

***Neolyrium* gen. n., first South American genus of net-winged beetles with 10-segmented antennae (Coleoptera: Lycidae)**

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Abstract

New genus *Neolyrium* **gen. n.** with 10-segmented antennae is described from South America, its two species, *N. duidae* **sp. n.** and *N. carltoni* **sp. n.**, discovered in Amazonian Venezuela and Ecuador. In spite of the apparent affinities with the tribe Lyropaeini that include all other taxa with 10-segmented antennae, *Neolyrium* is classified in Leptolycini. The potential relationships of the new genus are discussed.

Key words: Coleoptera, Lycidae, Leptolycini, new genus, new species, South America

Introduction

The tribe Lyropaeini has so far been the only higher taxon of Lycidae to include forms with a 10-segmented antenna. Such antennae are characteristic of *Lampyrolycus* Burgeon, 1937, *Lybnopeus* Kazantsev, 1998, *Lyroneces* Kazantsev, 1998, *Lyropaeus* Waterhouse, 1878 and *Mimolibnetis* Pic, 1936 (the indication of a 10-segmented antenna for *Dexoris* Waterhouse by Kazantsev (2005) was due to a technical error). These genera are known only from the Oriental (*Lybnopeus*, *Lyroneces*, *Lyropaeus*—Kazantsev, 1998) and Ethiopian (*Lampyrolycus* and *Mimolibnetis*—Kazantsev, 1999) zoogeographic regions. In this respect, the discovery of a new genus with 10-segmented antennae from South America is of particular interest. However, upon examination and despite its apparent affinities with the Lyropaeini, *Neolyrium* gen. n. is placed in the tribe Leptolycini, which contains entirely Neotropical species.

Material and methods

Specimens used as material for this study were dissected after being softened for several hours in water, with the male genitalia extracted and affixed with water-soluble glue on

cardboard plates or placed in vials with glycerin. To study internal morphology some parts were cleared with 10% KOH.

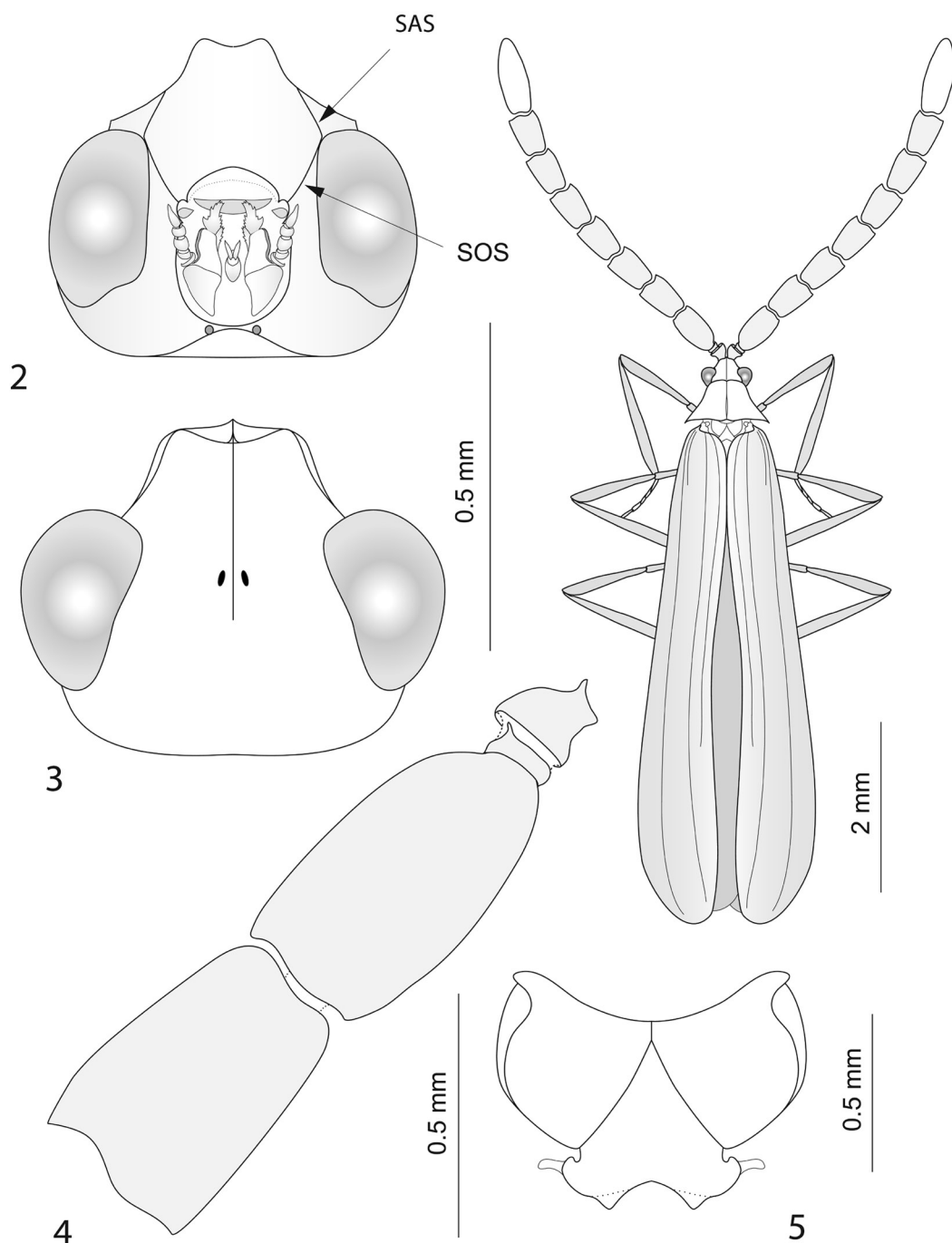
The following abbreviations are used in the paper: AMNH—American Museum of Natural History, New York; ICM—Insect Centre, Moscow; LSAM—Louisiana State Arthropod Museum, Baton Rouge.

Neolyrium gen. n.

Type species: *Neolyrium duidae* sp. n.

Description. Elongate (Fig. 1). Head transverse, not narrowed behind eyes (Figs 2–3). Fastigium acute, ca. 45 degrees. Tentorium represented by posterior pits and a pair of short slender ventral arms (Fig. 14); dorsal tentorial maculae present (Fig. 3). Labrum transverse, distally sclerotized, lying inside epistoma (Fig. 2). Eyes moderately large, spherical. Mandibles vestigial, hardly noticeable. Maxillary palps slender, 4-segmented, with ultimate palpomere pointed distally (Fig. 2). Prementum undivided, labial palps minute, 1-segmented, pointed distally, mentum absent (Fig. 2). Gula absent, genal sclerites connected by narrow process, also bearing posterior tentorial pits (Fig. 2). Antennal prominence conspicuous, antennal sockets separated by minute lamina (Fig. 3). Antenna 10-segmented, relatively long, with antennomeres 3–10 conspicuously flattened, but almost parallel-sided; antennomere 3 considerably longer and wider than antennomere 2 (Figs 1, 4); antennal pubescence complemented with small roundish scales on antennomeres 3–10.

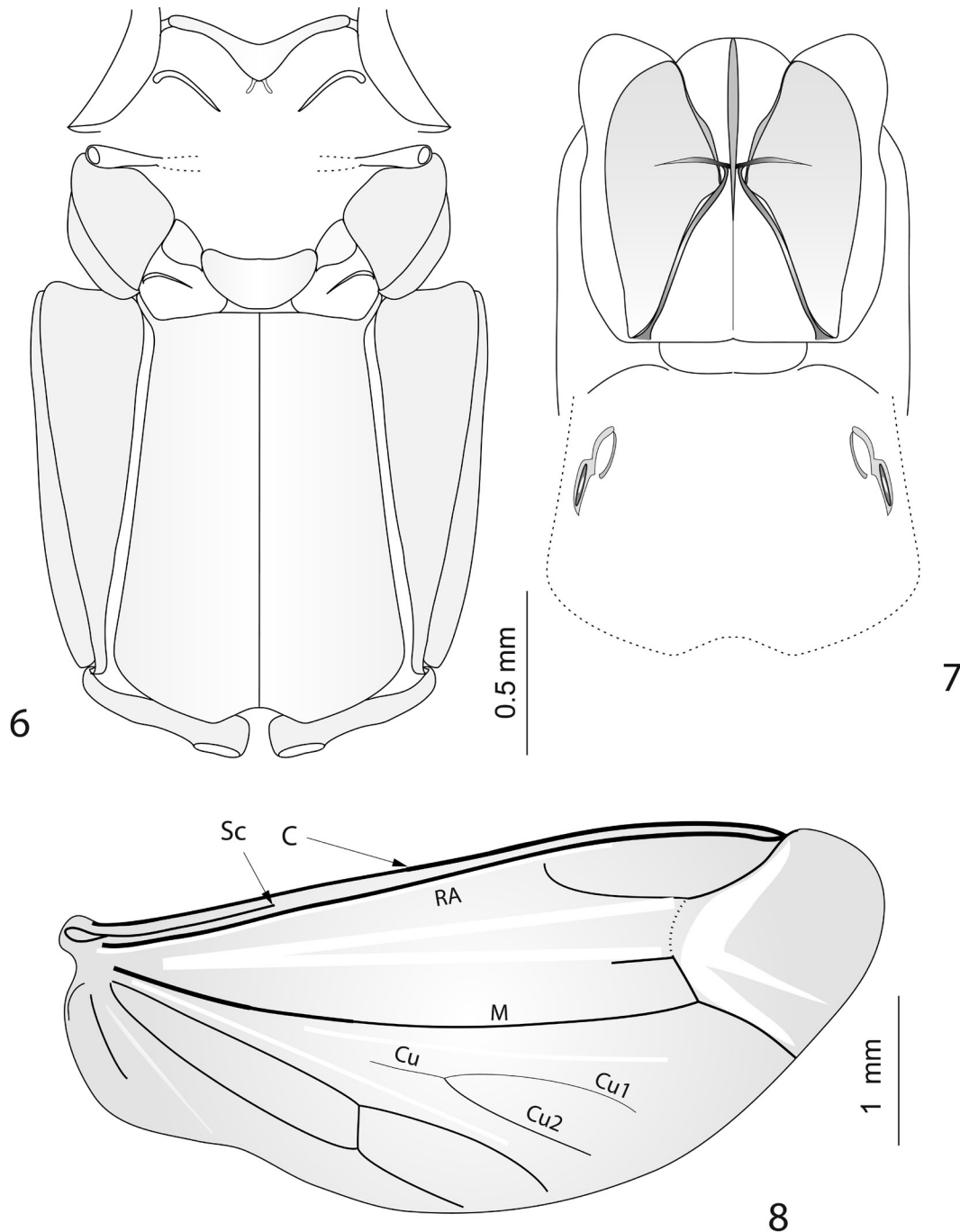
Pronotum transverse, ca. 10 times shorter than elytra, with fine median carina in anterior half and inconspicuous narrow median cell in posterior half; posterior angles strongly produced laterally (Fig. 1). Prosternum short, V-shaped, connected to hypomeron by separate sternopleural sclerites (Fig. 6). Thoracic spiracles well sclerotized and conspicuously protruding laterally beyond coxal limits (Fig. 6). Mesoventrite short and narrow, connected to mesepisternum by relatively large sternopleural sclerites; mesepimeron conspicuously narrower than mesepisternum (Fig. 6). Mesonotum with scutellum not quite attaining to anterior margin, each half of mesoscutum divided by a transverse intrascutal suture; scutellum without postnotal plate (Figs 5, 15). Elytra long, slightly widening posteriorly, with two fully developed primary costae (2 and 4); costa 1 may be present in proximal half and costa 3 noticeable in humeral area (Fig. 1); interstices finely areolate; short elytral pubescence uniform. Metanotum elongate, with convex scuto-scutellar ridge; allocristae inconspicuous, starting slightly anterior of the middle of scutum; scutellum with median suture (Fig. 7). Metaventrite with widely rounded posterior angles; discrimen (metasternal suture) complete, attaining to mesoventrite (Fig. 6). Metendosternite small, without transverse sutures (Fig. 16). Metathoracic wing with C joining RA at apical hinge; Sc vein separate and short; anal cell long; wedge cell absent; cu-a brace absent; Cu veins connected neither to M, nor to A veins (Fig. 8).



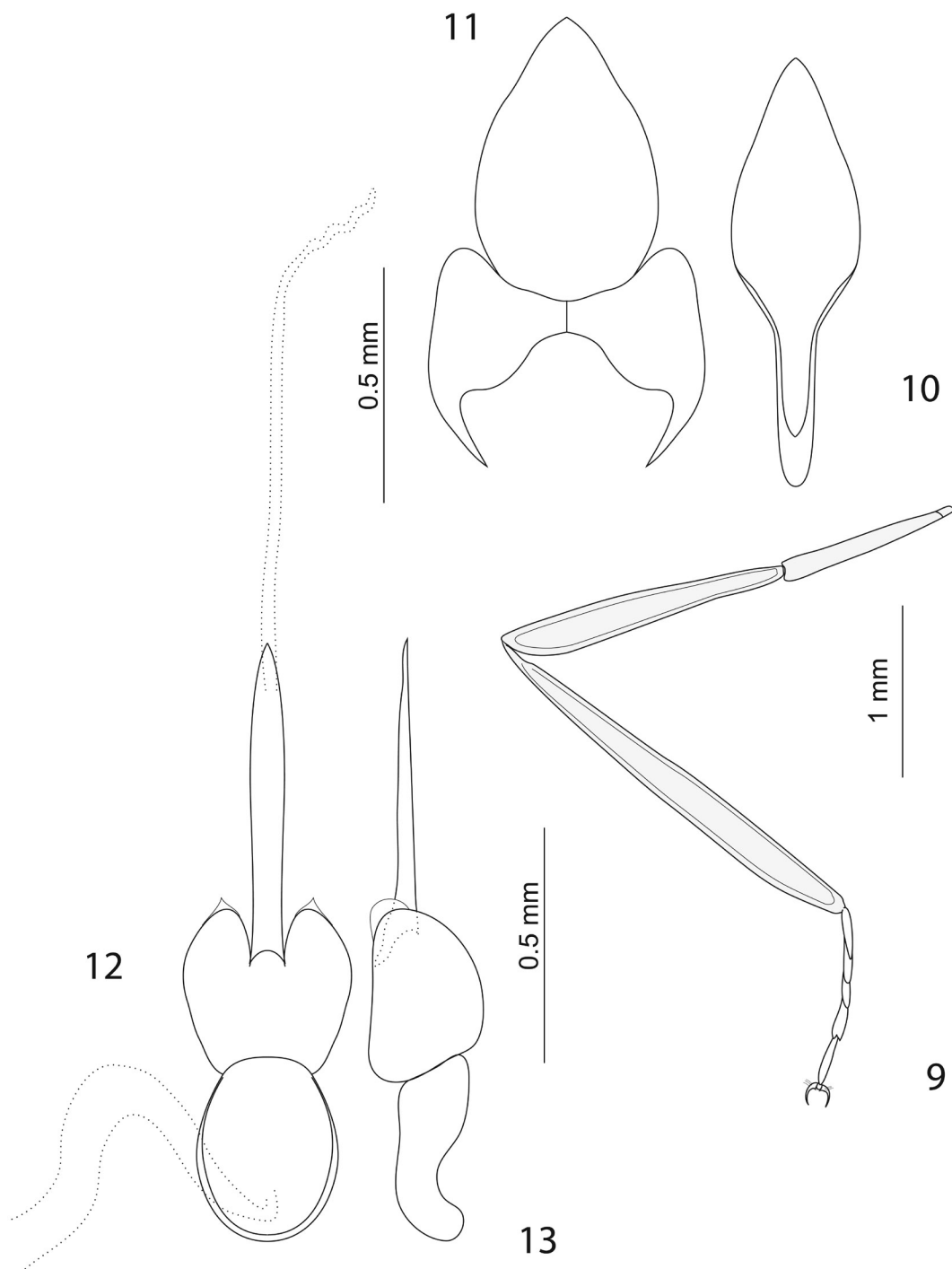
FIGURES 1–5. Details of *Neolyrium duidae* sp. n. 1—habitus; 2—head, ventrally; 3—same, dorsally; 4—antennomeres 1–4, ventrally; 5—mesoscutum, dorsally.

Protochantins slightly larger than mesotrochantins (Fig. 6). Pro- and mesocoxae elongate; metacoxae distinctly separated (Fig. 6). Legs long and narrow; trochanters elongate, cylindrical, connected to femora distally; femurs and tibiae flattened and narrow,

tibial spurs absent; tarsomeres 1–4 narrow, without plantar pads; all claws simple (Fig. 9). Abdominal spiracles located dorsally on lateral edge of tergite. Paraproct divided medially (Fig. 11); spiculum gastrale short (Fig. 10).



FIGURES 6–8. Details of *Neolyrium duidaense* sp. n. 6—thorax, ventrally; 7—metathorax, dorsally; 8—hind wing.



FIGURES 9–13. Details of *Neolyrium duidaeense* sp. n. 9—middle leg; 10—sternite 9; 11—tergites 9 and 10; 12—aedeagus, ventrally; 13—same, laterally.

Aedeagus symmetric, with short robust parameres and elongate straight median lobe; phallobase without median suture (Figs 12–13).

Females unknown, probably paedomorphic and larviform.

Diagnosis. *Neolyrium* differs from other lycids with 10-segmented antennae (such as lyropaeine *Lyroneces*) by the tergal location of abdominal spiracles. Additionally, it is distinguishable by the presence of ventral tentorial arms (Fig. 14) and dorsal tentorial maculae (Fig. 3), absence of a mentum (Fig. 2), division of each half of mesoscutum by a transverse intrascutal suture and a vestigial postnotal plate of mesoscutellum (Figs 5, 15), a narrow mesepimeron, long mesothoracic spiracles (Fig. 6), a long anal cell of the hind wing venation (Fig. 8), absence of tarsomeral plantar pads (Fig. 9) and structure of the aedeagus (Figs 12–13, 17–18).

Etymology. The name is derived from the combination of "Neotropical" and "Lyropaeus" alluding to the fact that the new genus is the first South American lycid with 10-segmented antennae. Gender neuter.

***Neolyrium duidae* sp. n.**

(Figs. 1–13)

Description. Male. Dark brown. Ultimate antennomere, pro- and mesothorax, pro- and mesocoxae and pro- and mesotrochanters yellow.

Head with deep paired impression behind antennal prominence. Eyes moderately large (interocular distance ca. 2 times as long as the radius Fig. 3). Antenna almost attaining to elytral middle (Fig. 1); antennomere 3 16X longer than antennomere 2 and 1.1X shorter than antennomere 4 (Fig. 4); antennal hairy pubescence short and decumbent, scaliform pubescence relatively dense.

Pronotum transverse (1.8 times wider than long), trapezoidal; both anterior and posterior margins conspicuously emarginated medially; hind angles long and acute (Fig. 1). Scutellum with slightly emarginated distally postnotal plate (Fig. 5).

Elytra long, 4.4X longer than wide at humeri and 10.3X longer than pronotum, slightly widening posteriorly, with equally developed primary costae 2 and 4, each reaching elytral apices, costa 1 weak in proximal and obsolete in distal halves (Fig. 1).

Spiculum gastrale about as long as distal portion of sternite 9 (Fig. 10). Aedeagus with straight slender median lobe, short roundish parameres and elongate phallobase (Figs 12–13).

Length: 6.8 mm. Width (humerally): 1.4 mm.

Female. Unknown.

Type material. Holotype male: Venezuela, Mt. Duida, XI.1929 (AMNH).

Diagnosis. *Neolyrium duidae* sp. n. is easily differentiated from *N. carltoni* sp. n., the only other known species of the genus, by the greater size, different coloration, short parameres of the aedeagus (Figs 12–13).

Etymology. The name is derived from Cerro Duida (Amazon, Venezuela), where the unique specimen of the new species was collected.

Biology. No biological data on *Neolyrium duidaeense* is available.

***Neolyrium carltoni* sp. n.**

(Figs. 14–18)

Description. Male. Dark brown. Antennomeres 9 and 10, coxae, trochanters and femurs, ultimate sternite and tergites 9 and 10 yellow.

Head with inconspicuous medial impression behind antennal prominence. Eyes moderately large (interocular distance ca. 2 times as long as the radius). Antenna attaining to elytral middle; antennomere 3 6X longer than antennomere 2 and 1.3X longer than antennomere 4; antennal hairy pubescence short and decumbent, scaliform pubescence relatively dense.

Pronotum transverse (1.85 times wider than long), trapezoidal; posterior margin conspicuously bisinuate; anterior angles prominent, posterior angles long and acute. Scutellum with almost straight distally postnotal plate (Fig. 15).

Elytra long, 3.7X longer than wide at humeri and 8.8X longer than pronotum, dehiscent, slightly narrowing posteriorly, bicostate, with equally developed primary costae (2 and 4) reaching elytral apices.

Spiculum gastrale distinctly shorter than distal portion of sternite 9. Aedeagus with long outwardly hooked parameres and relatively large phallobase (Figs 17–18).

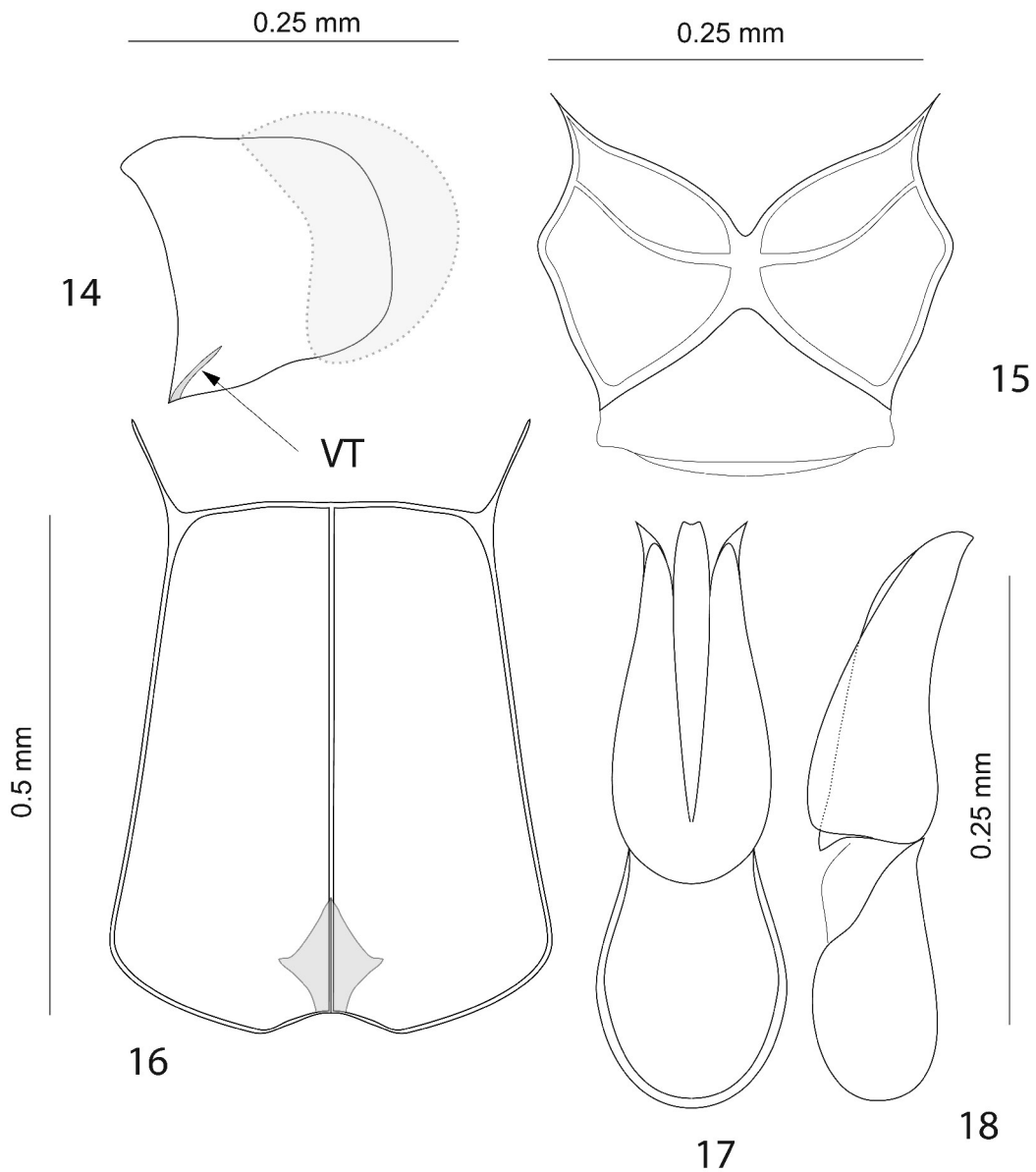
Length: 3.2–3.4 mm. Width (humeral): 0.6–0.7 mm.

Female. Unknown.

Type material. Holotype male: Ecuador, Napo, Yasuni Res. Stn. on mid Rio Tiputini, 0°40.5'S 76°24'W, FIT #1, 23–30.VI.1999, A.K. Tishechkin, C.E. Carlton (LSAM); paratypes, 11 males: same label; Ecuador, Napo, Yasuni Res. Stn. on mid Rio Tiputini, 0°40.5'S 76°24'W, FIT #1, 17–23.VI.1999, A.K. Tishechkin & C.E. Carlton; Ecuador, Napo, Yasuni Res. Stn. on mid Rio Tiputini, 0°40.5'S 76°24'W, FIT #2, 20–29.VI.1999, C.E. Carlton & V.L. Moseley; Ecuador, Napo, Yasuni Res. Stn. on mid Rio Tiputini, 0°40.5'S 76°24'W, FIT #M1, 28.V–5.VII.1999, C.E. Carlton & A.K. Tishechkin; Ecuador, Napo, Yasuni Res. Stn. on mid Rio Tiputini, 0°40.5'S 76°24'W, FIT #3, 28.VI–5.VII.1999, A.K. Tishechkin; Ecuador, Napo, Yasuni Res. Stn. on mid Rio Tiputini, 0°40.5'S 76°24'W, FIT #6, 4–17.VII.1999, A.K. Tishechkin, C.E. Carlton; Ecuador, Napo, Yasuni Res. Stn. on mid Rio Tiputini, 0°40.5'S 76°24'W, FIT #3, 18–23.VII.1999, A.K. Tishechkin; Ecuador, Napo, Yasuni Res. Stn. on mid Rio Tiputini, FIT #2, 25.VII–3.VIII.1999, A.K. Tishechkin; Ecuador, Napo, Yasuni National Park, Yasuni Biological Station, 0°40'32''S 76°23'50''W, FIT #1, 25.VII–4.VIII.1999, A.K. Tishechkin; Ecuador, Napo, Yasuni Res. Stn. on mid Rio Tiputini, 0°40.5'S 76°24'W, FIT #6, 26.VII–4.VIII.1999, A.K. Tishechkin (ICM and LSAM).

Diagnosis. *Neolyrium carltoni* sp. n. differs from *N. duidense* sp. n. by the smaller size, different coloration and long parameres of the aedeagus (Figs 17–18).

Etymology. The species is named after Dr. C.E. Carlton (Baton Rouge), one of the collectors of the type series.



FIGURES 14–18. Details of *Neolyrium carltoni* sp. n. 14—head, laterally; 15—mesonotum, ventrally; 16—metaventricle and metendosternite, ventrally; 17—aeagus, ventrally; 18—same, laterally. VT—ventral arms of tentorium.

Biology. All known specimens of *Neolyrium carltoni* sp. n. are males collected in June through August by flight intercept traps in undisturbed Western Amazon *terra firme* forest on the middle Rio Tiputini (tributary of the Rio Napo), at ca. 250 m elevation. This rain forest is growing on rough terrain cut by numerous creeks into more or less narrow ridges with steep slopes and deep (up to 50 m) ravines (Carlton et al., 2004).

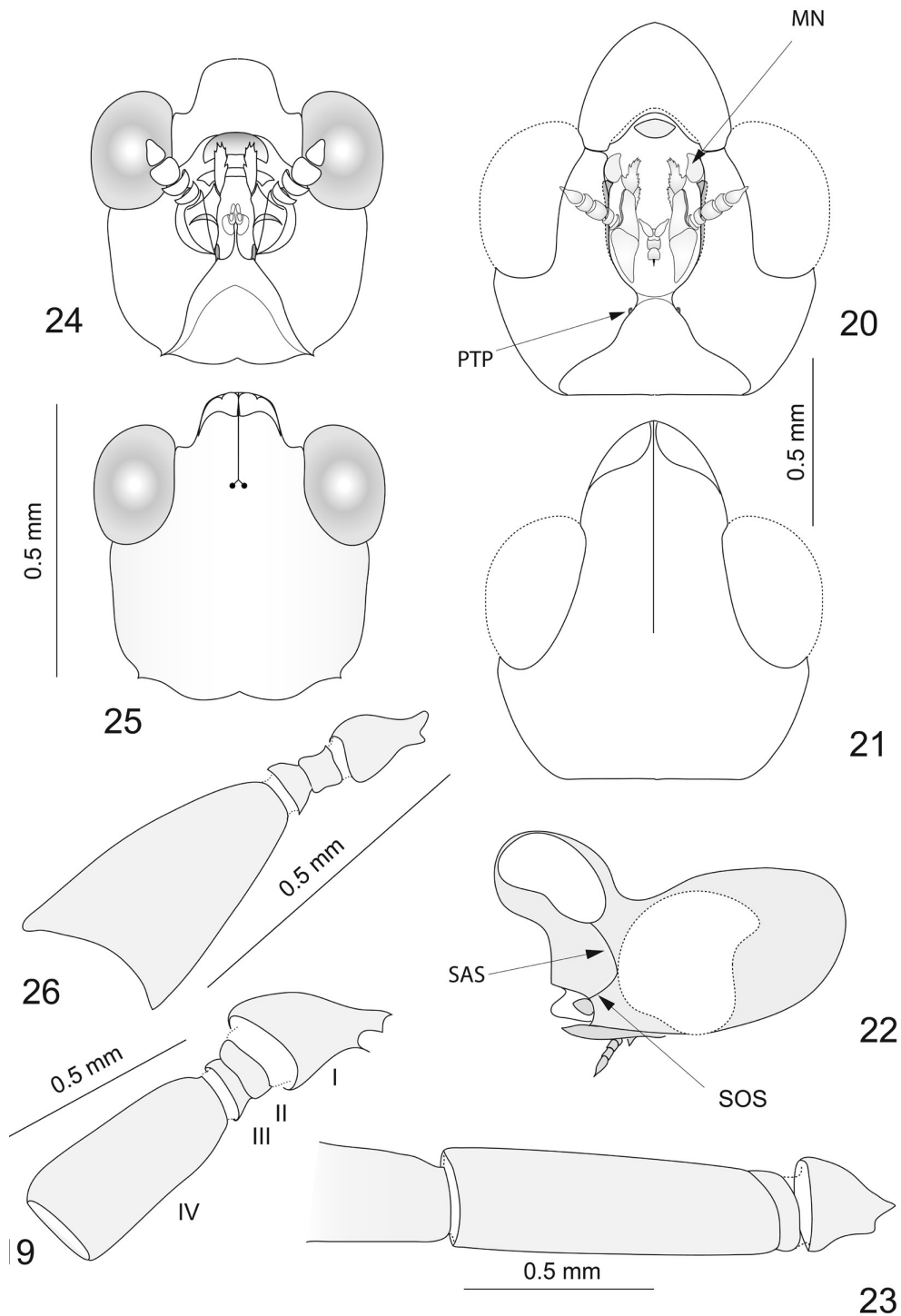
Discussion

The number of antennomeres is sometimes difficult to assess in Lycidae, as the pedicel (antennomere 2) and the first segment of flagellum (antennomere 3) may be extremely short, appearing to represent one segment (as in *Taphes*—Waterhouse Fig. 19). However, the actual condition of these antennomeres may be easily defined in relaxed specimens, where only the pedicel and the first segment of flagellum are rigidly attached to each other, while all other antennomeres are clearly divided by membrane (Figs 4, 19, 23, 26).

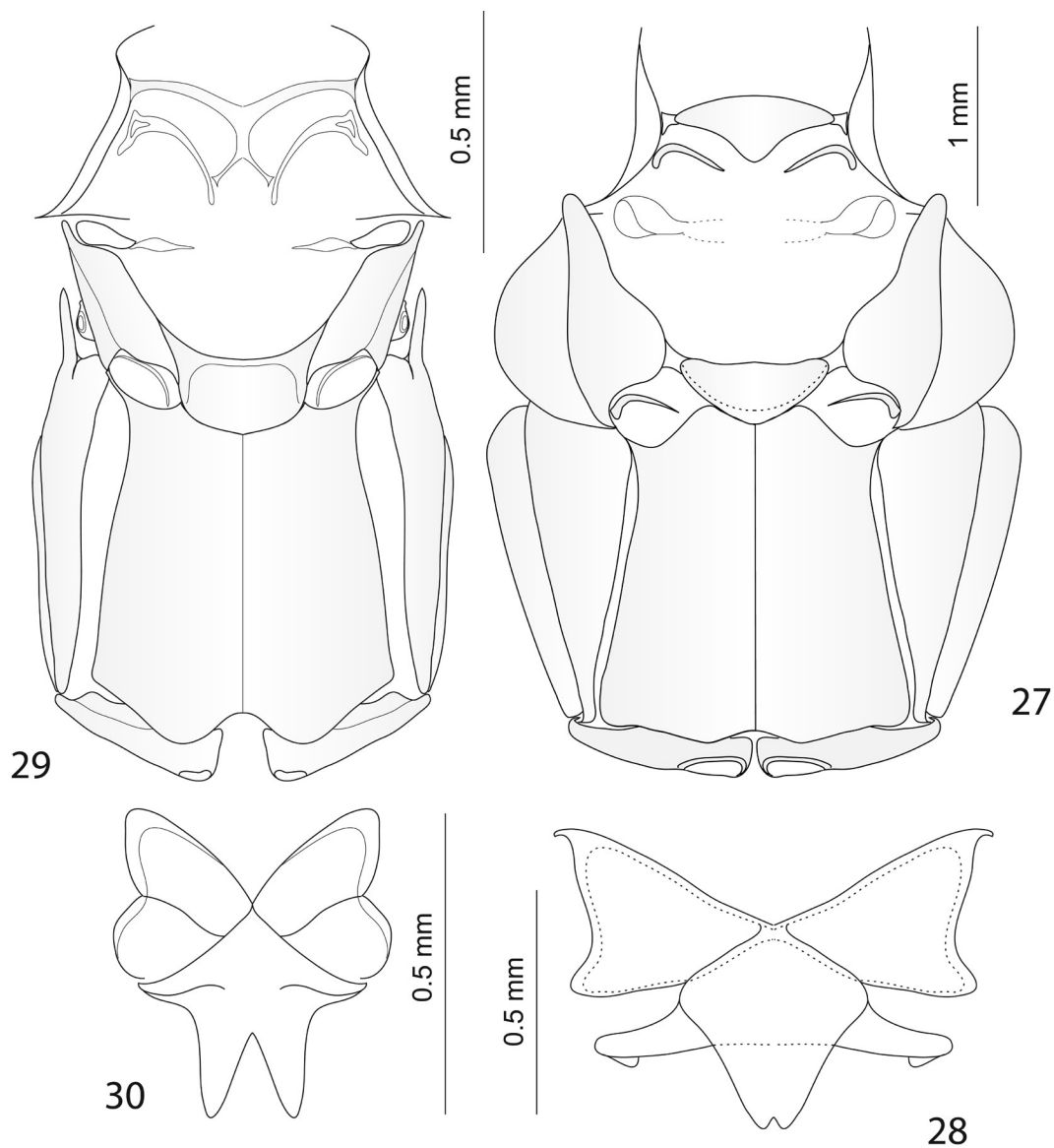
The 10-segmented antenna and conspicuous subocular suture seem to be the only features characteristic of both *Neolyrium* gen. n. and *Lyroneces* (Lyropaeini) that are not shared by leptolycini (Figs 2, 22). The greater part of other characters of *Neolyrium*, i.e. abdominal spiracles located on lateral edge of tergites, present ventral tentorial arms and dorsal tentorial maculae (Figs 3, 14), V-shaped prosternum (Fig. 6), transverse intrascutal sutures dividing each half of the mesoscutum (Fig. 15), narrow mesepimeron and long mesothoracic spiracles (Fig. 6), absent transverse sutures of metendosternite (Fig. 16), absent tibial spurs, testify to its closer relationships with Leptolycini (Figs 27, 29, 35, 36, 41). In the hind wing of *Neolyrium* the Cu veins are connected neither to M, nor to A veins (Fig. 8), as in the examined Lyropaeini and Leptolycini (Figs 32, 34). At the same time, *Neolyrium* seems to be quite different both from Lyropaeini and Leptolycini due to the labial structure (Figs 2, 20, 24), vestigial postnotal plate of scutellum (Figs 5, 28, 30), the metanotal structure (Figs 7, 31, 33), the long anal cell of the hind wing venation (Figs 8, 32, 43) and the genital structures (Figs 10–13, 37–40, 42–45). Nevertheless, *Neolyrium* is tentatively classified in Leptolycini pending a detailed redescription of *Leptolycus* Leng and Mutchler, 1922, the type genus of Leptolycini.

Acknowledgments

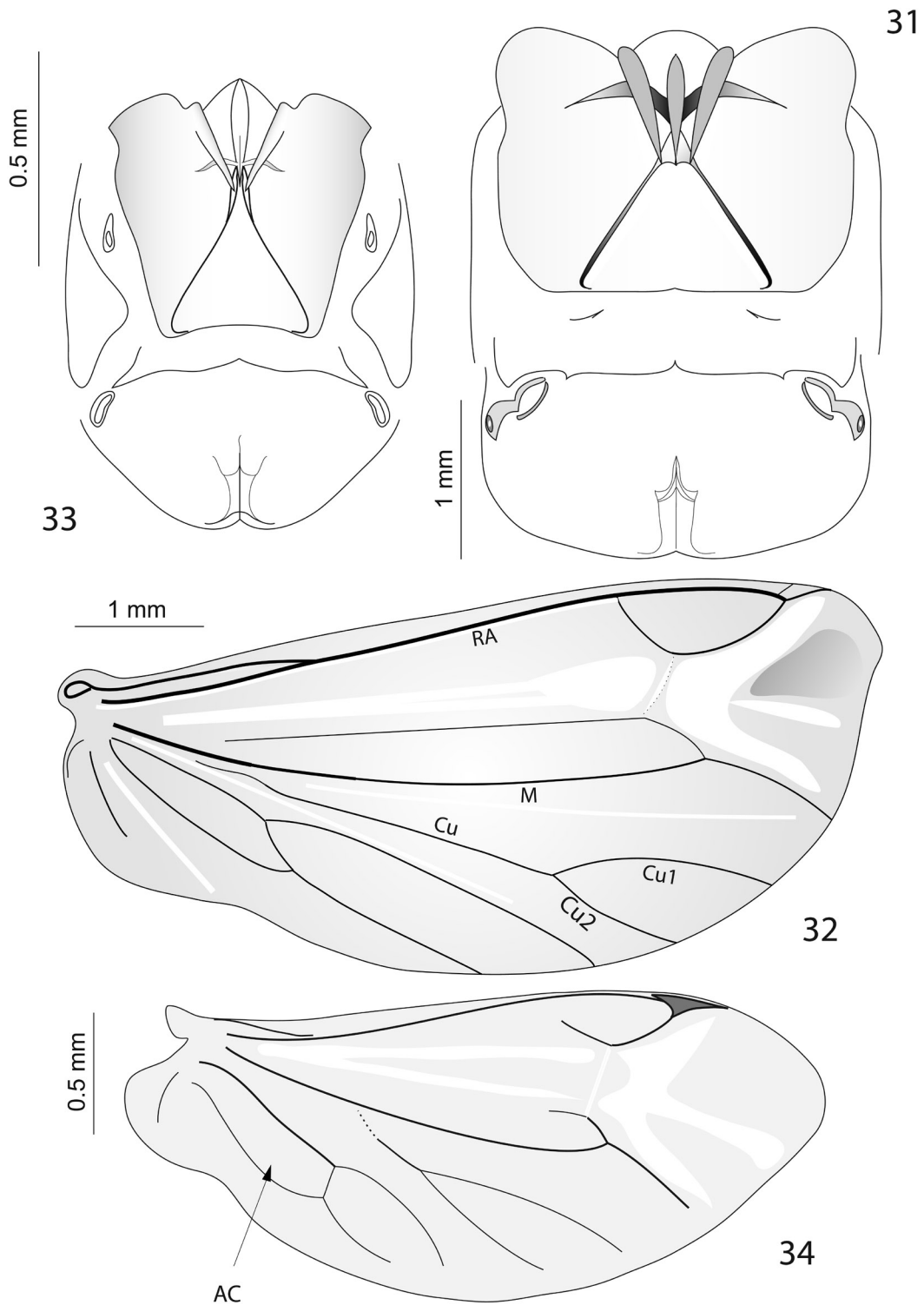
It is my pleasant duty to thank Dr. L.H. Herman (American Museum of Natural History) and Dr. C.E. Carlton (Louisiana State Arthropod Museum) for the opportunity to study material in their care.



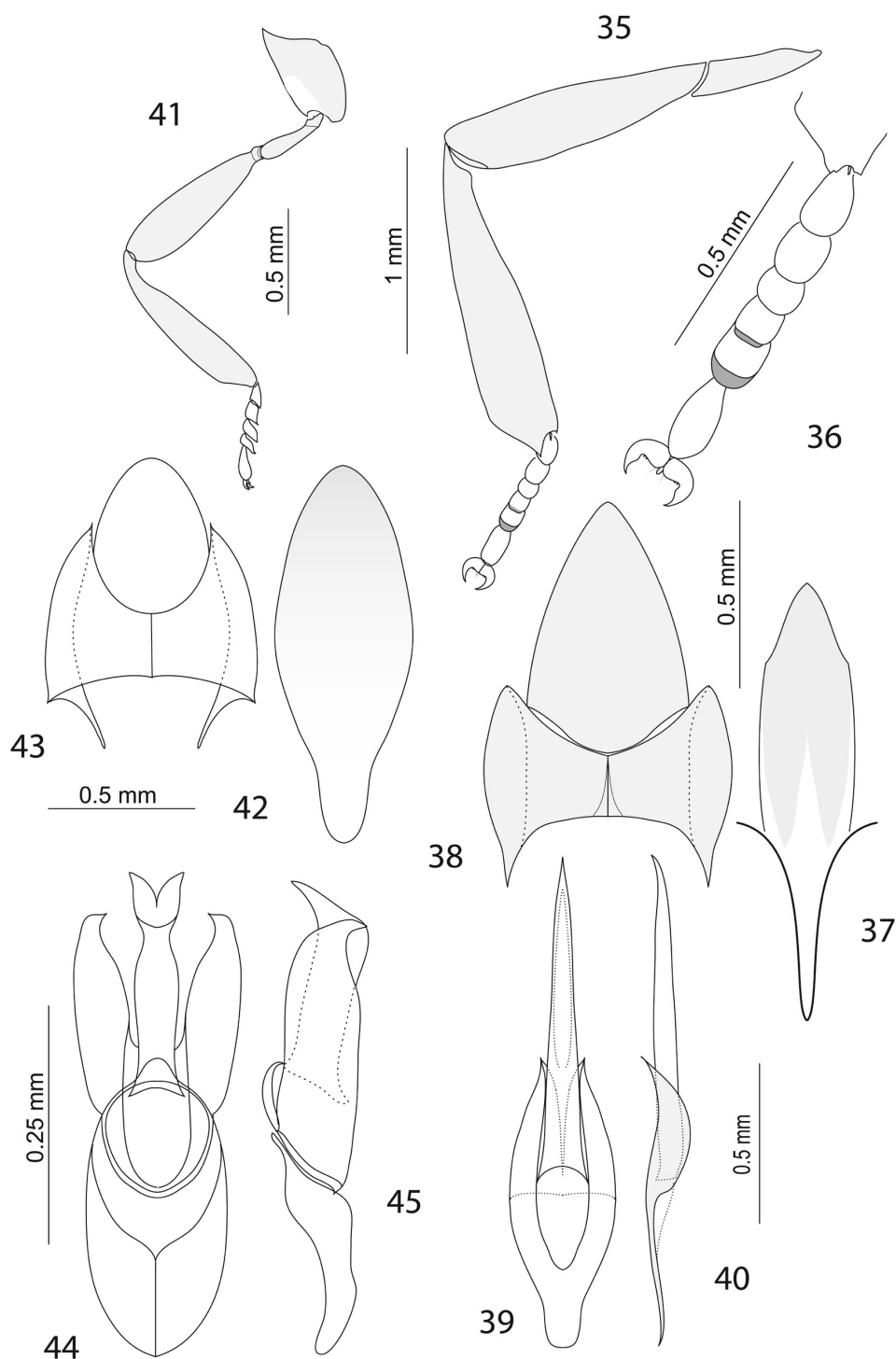
FIGURES 19–26. Details of Lycidae. 19—*Taphes brevicollis* Waterhouse, antennomeres 1–4, ventrally; 20—*Lyroneces optabilis* (Kleine), head, ventrally; 21—same, dorsally; 22—same, laterally; 23—same, antennomeres 1–3, ventrally; 24—*Ceratoprion* sp., head, ventrally; 25—same, dorsally; laterally; 26—same, antennomeres 1–4, ventrally. MN—mandible; PTP—posterior tentorial pits; SAS—subantennal suture; SOS—subocular suture.



FIGURES 27–30. Details of Lyropaeini (*Lyroneces optabilis*) and Leptolycini (*Ceratoprion* sp.). 27—*Lyroneces optabilis* (Kleine), thorax, ventrally; 28—same, mesonotum, dorsally; 29—*Ceratoprion* sp., thorax, ventrally; 30—same, mesonotum, ventrally.



FIGURES 31–34. Details of Lyropaeini (*Lyroneces optabilis*) and Leptolycini (*Ceratoprion* sp.). 31—*Lyroneces optabilis* (Kleine), metathorax, dorsally; 32—same, hind wing; 33—*Ceratoprion* sp., metathorax, dorsally; 34—same, hind wing. AC—anal cell.



FIGURES 35–45. Details of Lyropaeini (*Lyronectes optabilis*) and Leptolycini (*Ceratoprion* sp.). 35—*Lyronectes optabilis* (Kleine), middle leg; 36—same, mesotarsus; 37—same, sternite 9; 38—same, tergites 9 and 10; 39—same, aedeagus, ventrally; 40—same, laterally; 41—*Ceratoprion* sp., middle leg; 42—same, sternite 9; 43—same, tergites 9 and 10; 44—same, aedeagus, ventrally; 45—same, laterally.

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