less hidden under frons than in *Hapalips.* Transverse groove on anterior gular region weak but distinguishable. Antenna with scape and segment 3 longer than pedicel, club rather compact and segments 9, 10, and 11 transverse and equal in length, apical segment rounded at apex and slightly less transverse than segment 10, sometimes club loose and apical segment elongate and pointed at apex. Prothorax (Fig. 2) parallel sided, side margins more or less smooth or finely dentate, front angles rather rounded, hind angles somewhat acute, prebasal impressions on pronotum strongly

marked. Front coxal cavities rather narrowly open behind, prosternal process as figured (Fig. 2), sometimes sinuate at apical margin. Elytra glabrous, strial punctures in regular rows and with scutellary striole. Wing as figured (Fig. 19), with an anal cell. Mesocoxae moderately widely separated; mesepisternal pockets well developed; metasternum weakly transverse; mesocoxal lines short; median impressed line extending about ⅔ of its length. Metendosternite broad and short, as figured (Fig. 21). Tarsi as in *Hapalips;* tibiae broad at apex and obliquely truncated. Ventrite 1 with intercoxal process slightly broad, shape as figured (Fig. 1); sometimes a second pair of lines present on outer sides of the normal femoral lines (Fig. 1).

Habitat. Adults and larvae of *B. angulosus* have been found on a lichen-covered rock in a cave in Malaya.

Geographical distribution. Indo-Malayan region.

Key to the Genera of the Tribe Loberini

1. Trochanters short and broad; tarsi simple, except in *Xenoscelis,* where segment 3 is very slightly lobed below. Femoral lines on first ventrite absent; anterior part of gular region without transverse groove. Front coxal cavities usually narrowly open, rarely completely closed behind (*Xenoscelis*) ..... Tribe Pharaxonothini

— Trochanters broadly elongate (Fig. 26); tarsi distinctly lobed below, with minute segment 4. Femoral lines on first ventrite present; anterior part of gular region with a transverse groove (Fig. 20) or a cavity (Fig. 23). Front coxal cavities usually fairly widely, more rarely narrowly open behind ..... Tribe Loberini....2

2. Mesocoxae more widely separated and sternal fitting between them in a straight line. Prothorax (Fig. 5) with anterior part of side margins undulated. Intercoxal process of first ventrite broad with more or less rounded apical margin ..... *Pseudhenoticus*

— Mesocoxae more closely situated and sternal fitting between them with single knob (Fig. 9). Prothorax not as above. Intercoxal process of first ventrite narrow and pointed at apex (except in *Bolerus*) 3

3. Prothorax as figured (Fig. 2), with prosternal process broad at apex. Elytra glabrous; mesocoxal line on metasternum present. Intercoxal process of first ventrite broad, as figured (Fig. 1) ..... *Bolerus*

— Prothorax with prosternal process not as above. Elytra usually hairy; mesocoxal lines on metasternum absent. Intercoxal process of first ventrite narrow and pointed 4

4. Species larger, narrow and elongated, less Cryptophagidae-like in form. Elytra with scutellary striole (except in *Hapalips scotti* Grouvelle); wing often with anal cell (Fig. 18). Tibiae broad and truncate at apex; tarsal lobes broad. Metasternum less transverse 5

— Species smaller, more elliptical and Cryptophagidae-like in form. Elytra without scutellary striole; wing without anal cell. Tibiae slender, not broadened at apex; tarsal lobes narrow. Metasternum more transverse 7

5. Prothorax as figured (Fig. 6), side margins dentate or undulate, front angles projecting forward. Tarsal segments 2 and 3 lobed below. Anterior part of dorsal side of the head with transverse ridge .... *Pseudhapalips*

— Prothorax not as above, side margin not dentate or undulate, front angles not projecting forward. Only tarsal segment 3 lobed below. Head not as above 6

6. Head with a pair of humps on anterodorsal sides of eyes (Fig. 3). Prebasal impressions on pronotum indistinct. Elytra pubescent. *Truquiella*

— Head without humps as above. Prebasal impressions on pronotum usually distinct. Elytra glabrous or pubescent .....*Hapalips*

7. Prothorax narrowed in front, shape as figured (Fig. 7). Antenna with segment 9 considerably smaller than segment 10, which is markedly broad .....*Telmatoscius*

— Prothorax not narrowed in front, shape as figured (Fig. 7). Antennal segment 9 very little smaller than segment 10, which is less transverse .....*Loberus*

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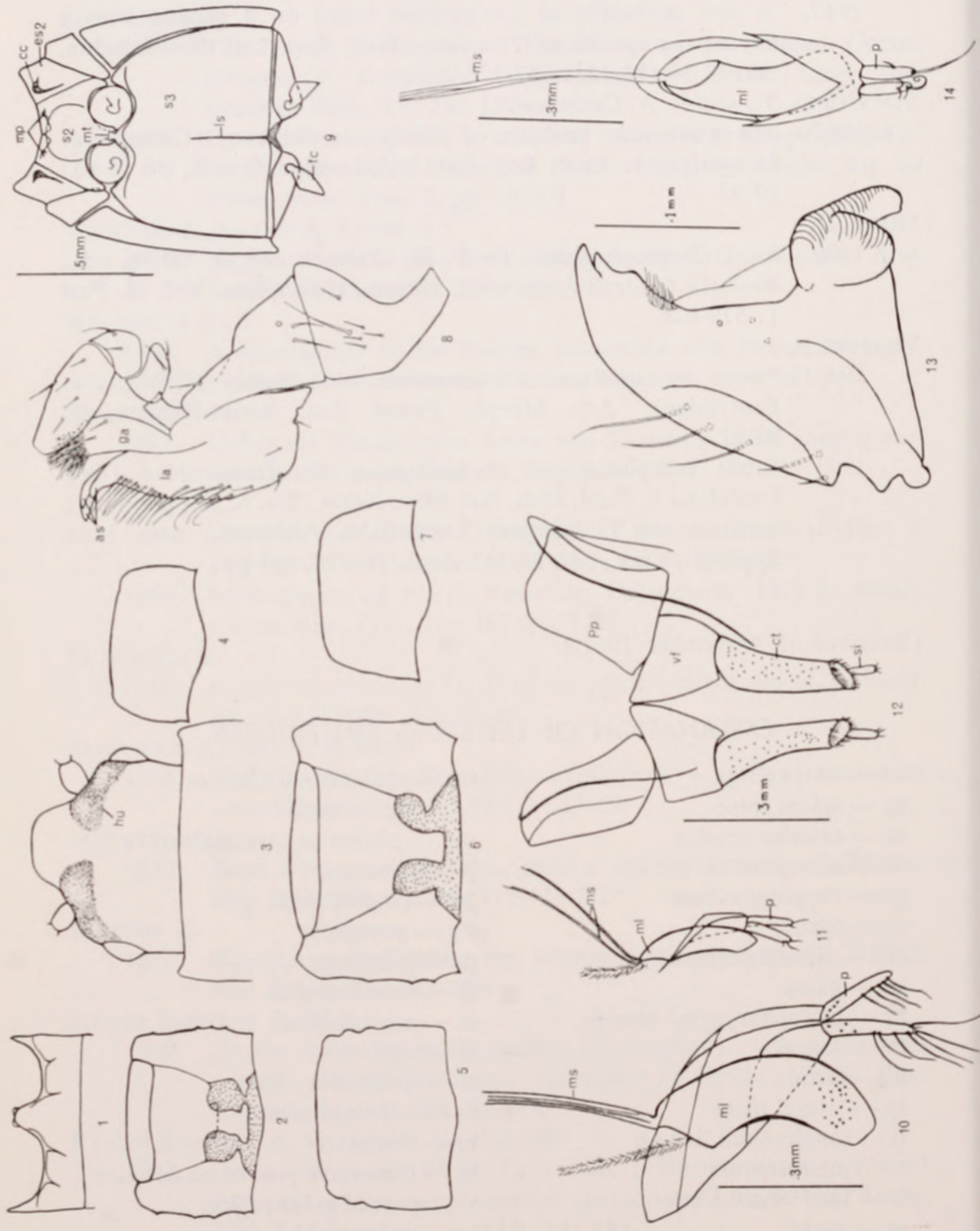
EXPLANATION OF LETTERING ON FIGURES

ac — anal cell
as — apical spine
at — anterior tendon
cc — mesepisternal pocket
cp — corpotentorium
ct — coxite
es2 — mesepisternum
ga — galea
hr — hypopharyngeal bracon
hu — hump
la — lacinia
lp — lateral plate
ls — longitudinal line on metasternum
lt — laminatentorium
m — mola
ml — median lobe
mp — mesosternal pocket
ms — median strut
mt — metasternal knob or projection
my — pocket or mycangium(?)
p — paramere
pa — peglike setae
Pp — paraproct
pr — prostheca
s2 — mesosternum
s3 — metasternum
si — styli
sl — stridulatory file
su — supratentorium
tc — trochanter
tg — transverse groove on anterior part of gular region
ur — urogomphi
vf — valvifer
vp — sensory appendage
vt — ventral crushing tubercle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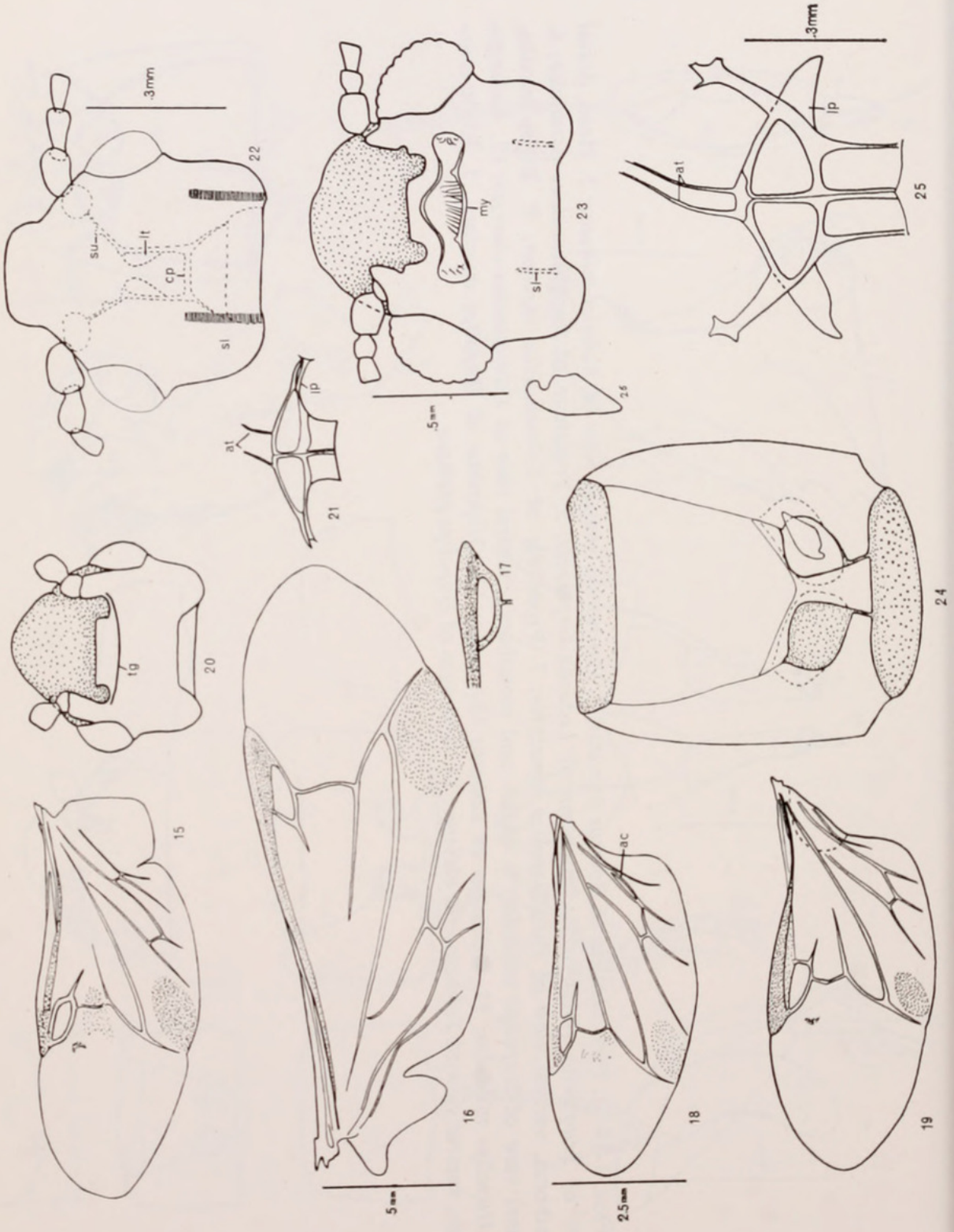
FIGS. 1-14. 1. First ventrite of *Bolerus minutus;* 2. Prothorax, ventral view of *Bolerus minutus;* 3. Head, dorsal view of *Truquiella gibbifera;* 4. Pronotum of *Loberus impressus;* 5. Pronotum of *Pseudhenoticus parallelus;* 6. Prothorax, ventral view of *Pseudhapalips lamellifer;* 7. Pronotum of *Telmatoscius claviger;* 8. Right maxilla, dorsal view of *Hapalips nitidulus;* 9. Meso- and metathorax, ventral view of *Telmatoscius claviger;* 10. Aedeagus of *Hapalips nitidulus;* 11. Aedeagus of *Loberus impressus;* 12. Ovipositor of *Hapalips acaciae;* 13. Right mandible, ventral view of *Telmatoscius claviger;* 14. Aedeagus of *Hapalips prolixus.*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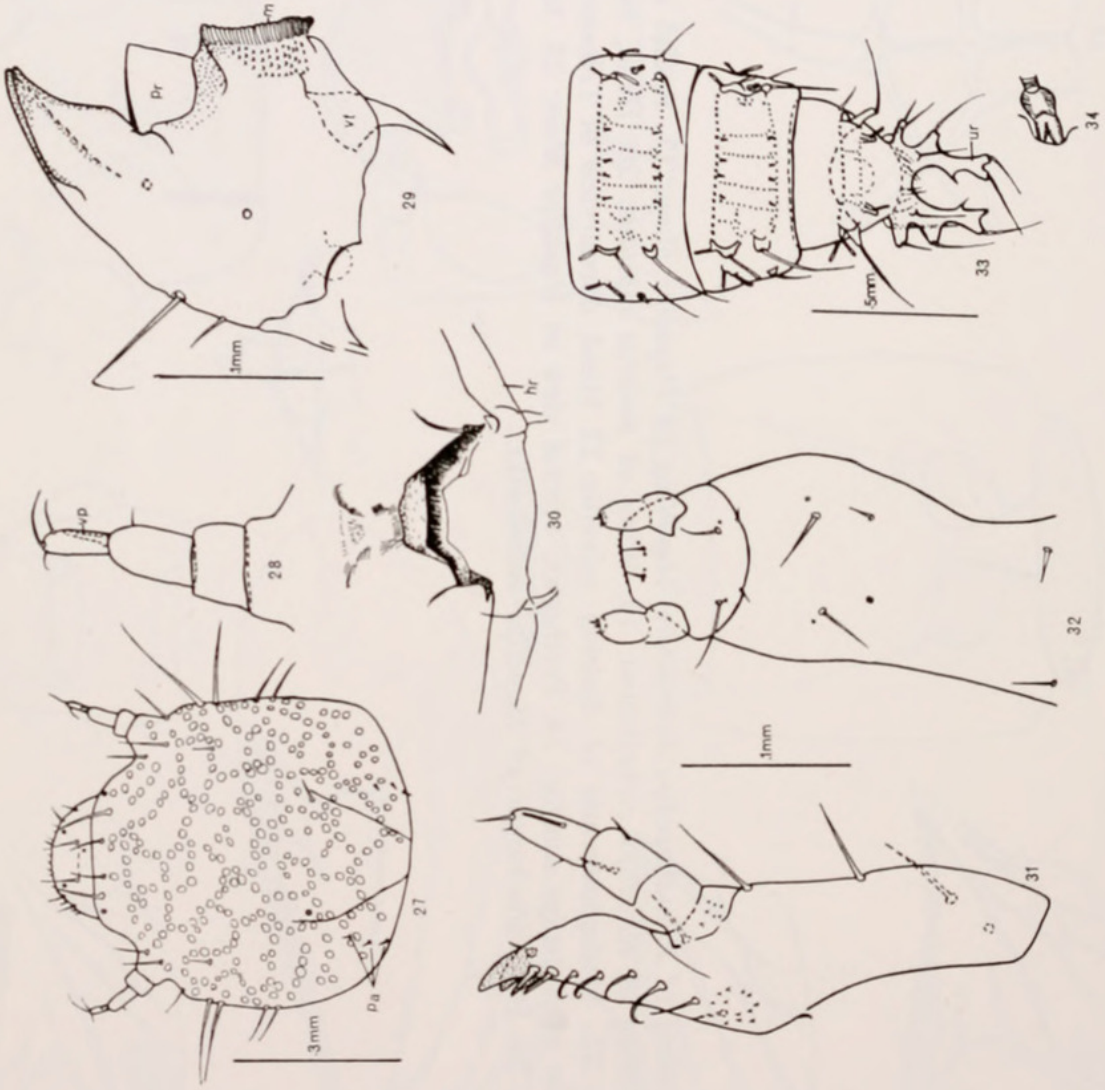
FIGS. 15-26. 15. Wing of *Pseudhapalips lamellifer;* 16. Wing of *Hapalips filum;* 17. Radial cell (wing) of *Hapalips scotti;* 18. Wing of *Hapalips eichelbaumi;* 19. Wing of *Bolerus minutus;* 20. Head, ventral view of *Hapalips cribricollis;* 21. Metendosternite of *Bolerus minutus;* 22. Head, dorsal view of *Telmatoscius claviger;* 23. Head, ventral view of *Hapalips acaciae;* 24. Prothorax, ventral view of *Hapalips filum;* 25. Metendosternite of *Hapalips acaciae;* 26. Hind trochanter of *Hapalips cribricollis.*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FIGS. 27-34. Larva of *Hapalips prolixus*. 27. Head, dorsal view; 28. Antenna, dorsal view; 29. Left mandible, dorsal view; 30. Hypopharynx; 31. Left maxilla, dorsal view; 32. Labium, ventral view; 33. Posterior segments, dorsal view; 34. 5th abdominal spiracle.