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## A review of New World *Laemophloeus* Dejean (Coleoptera: Laemophloeidae): 1. Species with antennal club of more than three antennomeres

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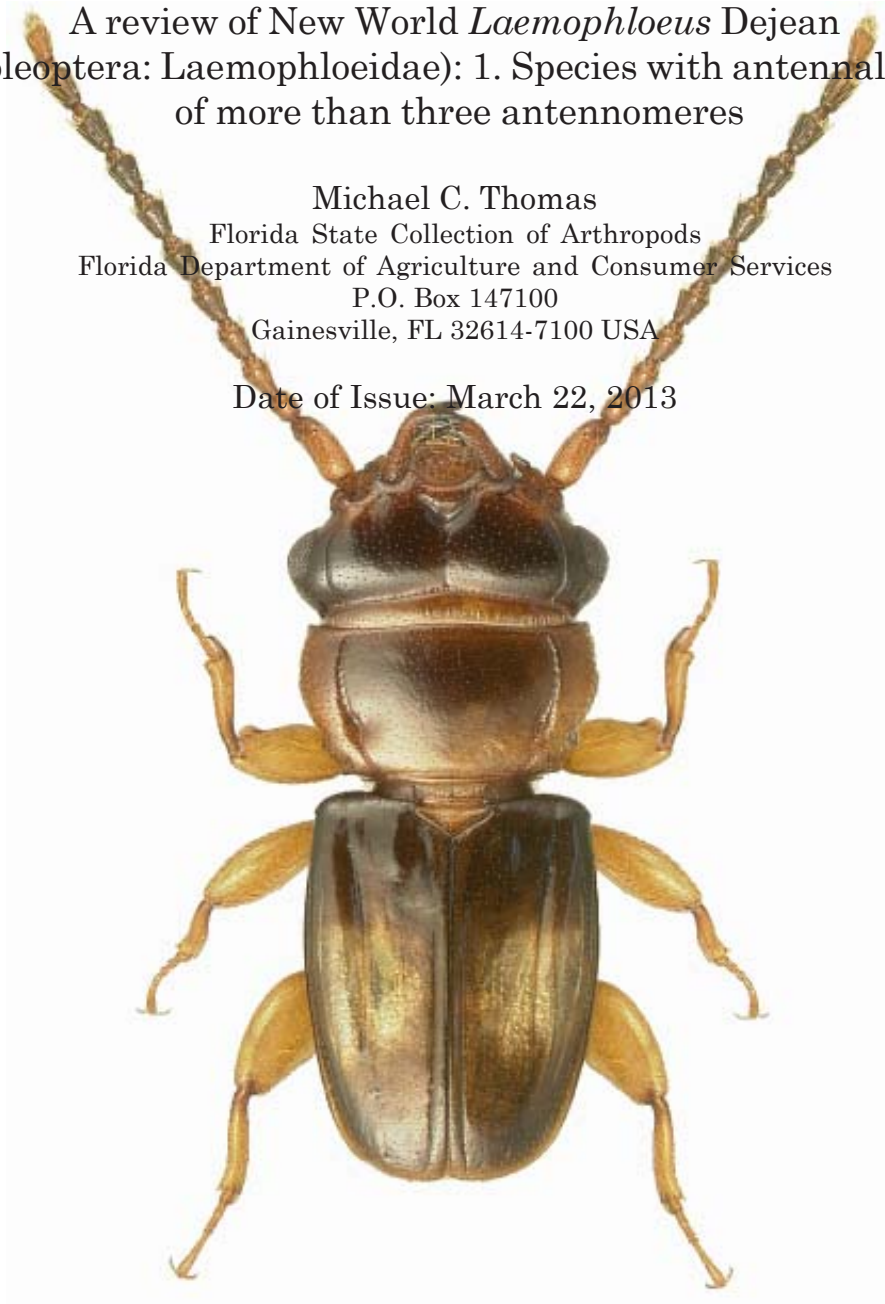
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A review of New World *Laemophloeus* Dejean  
(Coleoptera: Laemophloeidae): 1. Species with antennal club  
of more than three antennomeres

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A review of New World *Laemophloeus* Dejean (Coleoptera: Laemophloeidae): 1. Species with antennal club of more than three antennomeres

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**Abstract.** Five Neotropical species of *Laemophloeus* Dejean (s. str.) (Coleoptera: Laemophloeidae) with antennal clubs of more than three antennomeres are reviewed: *L. buenavista* Thomas, **n.sp.**; *L. concinnus* Thomas, **n.sp.**; *L. germaini* Grouvelle; *L. macrognathus* Reitter; and *L. sexarticulatus* Kessel. Diagnoses, descriptions of the new species, illustrations, and a key are provided. *Laemophloeus prominens* Hetschko, proposed as a replacement name for *Laemophloeus notabilis* Kessel, is synonymized under *L. germaini*, **new synonymy**.

## Introduction

Since almost all members of Laemophloeidae (Coleoptera) were originally described in the genus *Laemophloeus* Dejean, one of the biggest obstacles in conducting revisionary work on the genus has been to identify species actually belonging to *Laemophloeus* as delimited by Lefkovitch (1959). Through the cooperation of major collection curators I have been able to examine types of most of the New World species for which descriptions and illustrations, if any, were insufficient to determine generic affinities.

This is the first in a planned series of three papers that will review the New World species of *Laemophloeus*. The present paper treats five Neotropical species, including two new species, which possess antennal clubs composed of six or more antennomeres. This is a grouping of convenience and it is by no means certain that the species included in it comprise a monophyletic group (see Discussion below). This paper will be followed by a treatment of the rest of the Neotropical species, and finally a review of the Nearctic species.

As currently defined, *Laemophloeus* is composed of 28 species (including known but undescribed species) found in the Palaearctic (6 spp.), Nearctic (9 spp.) and Neotropical regions (16 spp.). Three species occur in both the Nearctic and Neotropical regions. *Laemophloeus* has not been reported from tropical parts of Asia, Africa, or Australia. The genus reaches its greatest diversity in the Neotropics, where all of the other genera possessing an acuminate intercoxal process on the ventrite III occur (*Charaphloeus* Casey, *Rhinophloeus* Sharp, *Rhinomalus* Gemminger in Harold, *Metaxyphloeus* Thomas, and *Phloeipsius* Casey).

## Materials and Methods

Habitus and some genitalic photographs were taken through a Leica Z16 APO microscope equipped with a JVC KY-F75U 3-CCD camera and controlled by Syncroscopy AutoMontage® software; high magnification genitalic photographs were taken using a Leica DM 2500 microscope and resulting image stacks were processed using CombineZP®. Scanning electron photomicrographs were produced with a JEOL JSM-5510LV. Images were post-processed with Jasc Paint Shop Pro 7®. Genitalia were dissected as described in Thomas (1984) and were slide-mounted in Hoyer's solution for photography. Subsequently, they were soaked off the slide and imbedded in a drop of dimethyl hydantoin formaldehyde on the card point with the respective specimen.

Measurements, using the measuring utility in Leica Application Suite v. 3, were taken as follows: **Length:** Total body length was derived by adding the following measurements: Head, from anterior most point of epistome to basal line at middle; pronotum: anterior edge to posterior edge

at middle; Elytra: anterior edge of scutellum to posteriormost point of elytron; **Width:** Head, widest point across eyes; Pronotum: widest point, usually behind anterior angles; Elytra: across widest point of one elytron and doubled for total width.

Label data for types of new species are reported verbatim; data are condensed for described species. Codens for collections in which specimens are deposited include:

BMNH — The Natural History Museum, London, England  
 DEFS — Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil  
 FSCA — Florida State Collection of Arthropods, Gainesville, FL, USA  
 MNHN — Museum National d'Histoire Natural, Paris, France  
 MNKM — Museo de Historia Natural "Noel Kempff Mercado", Santa Cruz de la Sierra, Bolivia  
 MZPW — Polish Academy of Sciences, Warsaw, Poland  
 USNM — National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA

The important collection of Fritz Kessel, who described a number of Neotropical laemophloeids (Kessel 1926), is held by the Polish Academy of Sciences (MZPW) in Warsaw. A number of years ago, specimens were examined through the aid of Adam Slipinski, and were found to be poorly and cryptically labeled. Types of many of Kessel's species were likely present but could not be identified as such at the time. Subsequent attempts to borrow that material have been unsuccessful.

## Discussion of Characters

Three structures used here necessitate some discussion: the antennae, the male genitalia, and the lateral margin of the pronotum.

**Antennae.** Several species of *Laemophloeus* (as well as members of several other laemophloeid genera) have been distinguished by earlier authors (e.g., Sharp 1899, Kessel 1926, Thomas 1993) by possession of an antennal club composed of more than the usual three antennomeres. However, those authors did not discuss the structure of the antennal club nor how to distinguish a club antennomere from a flagellar antennomere, aside from the relative width of the antennomeres. Crowson (1981) noted the correlation in Coleoptera between an apical concentration of sensilla and the enlargement of the apical antennomeres. Examination of numerous laemophloeid taxa by scanning electron microscopy has revealed that the more specialized sensilla are confined to a specific region on those antennomeres. Light microscopy at higher magnifications (up to 200×) reveals the more numerous sensilla on the club antennomeres but not their nature.

In laemophloeids generally, only two types of seta-like sensilla (besides the Böhm sensilla on the scape and pedicel) occur on the pre-club antennomeres. These presumably are sensilla chaetica (Rani and Nakamuta 2001) and typically are arranged in three to six or more rows on the body of each antennomere with a row of longer, slightly stouter, sub-erect sensilla subapically (Fig. 5). These sensilla chaetica are considered to be mechanoreceptors (Rani and Nakamuta 2001).

On the antepenultimate and penultimate antennomeres, a greater variety of presumably olfactory sensilla occurs on the apical face of the antennomere, an area Crowson (1981) termed the "peri-articular gutter." These sensilla often are concentrated in clusters in the peri-articular gutter or in pockets, but may be evenly distributed around the peri-articular gutter (Thomas 2010). The terminal antennomere is divided into two regions, a basal area with cuticular microsculpture similar to that of the remainder of the antennomeres and an apical region usually distinctly separated from the basal region by a ridge and with no microsculpture. What appear to be olfactory sensilla occur only on that apical region (Fig. 6).

The antennal club in Laemophloeidae can be defined as being composed of those antennomeres with specialized olfactory sensilla, regardless of relative width or color of the antennomeres. By that definition, the *Laemophloeus* species treated in this paper possess antennal clubs of six or eight antennomeres.

SEM examination of various laemophloeid genera also has revealed the presence of a single stout, erect sensillum on the dorsal surface distally on the scape (Fig. 30) in several genera with more-or-less rostrate adults (e.g., *Rhinomalus* Gemminger in Harold, *Rhinophloeus* Sharp, and

*Metaxyphloeus* Thomas). These genera are related to *Laemophloeus*, based on the structure of the intercoxal process of ventrite III and characters of the male genitalia. That sensillum has not been found in *Laemophloeus* nor in any other laemophloeid genus examined.

**Pronotum.** In almost all species of *Laemophloeus* examined, there is a small denticle located just anterior to the posterolateral angle of the pronotum (Fig. 2), even in species with a lateral pronotal margin otherwise non-denticulate. This character is here termed the antebasal denticle. This character has not been found in any other laemophloeid genus examined and seems to be a unique character in *Laemophloeus*. Three New World species do not possess an antebasal denticle, which is interpreted here as a secondary loss.

**Genitalia.** In most *Laemophloeus* species there are paired flat structures (as in Fig. 25 and 44) in the internal sac near the base of the median lobe. These characters are here termed basal plates. The shape of the basal plates can be diagnostic. One species, *L. germaini* Grouvelle, has such complex armature of the internal sac that the basal plates cannot be distinguished.

## SYSTEMATICS

### *Laemophloeus* Dejean, 1835: 315

**Type species.** *Cucujus monilis* Fabricius [by subsequent designation of Lefkovitch 1959: 101].

**Diagnosis.** The following combination of character states is diagnostic for this genus: Epistome with five emarginations anteriorly (Fig. 1); transverse groove marking epistomal suture present (reduced in some species) (Fig. 1); antennal scape without a stout, erect sensillum anterodorsally; pronotum with antebasal denticle (Fig. 2); humeral carinae of elytra present; procoxal cavities open posteriorly; all coxae widely separated; intercoxal process of prosternum broad, truncate or slightly curved posteriorly (Fig. 3); intercoxal process of sternum III acuminate apically (Fig. 4); tarsal formula 5-5-4 in males, 5-5-5 in females; tarsomere I shorter than penultimate tarsomere; anterior tibial spurs very unequal in size, longer spur strongly curved; parameres present, internal sac with flagellum and basal plates (as in Fig. 17, 25).

**Discussion.** Lefkovitch (1959) provided a detailed generic description of *Laemophloeus* and designated the European *Cucujus monilis* Fabricius, 1787, as type species.

### Identification key to *Laemophloeus* species with an antennal club of 6 or more antennomeres

- |       |  |  |
|-------|--|--|
| 1.    | Elytra maculate .....  | 3  |
| —     | Elytra not maculate; may be infuscate .....  | 2  |
| 2(1). | Head in male with deep emarginations over antennal insertions (Fig. 12); body color more or less uniformly testaceous or dark testaceous (Fig. 7) (Mexico, Central and South America) .....                                | <b><i>Laemophloeus sexarticulatus</i> Kessel</b> |
| —     | Head in male without deep emarginations over antennal insertions (Fig. 31); head and pronotum dark testaceous, elytra testaceous, infuscate medially (Fig. 9) (Panama, Colombia) .....                                     | <b><i>Laemophloeus concinnus</i> n.sp.</b>       |
| 3(1). | Frons unmodified, not excavate between antennae (Fig. 40); ground color of body testaceous; elytra dark basally and along suture, forming ill-defined, pale, elongate, maculae (Fig. 11) (Central and South America) ..... | <b><i>Laemophloeus macrognathus</i> Reitter</b>  |
| —     | Frons triangularly excavate medially (Fig. 23, 29, 34); ground color of body castaneous or piceous; elytra with well-defined pale maculae .....  | 4  |



- 4(3). Medial excavation of frons broadly triangular (Fig. 34); surface of head between punctures smooth, not microreticulate (Fig. 34) (Central and South America) ..... *Laemophloeus germaini* Grouvelle
- Medial excavation of frons narrowly triangular (Fig. 23, 29); surface of head between punctures strongly microreticulate (Fig. 29) (Mexico, Central and South America) ..... *Laemophloeus buenavista* n.sp.

***Laemophloeus sexarticulatus* Kessel**

Fig. 7, 12-22, 49

*Laemophloeus sexarticulatus* Kessel 1926: 72, 82

**Types.** Presumably in the MZPW. Kessel (1926) in his original description reported having 22 specimens. Specimens agreeing with his description were present in his collection at MZPW. The concept of this species is based on specimens in the Kessel collection.

**Diagnosis.** Length, 1.2-1.8 mm. The following combination of character states distinguish this species: antennal club composed of six antennomeres; trifurcate sensoria present on VI-X (Fig. 16); body entirely testaceous (Fig. 7); head microreticulate and, in males, epistome with a deep emargination over the antenna (Fig. 12); male genitalia as in Fig. 17-22. The front of the epistome is bordered by a groove which curves posteriorly near the middle and becomes evanescent on the frons (Fig. 12, 22). In large specimens of both sexes the longitudinal line on the head is deeply impressed and nearly reaches the curved epistomal groove, forming a triangular region that is not as well defined as in the following two species.

**Distribution.** Mexico, Central and South America. Kessel (1926) described this species from “Badenfurt, Santa Catharina”. Badenfurt is in southern Brazil at approximately 26.877°S 49.148°W.

**Specimens examined.** 128, from the following localities: **BELIZE:** Orange Walk: Rio Bravo Conservation Area, vic. Research Station; **BOLIVIA:** Santa Cruz: Reserva Privada Potrerillos de Guendá; 3.7km SSE Buena Vista, Hotel Flora & Fauna 405m; **BRAZIL:** Rondonia: 62km. SW Ariqueles Fzda. Rancho Grande; **St. Catarina:** Badenfurt; Rio du Sul; **HONDURAS:** Olancho: Catacomas; Montana de Malacate; **MEXICO:** Veracruz: Lake Catemaco, “Coyame”; **PANAMA:** Barro Colorado Island, Snyder-Molina Tr.; **SURINAME:** Brokopondo: Ston Eiland Eco-Resort near Brownberg; **TRINIDAD:** Arima: Arima Valley “Simla” Beebe Trop. Res. Center; Curepe, Santa Margarita Circular Rd.; Simla, Arima-Blanchisseuse Rd.; St. Augustine Pax Guest House. Deposited in DEFS, FSCA, and MNKM.

**Discussion.** This is the most widely distributed *Laemophloeus* species possessing more than a three-segmented antennal club and the one best represented in collections.

***Laemophloeus buenavista* Thomas, n.sp.**

Fig. 8, 23-29

**Types.** Holotype, male, deposited in MNKM, with following label data: “BOLIVIA: SANTA CRUZ Reserva Privada Potrerillos de Guendá; 17°40.26S 63°27.44W; 400m; 10/29-XI-2006; B.K. Dozier coll.” Allotype, female, deposited in MNKN, with following label data: “BOLIVIA: Santa Cruz, 3.7km SSE Buena Vista, Hotel Flora & Fauna 405m., 5-15-XI-2001 17°29.949’S; 63°33.152’W M.C. Thomas & B.K. Dozier tropical transition forest”.

**Diagnosis.** The following combination of character states distinguish this species: antennal club composed of six antennomeres; dorsal color dark with well-defined, pale elytral maculae (Fig. 8);

head microreticulate and in males with a deep, narrow excavation on the frons (Fig. 29); male genitalia as in Fig. 25-28. This species does resemble in coloration a new Bolivian species that will be described later, but that species has a three-segmented antennal club and other distinctive morphological characters.

**Description.** 2.4 mm long; elongate, rather parallel sided; dorsal surface piceous; mouthparts, legs, scutellum, and antennal flagellum reddish, antennal club infusate; each elytron with a pale macula at about middle third extending from inner margin of second cell to humeral carina (Fig. 8); ventral surface completely reddish.

**Head:** twice as wide across eyes as long; epistome with emargination over clypeus moderate, mandibular emarginations rather deep, antennal emarginations barely indicated (Fig. 23); frontoclypeal suture obsolete; longitudinal line impressed, becoming deeper and broader anteriorly to form a narrow v-shaped excavation on frons (Fig. 23); moderately punctate, punctures much smaller than an eye facet and separated by 2-3 diameters, each subtending an inconspicuous seta about the length of a puncture diameter; disc of head heavily microreticulate, especially anteriorly. Mandibles moderate in length, robust. Eyes moderate, length 0.4× that of head (Fig. 23). Antennae elongate, attaining about basal third of elytra; scape about 1.6× longer than broad; pedicel quadrate, about 0.5× length of scape; III elongate, 1.6× longer than pedicel; IV-V globular, subequal in length; each 0.6× length of III; club comprised of VI-XI, VI-X each slightly wider than long and subequal in length; XI about twice as long as X; olfactory sensilla of club segments not branched.

**Thorax:** pronotum transverse, widest at about apical fourth, 1.5× wider than long; 1.2× wider at apical fourth than across basal angles; anterior angles produced, narrowly, obtusely rounded; hind angles acute, produced; antebasal denticle distinct (Fig. 24); sublateral line with median fovea; punctation similar to head, punctures less deeply impressed than on head, each subtending an inconspicuous seta about the length of a puncture diameter; surface smooth and shiny between punctures, not microreticulate. Legs rather short; femora robust.

**Elytra:** 1.3× longer than combined width; inner margin of cell 1 grooved only at apical third; inner margin of cell 2 complete; cell 3 complete; humeral carina well-marked, elytra laterally declivous and narrowly explanate; surface minutely punctate and inconspicuously pubescent.

**Male genitalia:** (Fig. 25-28) parameres attenuate apically, narrowly but completely separated; basal plates truncate basally and rounded apically; flagellum longer than basal strut, apically bifurcate, with microspinose processes; claspers rectangular with inner apical edge produced as a narrow process about equal in length to body of clasper.

**Female allotype:** 2.1 mm in length; head, 2.1× wider than long; eye larger in proportion than in male, 0.6× length of head; pronotum not as transverse, 1.3× wider than long; elytra longer in proportion, 1.5× longer than broad; antennae barely attaining basal fourth of elytra. Microsculpture of head not as pronounced as in male, frontal excavation absent, and frontoclypeal suture represented laterally by short lines.

**Variation:** Length of paratypes varies from 1.5-2.4 mm. A few small males lack the frontal fovea, but genitalia match other specimens.

**Distribution.** Southern Mexico south to Bolivia.

**Paratypes.** 46, from the following localities: 2, "BOLIVIA: SANTA CRUZ Reserva Privada Potrerillos de Guenda; 17°40.26'S 63°27.44'W; 400m; 10/29-XI-2006; B.K. Dozier coll."; 39, "BOLIVIA: Santa Cruz, 3.7km SSE Buena Vista, Hotel Flora & Fauna 405m., 5-15-XI-2001 17°29.949'S; 63°33.152'W M.C. Thomas & B.K. Dozier tropical transition forest"; 1, "BOLIVIA: SANTA CRUZ, 3.7km SSE Buena Vista, Hotel Flora & Fauna; 5-15-XI-2001 17°29'S; 63°33'W; 430m; 10/29-XI-2004; UV; B.K. Dozier"; 1 "MEXICO: Quintana Roo 19km N Carrillo Puerto 18-VI-1990 coll. M.C. Thomas"; 2, "CANAL ZONE, Barro Colorado Is., UV trap 1(3m high) 5 July 1977 H. Wolda"; 2, "PANAMA: Colon Prov. Fort Davis mv + bl, 15 May 1991 R. Turnbow". Deposited in DEFS, MNKM, FSCA, BMNH, and USNM.



**Etymology.** This species is named for the village of Buena Vista in the Department of Santa Cruz, Bolivia, near which most of the known specimens were collected. The specific epithet is a noun in apposition.

**Discussion.** This distinctive species was relatively abundant at lights during the night in Bolivia. This species, *L. concinnus* (described below) and *L. sexarticulatus* Kessel seem to form a natural group, united by their antennal club composed of six antennomeres, modified frons, microreticulate head, male genitalic structure, and general facies.

***Laemophloeus concinnus* Thomas, n.sp.**

Fig. 9, 31-33

**Types.** Holotype male and allotype female, deposited in FSCA, with the following label data: "PANAMA: Barro Colorado I., Snyder-Molina Tr., 3-9-VII-1985 H. Wolda canopy light trap".

**Diagnosis.** The following combination of character states distinguish this species: antennal club composed of six antennomeres; dorsal color testaceous, with head and pronotum darker and elytral disc infuscate (Fig. 9); head microreticulate (Fig. 31); male genitalia as in Fig. 32-33.

**Description.** 1.6 mm long; elongate, parallel sided; dark testaceous, front of head slightly paler; antennae, legs, and elytra testaceous, disc of elytra infuscate (Fig. 9); ventral surface entirely testaceous.

**Head:** Twice as wide across eyes as long; epistome with emargination over clypeus moderate, mandibular emarginations rather deep (Fig. 31), antennal emarginations barely indicated; frontoclypeal suture obsolete; longitudinal line impressed, anteriorly a little wider and deeper but not nearly so well-marked as in *L. buenavista*; moderately punctate, punctures much smaller than an eye facet, separated by 2-3 diameters, each subtending an inconspicuous, pale seta about twice as long as a puncture diameter; surface heavily microreticulate anteriorly and medially, smooth and shiny posterolaterally. Mandibles short, robust. Eyes large, about 0.5× length of head (Fig. 31). Antennae elongate, attaining basal third of elytra; scape oval, 1.4× longer than wide, pedicel subquadrate, 0.7× length of scape; III narrower, elongate, equal in length to scape; IV-V subquadrate, equal in length to pedicel; club comprised of VI-XI, VI-X about length of V, wider than long; XI elongate, twice as long as X.

**Thorax:** pronotum transverse, 1.6× wider than long as across widest point just behind apical angles; 1.2× wider there than across basal angles; anterior angles obtuse, not produced; posterior angles obtuse, not produced; antebasal denticle distinct (Fig. 31); sublateral line slightly broader medially but not foveate; punctation and pubescence similar to head; surface between punctures smooth and shiny, not microreticulate; legs short, femora robust.

**Elytra:** 1.5× longer than combined width; inner margin of cell 1 grooved at posterior half and shallowly grooved for anterior fourth; inner margin of cell 2 grooved at apical three-fourths; cell 3 complete; humeral carina well marked; elytra declivous laterally, narrowly explanate; surface minutely punctate and inconspicuously pubescent.

**Male genitalia:** parameres attenuate apically (Fig. 32), but less so than in *L. buenavista*, not separated; basal plates elongate-oval in shape, not truncate basally (Fig. 32); flagellum longer than basal strut, apically bifurcate, with microspinose processes (Fig. 33); claspers similar to *L. buenavista* but narrower and more elongate (Fig. 32).

**Female allotype:** 1.7 mm long; eyes proportionally larger, 0.7× length of head; pronotum less narrowed posteriorly.

**Variation:** The two male paratypes are both 1.4 mm in length.

**Distribution.** Known only from Panama and Colombia.

**Paratypes.** 2, from the following localities: 1, “COLOMBIA: Dept. of Antioquia, 24km. S & 21km. W Zaragosa above Rio Anoria, 15-IX-1970, 150 meters”/”D.G. Young, blacklight trap, primary forest”; 1, “PANAMA: Colón, Sierra Llorona Lodge 17-21-II-2012 Coll. J.B. Heppner”. Deposited in FSCA.

**Etymology.** The specific epithet is Latin for “neat” or “elegant.”

**Discussion.** This appears to be the least common and geographically most restricted member of this group of *Laemophloeus*, being represented by only four specimens from two countries.

***Laemophloeus germaini* Grouvelle**

Fig. 10, 34-38, 48

*Laemophloeus germaini* Grouvelle 1896: 200

*Laemophloeus prominens* Hetschko 1928: 142, **new synonym**

*Laemophloeus notabilis* Kessel 1926: 72, 81 (not Grouvelle 1904)

**Types.** There are eight specimens of this species on three cards in the MNHN bearing the handwritten labels: “Yungas de Cochabamba Bolivie”. Each pin also bears a black on green printed label: “MUSEUM PARIS COLL. A GROUVELLE 1917”. One pin with two specimens also bears the identification label: “*Laemophloeus Germaini* Grouv.” in Grouvelle’s handwriting. Although these specimens agree with the data in the original description none is labeled as a type specimen as was Grouvelle’s usual practice and thus their status is uncertain.

Kessel (1926) wrote of *L. notabilis*: “Typo em minha collecção.” However, Tomasz Huflejt (in litt.) checked the Kessel collection in the MZPW and could not find it.

**Diagnosis.** Length, 1.8-2.6 mm. The following combination of character states distinguish this species: antennal club composed of more than six antennomeres; frons broadly triangularly impressed (Fig. 34); eyes relatively small, with smooth facets (Fig. 34); sides of head laterally produced so that eyes appear to be situated on short stalks; elytra epipleura broad but almost vertical; male genitalia with broad, obliquely truncate and widely separated parameres, and complex armature of internal sac (Fig. 37-39).

**Distribution.** Central and South America. Grouvelle (1896) described *L. germaini* from “Colombie. Bolivie, province de Cochabamba.” Sharp (1899) recorded it from Las Mercedes, Guatemala (in Quetzaltenango (Selander and Vaurie 1962)) and Bugaba, Panama (in Chiriquí (Selander and Vaurie 1962)). Kessel (1926) described *L. notabilis* from “Badenfurt, Sta. Catharina.” Badenfurt is in southern Brazil at approximately 26.877°S 49.148°W.

**Specimens examined.** 8, from the following localities: **BELIZE: Orange Walk:** Rio Bravo Conservation Area; **BOLIVIA: Santa Cruz:** Buena Vista; **HONDURAS: Atlantida:** Lancetilla, Jardin Botanica; **Olancho:** Catacomas; **PANAMA:** Barro Colorado Is.; **SURINAME: Brokopondo:** nr. Brownsberg, Ston Eiland Eco Resort. All in FSCA.

**Discussion.** Individuals of this species can vary in color from a dark testaceous, usually variously infuscate, to almost completely piceous. Olfactory sensilla and a partial peri-articular gutter are present beginning on antennomere IV. The median excavation of the frons is present in both sexes.

Kessel (1926) distinguished his species from *L. germaini* by differences in color and number of lines on the elytra. Hetschko (1928) noted that *L. notabilis* Grouvelle 1904 had precedence and proposed *L. prominens* as a replacement name. Since the color is variable in this species (as pointed out by Sharp (1899)) and the number of impressed lines on the elytra historically has been difficult to interpret, I am synonymizing *L. prominens* Hetschko under *L. germaini* Grouvelle.

***Laemophloeus macrognathus* Reitter**

Fig. 11, 40-47

*Laemophloeus macrognathus* Reitter 1876: 48

**Types.** Reitter (1876) wrote that the type was deposited at “Mus. Steinheil,” presumably that of E. W. Steinheil, whose collection passed to Rene Oberthür, so it should be in Paris (Horn and Kahle 1935-1937). In fact, Grouvelle (1881) illustrated and redescribed *L. macrognathus* apparently from Reitter’s specimen which was in Oberthür’s collection at that time. However, Azadeh Taghavian (in litt.) checked the MNHN collection and reported, “I found only the label in the bottom of the box but without any specimens.”

**Diagnosis.** Length, 1.8-2.4 mm. The following combination of character states should distinguish this species: Antennal club composed of more than six antennomeres; antennomere XI elongate (Fig. 11); elytra testaceous with base and suture broadly infusate (Fig. 11); mandibles in large males almost equal in length to head (Fig. 11); head without a median excavation on the frons (Fig. 40); eyes large and coarsely faceted (Fig. 41); male genitalia as in Fig. 43-45, basal plates linear and angulate.

**Distribution.** Central and South America. Described from “Columbia, Medellin.” (Reitter 1876: 48).

**Specimens examined.** 20, from the following localities: **BRAZIL: Rondonia:** 62km SW Ariquemes, Fzda. Rancho Grande; **PANAMA:** Barro Colorado Island; **TRINIDAD:** Simla, Arima-Blanchisseuse Rd.; St. George Co. Simla, Arima Valley; Arima Valley “Simla” Beebe Trop. Res. Center. Deposited in FSCA.

**Discussion.** This is one of the most distinctive species of *Laemophloeus*. The coloration, the elongation of the gena (Fig. 47), which Grouvelle (1881) compared to *Prostomis* Latreille (Prostomidae), and the long mandibles in large males are unmistakable. The epistomal suture is almost completely obsolete in the male (Fig. 40), but obsolete only on the middle third of the female (Fig. 41). This species is uncommonly collected.

**Relationships**

This group of species appears to represent two or more lineages and the evolution of multi-segmented antennal clubs must have happened at least twice within *Laemophloeus*. The species with a club composed of six antennomeres (*L. sexarticulatus*, *L. buenavista*, and *L. concinnus*), which I will call the Sexarticulatus Group, seem to form a related, cohesive unit based not only on antennal structure but also on general shape, structure of the epistome and frons, and possession of an elongate, distally bifurcate flagellum. Within that group, *L. sexarticulatus* is unique in possessing trifurcate antennal sensilla (Fig. 16).

The other two species, *L. germaini* and *L. macrognathus*, both possess antennae with specialized sensilla and at least partial peri-articular gutters beginning at antennomere IV (Fig. 46), thus having by my definition an eight-segmented club. Both also possess rather elongate genal processes (Fig. 47-48) compared to those found in the members of the Sexarticulatus Group (Fig. 49) (a feature Grouvelle (1896) used to separate these two species out in his key to South American *Laemophloeus* (sens. lat.)). However, in body form and, especially, the modified frons, *L. germaini* seems closer to the Sexarticulatus Group than to *L. macrognathus*. The structure of the male genitalia of *L. germaini* (Fig. 37-39) is unique, not only in this group of species but also in the entire genus.

The structure of the male genitalia of *L. macrognathus* is closer to that found in the Sexarticulatus Group, but differs in details such as the linear, angulate basal plates and short, rather thick

flagellum (Fig. 43-44). Grouvelle (1881) suggested that the genal processes were sufficient to erect a new genus for *L. macrognathus*. In *L. macrognathus*, the ligula is very broad compared to any other laemophloeid studied (Fig. 47), possibly correlated with the large and widely spaced mandibles. However, *L. macrognathus* possesses the diagnostic characters of *Laemophloeus* and I think it fits comfortably within that genus.

### Acknowledgments

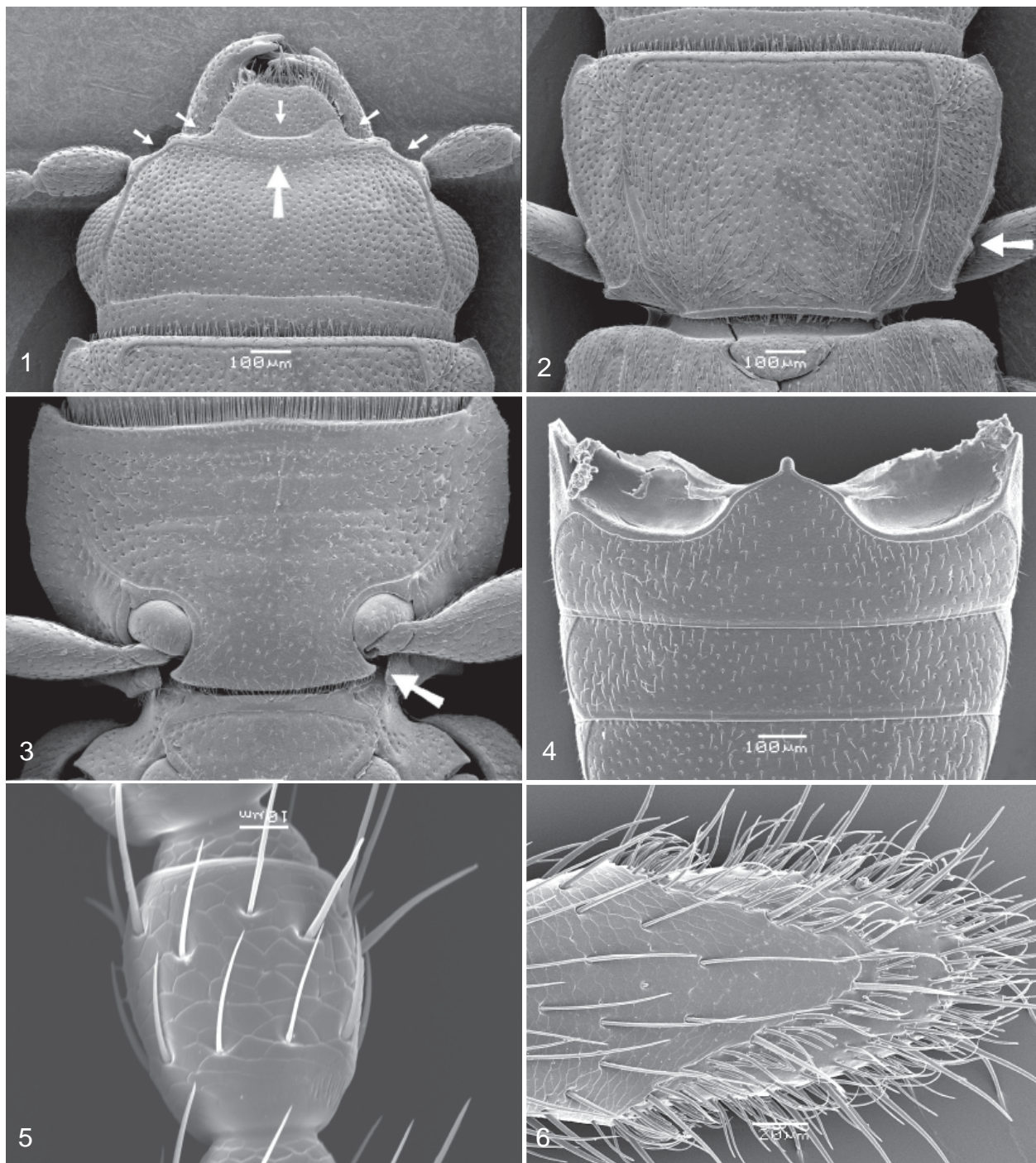
I thank the curators of the various collections for their cooperation, and especially Azadeh Taghavian of the MNHN, who was of great help in determining the status of certain specimens. Julieta Ledezma was very helpful in obtaining permits for collecting in Bolivia. Ian Stocks helped improve the photography. Michael Karner and Andrew Cline provided constructive criticism of earlier drafts. This is Entomology Contribution No. 1235 of the Bureau of Entomology, Nematology, and Plant Pathology, Florida Department of Agriculture and Consumer Services.

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**Figures 1-6.** 1-4) *Laemophloeus biguttatus* (Say). 1) Head, showing epistomal emarginations and frontoclypeal suture. 2) Pronotum, showing sub-basal denticle. 3) Prosternum, showing open procoxal cavities. 4) Acuminate intercoxal process of first visible ventrite. 5) *L. sexarticulatus* Kessel, antennomere 5. 6) *L. mathani* Grouvelle, antennomere XI.





**Figure 7.** *Laemophloeus sexarticulatus* Kessel.



**Figure 8.** *Laemophloeus buenavista* Thomas, n.sp.



**Figure 9.** *Laemophloeus concinnus* Thomas, n.sp.



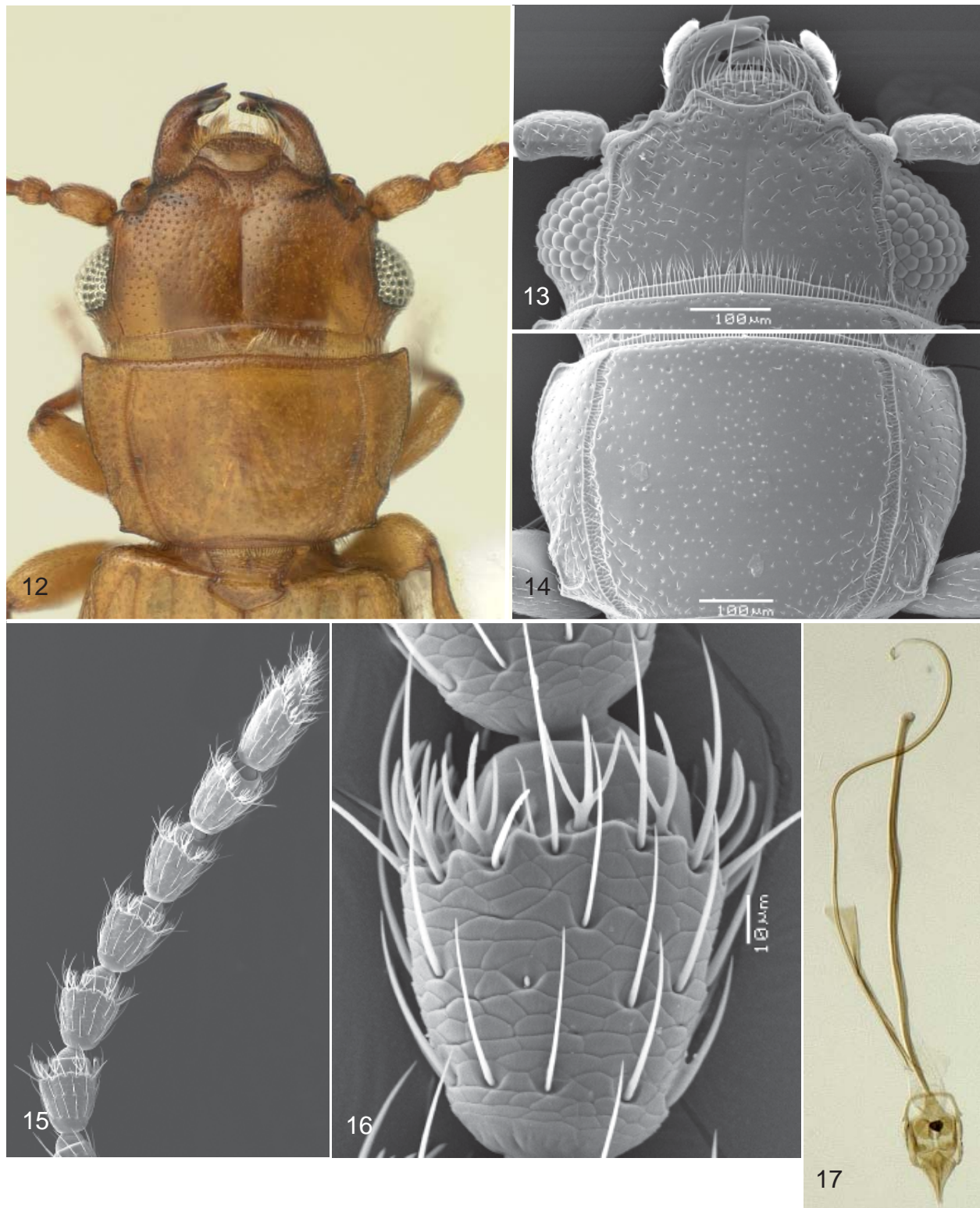
Figure 10. *Laemophloeus germaini* Grouvelle.



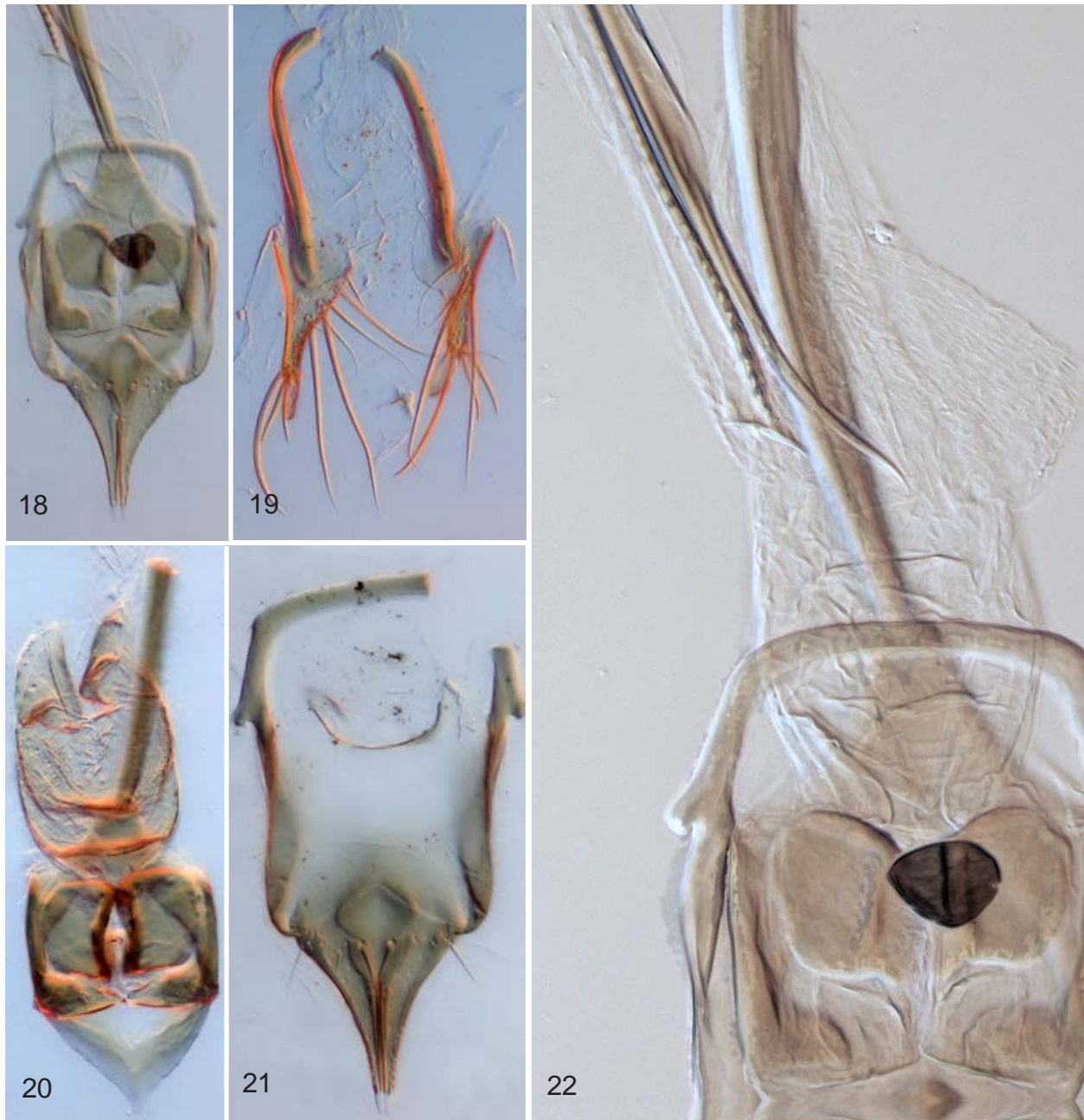


**Figure 11.** *Laemophloeus macrognathus* Reitter.



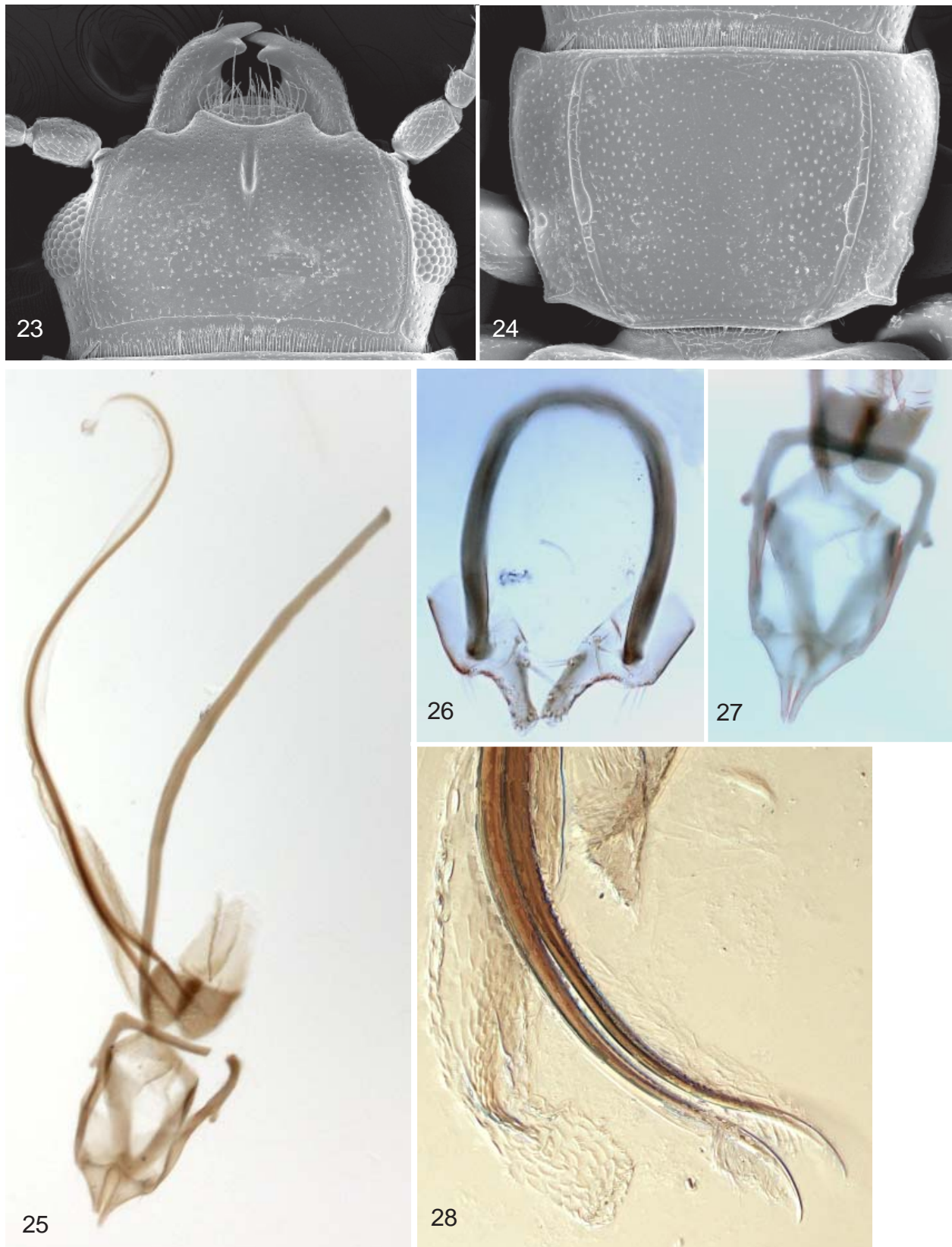


**Figures 12-17.** *Laemophloeus sexarticulatus* Kessel. **12)** Head and pronotum. **13)** Head. **14)** Pronotum. **15)** Antennal club. **16)** Antennomere IX, showing trifurcate sensilla. **17)** Male genitalia.

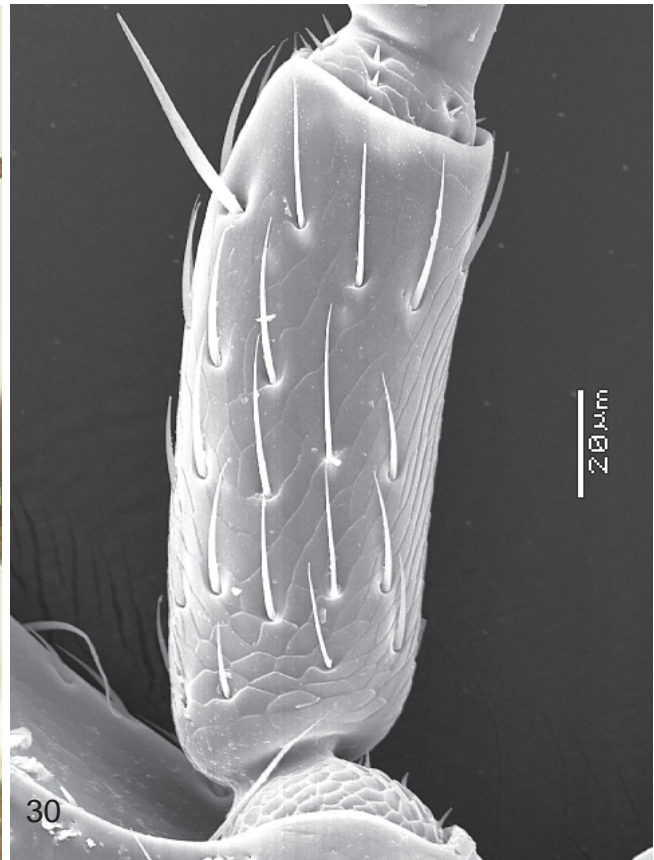


**Figures 18-22.** *Laemophloeus sexarticulatus* Kessel. **18)** Median lobe and tegmen. **19)** Male claspers. **20)** Median lobe. **21)** Tegmen. **22)** Distal end of flagellum showing bifurcate apex and denticles. The dark object near the basal plates is a fungal spore capsule.





**Figures 23-28.** *Laemophloeus buenavista* Thomas, n.sp. 23) Head. 24) Pronotum. 25) Male genitalia. 26) Male claspers. 27) Median lobe and tegmen. 28) Distal end of flagellum showing bifurcate apex and denticles.



**Figures 29-30.** 29) *Laemophloeus buenavista* Thomas, n.sp., head and pronotum. 30) *Rhinophloeus* sp., scape.



**Figures 31-33.** *Laemophloeus concinnus* Thomas, n.sp. **31)** Head and pronotum. **32)** Male genitalia. **33)** Flagellum.



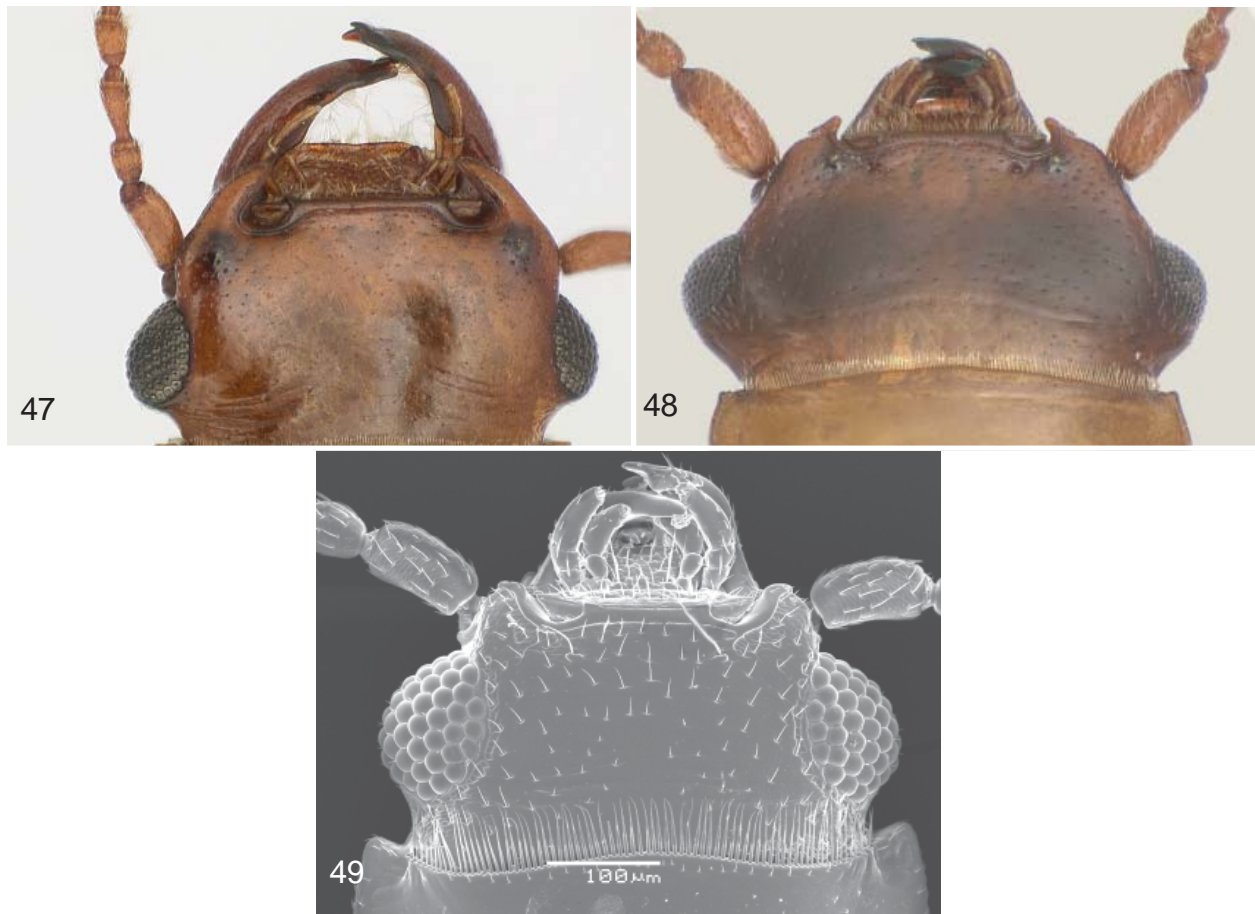


**Figures 34-39.** *Laemophloeus germaini* Grouvelle. **34)** Head and pronotum. **35)** Antennomeres IV-VI. **36)** Antennomere V. **37)** Male genitalia. **38)** Median lobe and tegmen showing armature of internal sac. **39)** Male claspers.



**Figures 40-46.** *Laemophloeus macrognathus* Reitter. 40) Head and pronotum, male. 41) Head, female. 42) Pronotum, female. 43) Male genitalia. 44) Median lobe and tegmen. 45) Male claspers. 46) Antennomere IV.





**Figures 47-49.** *Laemophloeus* spp., heads, ventral view. 47) *L. macrognathus*. 48) *L. germaini*. 49) *L. sexarticulatus*.

